# Raised Structures: Reclaiming the Interstitial as a Means of Acclimatization

We shape our buildings and afterwards they shape us.

— Winston Churchill

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On its website the Federal Emergency Management Agency states, "The 2012 edition of the I-Codes contains provisions that are consistent with the minimum flood-resistant design and construction requirements of the NFIP for buildings and structures." Taking a look at the provisions in the 2012 International Residential Code it becomes clear that a key strategy for "minimum" flood resistance is the elevating of structures in flood hazard areas. In Coastal areas those flood hazard areas are defined as A or V zones (depending on the height of projected wave action) and required to be elevated to or above the design flood elevation defined by the municipality or in some cases the building official.[1] The design flood elevation is determined in relation to the peak elevation of a 100-year flood event, referred to as the base flood and it can easily require coastal structures to be as much as an entire story above grade. The code excludes this space from its definition of "lowest floor" and restricts its functions to "vehicle parking, building access or limited storage".[2] This constructed space – encompassing the entire footprint of the structure is relegated to interstitial duties and made virtually nonexistent by regulation but it is a construction of undeniable presence, contributing to the tectonic character of the entire structure and establishing the structures primary relationship with the ground and the surrounding site. If such a space is regarded as merely a - a space of pending necessity, to be inhabited or fulfilled in the event of rising water only, then it cannot offer the structure or the individuals that inhabit it anything beyond "storage" for the present moment. It becomes a mute "adaptation", to borrow a biological term. It is a permanent appendage developed for a specific purpose. But if we can "reclaim" that space, reinvest it with immediate value then it might offer possibilities for the structures and the individual acclimatization providing long term resistance by presenting an space that can respond to the site and environment as it changes. This paper will look at the possibilities for the ground floor, first by looking at how this space was deployed and understood historically

in flood prone areas and then by looking at a series of contemporary responses in Coastal South Carolina that present an evolving redefinition of ground floor spaces and their relationship to the structure above and the site itself. A reconsideration of this interstitial space and how it might contribute to the resilience of the structure and its inhabitants.

### ADAPTATION OR ACCLIMATIZATION

To apply biological terms to this architectural discussion, working definitions of the terms should first be understood. Adaptation is transformation that occurs gradually over a long period of time in response to changing needs of a given organism. The new characteristic is permanent and only given to change as the result of further adaptation over time. In basic terms the raised structure might be seen as a new adaptation to residences in flood prone areas. But this then understands the function of the raised story only terms of the flood event and not in other times. Acclimatization is an organism's ability to respond to immediate changes in their environment. These modifications are temporary and adjust to the stabilization of their situation. This term allows for the spaces to function in both conditions of high water and conditions without. This seems a more appropriate term if the aim is to reintegrate the ground story morphologically and systemically into the upper stories of the residence.

### CHARLESTON ARCHITECTURE – A PERSISTENT MODEL

Most of the earliest structures in Charleston that still exist today date from the mid to late 1700's. This period saw the development of the distinctive Charleston Single house – a "multi-story dwelling one room wide and three across" with the narrow side typically facing the street".[3] While this particular typology may not have originated as a specific response to climatic conditions it was certainly a successful mediation of the hot humid conditions in Charleston. Most consisted of a masonry ground floor, with two floors of wood or masonry extending above what was known as a water table – the joint between the ground story and what was considered the "first floor" of the residence. The solid masonry walls of the ground floor were as much as 30" thick and typically involved arched openings to maintain stability of what were really "foundation" walls. The plan would follow the layout of the more formal spaces above, but with the thickness of the walls and the lower ceiling height would usually present a more intimate scale. These residences were morphologically acclimatized in that the thick walls could withstand the hydraulic forces of rising water and the masonry would easily dry out once the water had subsided. The resultant light quality, material presence, tactility, and manipulation of daylight contributed to spaces that aesthetically encouraged habitation as well as equipped individuals to negotiate the surrounding climate as it changed seasonally. From holding heat in the thermal mass in the winter months to providing insulation from the solar heat in the summer, these spaces maintained comfort without mechanical means and allowed for inhabitants to adjust and acclimate to varied changes in the surrounding environment. These spaces were understood to flood occasionally but they were also incorporated into the functions of the residence and since the assignment of specific room functions did not occur until the 19th century they enabled a variety of uses.[4] So historically these spaces were morphologically acclimatized and systemically as well. Their assigned functions contributed to the activities of the residence but were easily relocated or done without in periods of inundation. And the consequences of water infiltration were met without

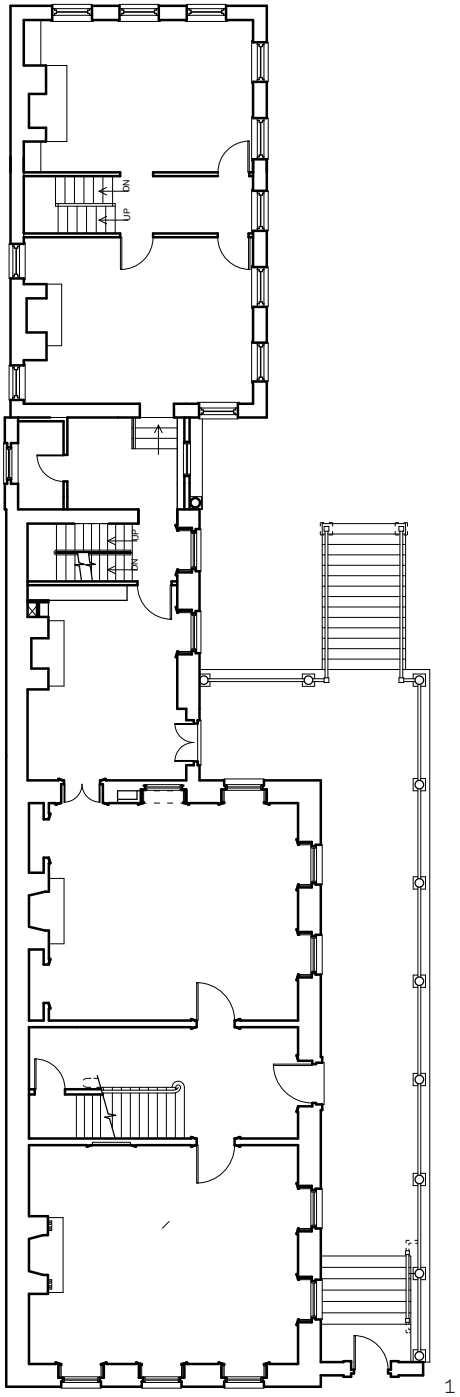

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Figure 1: Charleston Single House
Glenn Keyes Architects

significant damage to the structure. In addition the physical attributes of the materials and their structural organization contributed to spaces that were thermally and aesthetically comfortable for use in normal environmental conditions. This contributed to the inhabitants themselves acclimating to the existing climate when there was no mechanical means to do otherwise.

The overwhelming contemporary strategy to climatic challenges is to use mechanical means within the enclosed envelope of the residence to create an environment completely separate from the external conditions. This strategy is even more prevalent in the subtropical coastal regions of South East where excessive heat and high humidity are largely outside of acceptable ranges of comfort. Tightly insulated, sealed and conditioned dwelling spaces are fairly standardized. The regulations for structures in areas prone to high winds further perpetuate this environmental separation. The size and construction of windows and doors is highly constrained by requirements that all openings be constructed to withstand designated design pressures. With heavier frames, smaller expanses of multiple layers of glass the effective separation from the surrounding environment is increased. This coupled with the requirements that the structure be elevated further disassociates the structure from its site, particularly if that space between the first floor of the house and the ground isn't even regarded as habitable space. To reclaim it we must challenge our notion of what habitable space is. This is space is regulated by code to be without obstruction, without plumbing, and without mechanical conditioning but it is not prohibited from definition, enclosure, and accommodating various activities beyond storage and parking as long as they exist in such a way that they "minimize flood damage" to the structure and its material components.

If we use the vernacular/historical model of the first floor as areas that can be flooded without loss of value or use to the areas above then it builds in the future acclimatization to high water as designated by the code. In addition there is the potential for the contemporary ground floor space to act a climatically modified space transitioning from full exterior climate to environmentally controlled interior climate and back again. While no longer constructed of solid masonry, the ground floor space can have some degree of enclosure that can be designed to channel wind and control shading. The IRC allows for partitions, insect screening, and lattice as long as the connections to the larger structure are designed to break away at particular design pressures.[5] The resulting definition of the space or series of spaces can further "acclimatize" the individual to the exterior climatic conditions as well as make the transition to the interior less abrupt. If these spaces are incorporated into dwelling, lingering spaces they may encourage an interior climate closer to that of the exterior, lowering cooling loads and energy consumption for the dwelling. Making for a more sustainable as well as resilient structure.

### CASE STUDY 1: SIMONS HAGERTY RESIDENCE

This residence is an example of persistent acclimatization not only to changes in the physical environment but the regulatory environment as well. The original house occupying this site was a single story, slab on grade concrete block structure. When it was renovated in the 1990's the public living spaces were moved to the second floor to capture views of the surrounding marshes. In 2003 a fire necessitated the further renovation of the structure. New FEMA regulations

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required the ground floor spaces to be abandoned and all living spaces to be elevated to the level of the second floor. Structural evaluation did allow for the modification of the original concrete block structure to support the upper levels. The residual rooms were reclaimed as "outdoor" space – remaining unconditioned and free of obstructions to water movement. With the strategic placement of laser cut panels modulates sunlight at the same time facilitating air movement through the rooms. While contributing to an elongated entry sequence, and prolonging the sense of arrival to the conditioned spaces above they also qualify as rooms or dwelling spaces in their own right. By providing strong visual and climatic extension into the surrounding site, they provide a stronger basis for the individual to connect to the exterior from the residence. The morphological acclimation of the tectonic form facilitates the thermal acclimation of the inhabitants.

#### CASE STUDY 2: MURREN BEACH HOUSE

A house on the beach. This residence is sited just behind the principal dune line and high water extension. Here the interstitial space negotiates between the dunes and the street level. The understanding of the extension of the house flips from the driveway side where it is presented as a two-story structure and the beach side where the relationship between the first floor and the dune masks the lower story. The panels of the ground floor are arranged to act as filter and frame from the realm of the car to the beach. By modulating the height and width of the ground floor spaces it allows for a spatial sequence that acts simultaneously as both a thickened horizontal threshold from a constructed edge to a natural one across the site as well as a vertical one from non conditioned to conditioned envelope of the residence itself. Also provides a permeable membrane of multi-hieght spaces that transition from dwelling to site.

#### CASE STUDY 3: PON PON LODGE

This house takes its place in the continuum of residences sited in the Edisto River Delta. Like other houses historically located in this flood plain it is elevated to accommodate shifting water levels. But while the lower floors were traditionally heavy and opaque this upends that conceit by almost completely

Figure 2: Simmons Hagerty Residence
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dissolving it – allowing the house to float above the ground plane. Instead of this situation resulting in a disconnection with the surroundings, it reinforces its position within the terrain by providing uninterrupted views of the extensive horizon. Its occupation within the larger landscape is not only unquestionable but it also facilitates an apprehension of the scale and character of the landscape from multiple vantages – the approach, from within the ground floor space itself and from the stairs as one moves up to the conditioned areas of the residence.

Programmatically the ground floor is assigned to providing for transitioning between outdoor and indoor activities. A large central hearth provides warmth as hunting clothes are shed and hung to dry, tools are cleaned and stored, and narratives of the day are shared. This space provides thermal and morphological acclimatization at the individual scale on a day-to-day basis

### CASE STUDY 4: VARDELL

Built as a vacation dwelling for a family with three young children, this compound was designed so that each of the "outbuildings" could be given to the children when they grew older. Ensuring that the open land easement on this property stayed intact across multiple generations of land use. This residence or rather cluster of residences offers an example of not only reclaiming the spaces beneath the structure, but the exterior spaces immediately surrounding it. All of the structures are at varying levels and are connected by raised walkways, stairs and ramps. The arrangement of the walkways and structures creates a series of partially enclosed outdoor rooms. The shifts in levels offer numerous vantages into and across these spaces, providing opportunities

Figure 3: Murren Beach House
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Figure 4: Pon Pon Plantation
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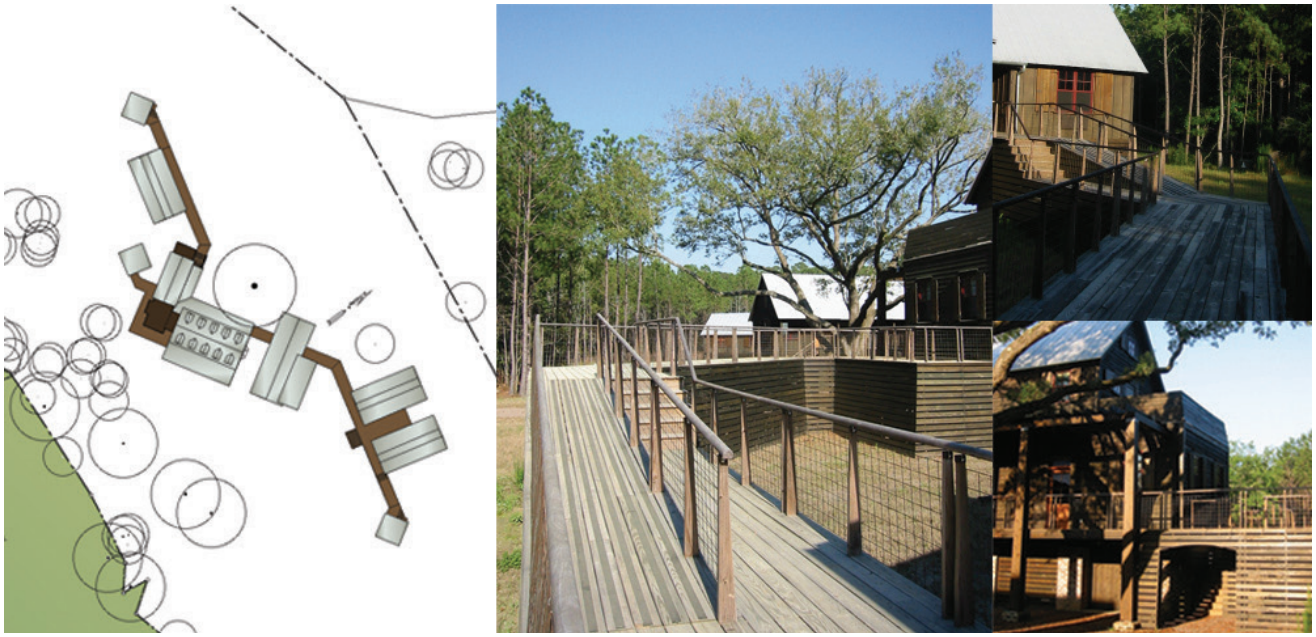

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for engagement between inhabitants and the site from above and below. Passages and screened porches provide places to rest in and to traverse through the lower story. These spaces become antechambers to the "unconstructed site" from the mediated site. This situation brings both to attention of individual. And present spaces with different degrees of definition and mediation between the site and the occupant.

## CONCLUSION

Raised structures are signifiers of the potential for high water making visible our vulnerability to significant changes in our surroundings. Yet the condition of being raised and the potential engagement with the current environment that the tectonic residue of such a condition can foster might also provide us with the means of constructing not only a material resilience but an individual one as well. Such spaces may offer a semipermeable enclosure in which to dismantle the technological distance between interior and exterior. Enhancing the relationship between inhabitant, and the site in its present state and while acclimatizing to future shifts in both temperature and water level - offering the means to adjust how we dwell to whatever the future might bring.

Figure 5: Vardell Residence
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## ENDNOTES

1. *2012 International Residential Code for One and Two-family Dwellings*, International Builings Code Council, Inc.,Washington D.C. R322.2 + R322.3.
2. *2012 IRC* R322.1.5.
3. Waddell, Gene "*The Charleston Single House*" Preservation Progress, 22 March 1977: p.4-8
4. Poston, Jonathan. *The Buildings of Charleston.* Columbia, SC: University of South Carolina Press,1997. p.81.
5. *2012 IRC* R322.3.4.