Livingston Bay Pocket Estuary Restoration – Project # 09-1463

Response to local and state technical reviewer comments Prepared by The Nature Conservancy

July 13, 2009

TECHNICAL REVIEW COMMENTS	TNC RESPONSE
Local TAG and WRAC Review	
 Funding amount. a. Provide details on costs: \$100K for assessment & design; \$300K for restoration 	<u>A&E</u> These costs include: <u>Personnel and Benefits</u> Includes costs for project management including development of a monitoring plan, volunteer recruitment and management, hiring and oversight of contractors and stewardship/weed control. <u>Preliminary Design</u> Includes survey work needed to inform design (dike and ditch cross sections, marsh plain elevations and relic channel locations). <u>Final Design</u>
 2) Should assessment occur first to ensure \$300K for restoration is needed? Provide details on how restoration cost calculated. 	RESTORATION Since the pre-application phase, the restoration costs have bee revised. Total restoration costs are estimated at and are itemized in the attached restoration budget worksheet. Restoration costs were estimated based on staff expertise and knowledge from other similar projects. Because of the small size and relative simplicity of the restoration, it is proposed as a design-build project. Given the uncertainty of state and federal funding for future grant rounds, a design-build scenario ensures that the project designed can be built and does not get delayed due to future funding limitations. The design-build scenario is also most effective in terms of reducing time and costs associated with grant/contract management and reporting. Following completion of a preliminary design, feedback from the SRFB, Local TAG and WRAC would be welcome. Since submitting the pre-application, we have refined the project costs estimates. However, as is customary with all restoration projects, the cost estimates will likely changes as the project moves through the design phase. Details on the restoration budget can be found in the attached budget form.
3) Provide description of the modeling approach to be used in developing	Modeling will occur as part of the design phase of the project including development of a simple 1-D hydraulic model which will examine the relationship between channel width, water velocity and anticipated duration,

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restoration design	frequency and area of inundation in the pocket estuary. Based on LIDAR data for Island County we expect a majority of the area would be flooded at a 10-11 foot tide. With remnant channels connected to the new opening, that would likely be a foot or two lower than the marsh plain, and would thus be accessible to fish at 8-9 ft tides. Elevations here are within the mid to upper range of those observed in other pocket estuaries on Whidbey and Camano Islands.
4) Opening of dike limited to 100' through agreement with landowner/easement	Full removal of the north dike was not feasible based on landowner negotiations. Therefore, we have chosen breaching of the dike as our preferred restoration approach. This approach will re-establish a channel connection with Livingston Bay and restore tidal process to the salt marsh. As described above, comparison with other nearby marshes and review of Lidar data suggests that the restoration is feasible and that the 100' restriction would be adequate for restoring natural tidal flow into the site. For example, a pocket estuary at the end of Francisco Lane on Whidbey Island was identified as a potential reference site. It is similarly sized and oriented, but 1-2 feet lower in elevation, than the Livingston Bay site, and its tidal channel was estimated at 20-40 feet wide. Also, the design for restoring the 240-acre Crescent Harbor marsh on Whidbey Island found a stable inlet width of 92 ft—still smaller than the 100 ft breach possible at this site. The 1-D hydraulic model will be used to predict the expected impact of our restoration on the duration, frequency and tidal inundation within the pocket estuary as well as likely vegetation response.
5) What was pre-development of opening/mouth of lagoon? Attach T-sheet.	Our pre-application incorrectly indicated that the historic T-sheet showed a small opening at the north end of the pocket estuary. After acquiring a higher resolution digital copy of the T-sheet, it is apparent that the pocket estuary was drawn as a barrier lagoon.
	However, based on knowledge of coastal geomorphic processes and an understanding of the T-sheets, the exact pre-development opening/mouth of the lagoon is not known. Many barrier lagoons cycle between open and closed states, depending on the timing and scale of annual storm events and whether the net response was a scoured opening or a large sand berm in the entrance. Depending on the timing of the T-sheet survey, surface connectivity could have been absent or not obvious. Alternatively, the surveyors could have missed this detail at the site. Regardless of the accuracy of the T-sheets, based on known land use history and existing conditions, the site must have been tidally influenced at least on a semi-regular basis. It has clearly been diked at the northern end and built up and armored along the eastern edge, and these modifications would not have happened if regular tidal flow did not previously occur.
	in the south to the north, creating a natural sand spit similar to, but at a smaller scale than, nearby Iverson Spit. Based on the direction of sediment movement, a tidal opening would naturally occur on the north end of the lagoon.

6) What will be the impact of existing LWD at site?	Due to its geographic position at the head of the bay, prevailing northerly direction of shoreline drift and proximity to areas of high shoreline development, large numbers of LWD are routinely deposited on the shorelines of Livingston Bay and within the pocket estuary. Similar phenomena occur naturally in other pocket estuaries (e.g., Elger Bay), and while the LWD accumulations do disturb salt marsh vegetation, it is not clear that they negatively impact ecosystem functions. With a breach at the southern end of the pocket estuary and an artificial dike at the northern end, LWD is being trapped in the estuary. The proposed new opening at the north end of the pocket estuary will facilitate greater tidal flux and allow the trapped LWD to more easily move out into the larger bay. However, given the extensive accumulations of LWD and generally low energy nature of the site, we expect a substantial amount of LWD to remain on-site.
State-SRFB Review	
1. Recommended improvements to make this a	As described above, this project is proposed as a design-build project, and restoration costs include surveys,
technically sound project according to the	design, permitting and construction.
SRFB's criteria. This project is part of the third phase of a series of acquisitions (the current and related 43-acre acquisition proposal is a separate application but this restoration relies on that acquisition) which collectively will protect over 7100 acres of salt marsh, tide flat and beach habitat in Port Susan Bay. The restoration proposal is to remove 100 ft of an 80-year old dike to restore connectivity to the 10-acre pocket estuary. The 100-foot removal was a negotiated amount of removal area with the land owner and is apparently a restriction as part of the sale agreement.	Restoration costs were estimated based on staff expertise and knowledge from other similar projects. Cost estimates have been re-evaluated based on feedback, and the Conservancy feels they are reasonable to incur given the inclusive nature of the project: survey, design, permits, and construction. A restoration of this limited magnitude is well-served as a design-build style. Relative uncertainties are smaller with smaller scale.
There was discussion on site about the correct opening location, amount of opening needed and the cost. This is a construction project but does not yet have any design information available. The \$414,000 cost estimate seems very high for only 100 feet of removal in an area where borrow ditches can be filled. The sponsor needs to justify the costs and have some conceptual design information to move forward.	

2. Missing Preapplication information.	This restoration is proposed as a design-build project which will include development of a preliminary
Conceptual Design Plans or Sketch	design which will be moved through the final design and permitting process prior to restoration. The current
	conceptual design, which is described in the final SRFB proposal, includes:
Budget Breakdown	1. Dike breaching- removal of a 100 foot section of the dike at the northern end of the pocket estuary to
	allow tidal flow and fish access into the pocket estuary. It is anticipated that minimal excavation will be
	need to ensure that the small remnant channels are connected to the new opening.
	2. Re-contouring of eastern dike that was built upon a natural spit
	3. Filling and plugging of the interior ditches with material from the eastern dike and imported material as
	needed for the plug
	4. Removal of rip-rap along the eastern levee
	5. Re-vegetation as needed
	Revised cost estimates have been provided with our final application.