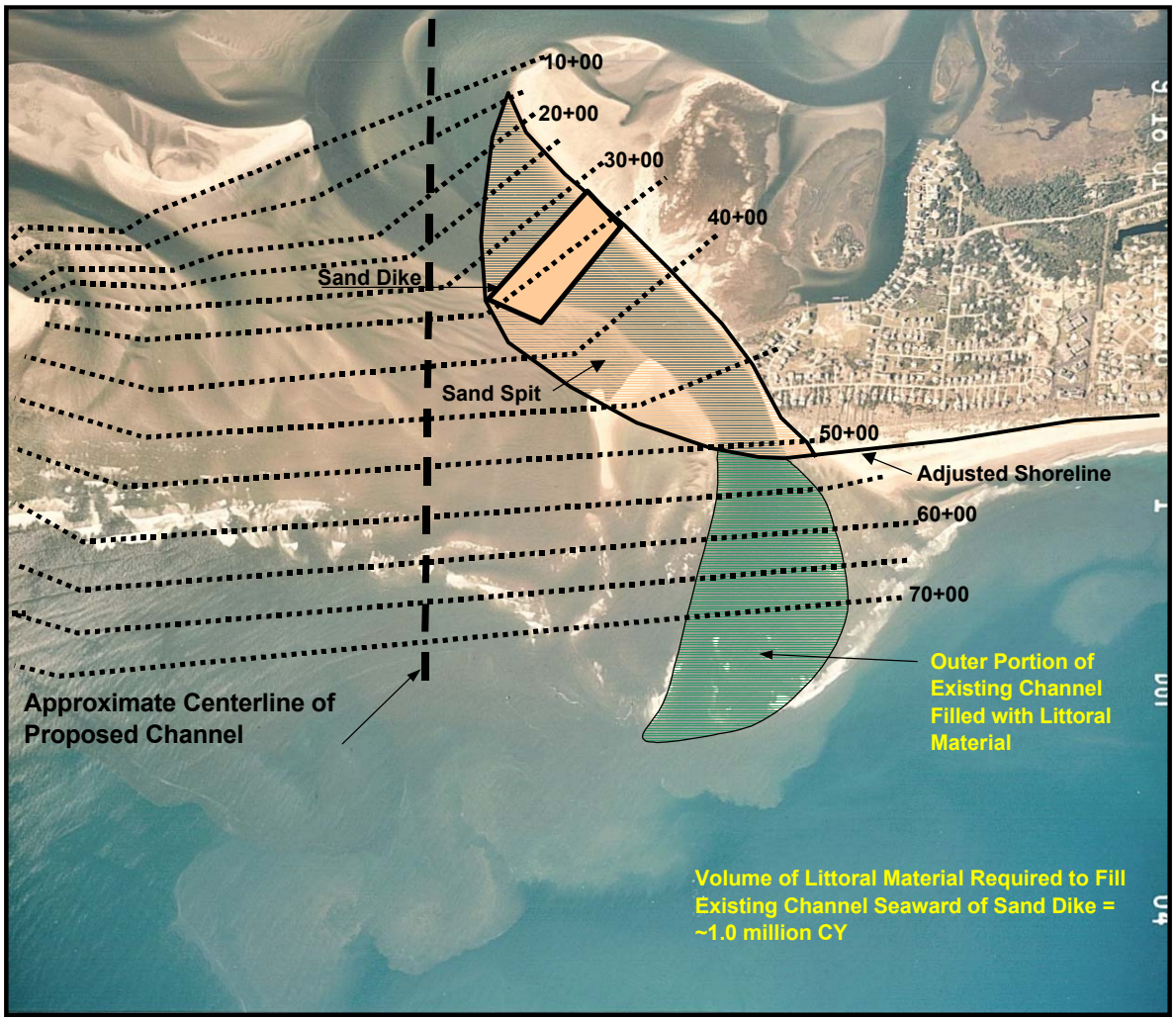

Figure 6.1 Cross-Section Locations and Adjusted Shoreline Conditions Following Channel Reloaction

- Velocities in the existing channel can be reduced sufficiently by constructing a dike to close the channel and raising the elevation of the Emerald Isle sand spit to at least +3 feet NGVD.

- The relocation of the channel with a dike will change the overall distribution of flow with a higher percentage of the total flow passing through the Dudley Island Channel and the Eastern Channel. The Dudley Island Channel will become an ebb-dominated channel compared to its present flood dominance while the Eastern Channel will continue to be ebb-dominant.

Closure of the existing ebb channel by the construction of a sand dike with dredged material will significantly reduce the likelihood of additional erosion along the inlet shoulder in the vicinity of The Pointe. Numerical Model results indicate that some of the flow would persist in the existing channel for a period of time even with the construction of a sand dike. However, these persistent flows would have low velocities and should not negatively impact The Pointe shoreline. A sand dike would forcibly redirect the ebb flow toward the new channel and aid in the demise and abandonment of the former ebb channel. The cessation or reduction of ebb tidal flow in the existing channel would accelerate the reorganization and eventual collapse of the fronting ebb delta segment. The relatively rapid landward transport of the materials comprising the shoal segment would result in rapid spit growth on the Bogue Banks shoulder and infilling of the seaward portion of the former ebb channel. The aforementioned post-relocation scenario will also involve transport of sand into the estuary through the marginal flood channel that will develop between the newly relocated ebb channel and the eastern shoulder. The redevelopment of the sand spit on the west end of Emerald Isle will take four to six years with the spit eventually merging with the sand dike. Once the new spit reaches the sand dike, material will be transported past the dike and the spit will reconnect with the existing sand spit landward of the dike. During this period of evolution, the eastern channel should remain stable thus easing some of the erosion of the Dudley Island marsh. However, once the spit has completely reformed and merged with the existing spit, erosion of Dudley Island may continue.

7. **CHANNEL SHOALING ANALYSIS**: Immediately following relocation of the inlet channel, adjustments will begin to occur with some shoaling expected along the interior portions of the channel and scour in the outer sections. Following these initial changes, the new channel will begin to behave as an artificially deepen channel constructed across the inlet's ebb tide delta. In this regard, the depths and width characteristics of an inlet ocean bar channel are dictated by prevailing currents, tides, wave action and, sediment transport. When an artificially deep or wide channel is cut through the ebb tide delta, these factors will immediately begin to work toward restoring the dimensions of the channel to its natural depth and width.

8. **RECOMMENDED CHANNEL ALTERNATIVE:** Based on the results of the geomorphic analysis of the inlet, model studies, and channel stability analysis, closure of the existing channel will be necessary to assure the success of the project and accelerate the recovery of The Pointe shoreline and associated intertidal habitat. Also, with respect