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CITY & BOROUGH OF SITKA
SCIP FISH PROCESSING WAREHOUSE & DOCK
STRUCTURAL MODIFICATIONS

WORKSHOP NO. 3 – REFINED DESIGN OPTIONS
PND ENGINEERS, INC.

AGENDA – July 26, 2007

1. **Existing Dock Structural Conditions & Repair Considerations**

   A. Late 1950's – The dock was originally constructed. Plans are dated 1957-58.

   B. 1977 - ABAM Engineers inspected the dock reporting serious corrosion issues and estimating 11 years of useful life remaining w/o significant repairs.

   C. 1991 - PND Engineers first inspected the dock and reported severe corrosion with many pile problems. PND recommended structural repairs, fender system and live load reduction.

   D. 1999 - Reid Middleton Engineers performed a limited inspection and reported poor pile conditions, lack of fender system and extensive cracking and efflorescence developing in the concrete deck. RM cautioned that load capacity had been significantly compromised and extreme care must be exercised.

   E. 2000 - PND Engineers and Foreshore Technologies, Inc. performed extensive underwater dive and above water structural inspections with concrete core sampling. The inspection reported extensive corrosion throughout all piles, deteriorated concrete strengths below 2,000 psi, 30-50% of the deck area had delaminated, numerous broken piles, many cracked or damaged structural elements and lack of fender system. Structural analysis estimated the remaining load capacity at 25% of original design and provided recommendations for immediate dock repair as well as replacement options. PND estimated that the useful life with a reduced load capacity could be extended 5-10 years with extensive repairs ranging in cost up to $6 million. Costs for complete dock replacement options ranged between $8-9 million.

   F. 2004 – PND performed a limited inspection and observed continued corrosion and deterioration with no repairs being performed. PND issued recommendations for strict load restrictions resigned to foot traffic and one light duty forklift access corridor.

   G. 2007 – PND performed limited inspections, measured the metal thickness of 29 bearing piles along grid line B and performed light duty load tests in specific areas requested by the CBS. Significant reduction in metal thickness along B line was found. Recommendations were made for operational load restrictions, barricades, cautionary signage, and regular inspections by qualified CBS personnel. PND reported that structural conditions were critical and recommended extreme operational caution to avoid potential losses to property and life. CBS issued RFP for engineering services to perform structural upgrades to facility.

   H. Repair Considerations:

      - The concrete deck is deteriorating and the surface is in poor condition. The deck is delaminating and was made from aggregates laden with salt. The dock was not constructed with air entrained concrete so it is very susceptible to damage from freeze-thaw cycles. The deck strength will continue to decrease over time rendering repairs impractical. The existing deck should be demolished and replaced.

      - The damaged or deteriorated dock piles include not just the H piles on B and C line that additionally support the building but most of the other pipe piles as well. Many piles have little to no steel

remaining due to corrosion and the maximum corrosion was found near mean lower low water making any repair option very costly and impractical due to underwater work. The extent of deterioration in many piles is beyond the ability to effectively repair, making replacement the most practicable option. The number of piles needing extensive repair and replacement is very high.

- Concrete pile caps are in poor condition due to prior impact damage and reduced concrete strength. It may be possible to repair the pile caps using concrete beam strengthening and epoxy injection schemes, however given the condition of the deck above and piles below, repair options will be very costly and possibly impractical.

- Pile repairs and replacement without the building removed will be difficult and inefficient due to the presence of large armor rock and the lack of head room below the deck, limited access due to tides and limited space for equipment working inside the building next to tenant improvements.

- Methods for making in place "temporary repairs" to existing structural elements will result in a limited service life and higher eventual costs for performing necessary structural upgrades. The risks are considerably higher to the CBS with "temporary repair" methods because available solutions are less effective in solving the problems and the extent of damage needing to be repaired is not always certain.

2. **Design Criteria** – Design criteria will need to be adopted by the CBS prior to proceeding to final design. The development criteria have remained flexible during the concept phase as options are studied. The following outline the most significant design criteria to resolve.

   A. Fish Processing Warehouse Footprint: Options consist of full building dimensions as they currently exist or a reduced footprint to reduce costs. Two warehouse options have been developed to date based on CBS direction and these will be discussed today. Other reduced footprint options are also possible.

   B. Marine Facilities: Dock access and pier head operations are essential for fish processing by both tenants. Prior work sessions established the proposed pierhead depth as the same as it exists today, roughly – 30' MLLW. A variety of development concepts, both joint and separated facilities, may satisfy the operational requirements for the marine facilities. Six concepts will be presented today for discussion and further refinement.

   C. Operational Loads: Maximum equipment size located anywhere on new pile supported facilities is projected as a Nissan 5S forklift with two loaded totes. Storage loads will consist of a maximum stack of two loaded totes. Isolated point loads for crane operations must be incorporated into the design. Uniform live loads in the range of 250 PSF are predicted as being satisfactory for these operations.

   D. Dock Access: Access to and from the dock is limited to corridors through the building. None of the marine concepts developed to date provide access at the ends of the warehouse.

   E. Preferred Construction Period: October to March is reported by the tenants as being the slowest period of the year. Herring harvest is typically mid March. Long line season can extend into November however is typically slow later in the season. It is proposed to allow construction on site October 1, 2008 – March 15, 2009 with material delivery and stockpile at SCIP commencing prior to this time.

   F. Project Budget: The following funds are anticipated thus far by the CBS to develop this project. CBS $400K, Denali Commission $500K, SCIP CIP $150K, Bond $3.5 M. Total available funds = $ 4.55 M. This budget will need to be increased or the scope of improvements will need to be reduced for the Work contemplated to date by the CBS. See cost estimates.

3. **Concept Design Study** – Presentation of options and costs refined to date.

4. **Questions, comments, suggestions....**

SCIP Warehouse and Dock Structural Modifications--Description of Alternatives		
Concept	**Description**	**Estimated Cost**
Permanent Options		
1	**Dock:** Demolish entire structure and replace with new dock under the bldg plus a 30' X 200' timber dock and a 10' X 400' float. **Bldg:** Keep same footprint.	$10.1 Million
2	**Dock:** Demolish entire structure and replace with new dock 16' narrower than the existing bldg plus a 30' X 200' timber dock and a 10' X 400' float. **Bldg:** Remove 16' from water side.	$9.4 Million
3	**Dock:** Demolish entire structure and replace with new dock under the bldg plus two 48' X80' timber docks. **Bldg:** Keep same footprint.	$10 Million
4	**Dock:** Demolish entire structure and replace with new dock 16' narrower than the existing bldg plus two 64' X80' timber docks. **Bldg:** Remove 16' from water side.	$9.8 Million
5	**Dock:** Demolish entire structure and replace with new dock under the bldg plus a 64' X 140' Dock and two 10' X 100' floats. **Bldg:** Keep same footprint.	$9.9 Million
6	**Dock:** Demolish entire structure and replace with new dock 16' narrower than the existing bldg plus a 64' X 140' Dock and two 10' X 100' floats. **Bldg:** Remove 16' from water side.	$9.6 Million
Interim Fixes		
7	**Dock:** Demolish entire structure and replace with 16' X 220' fill section and 10' X 200' floating dock. **Bldg:** Remove 32' from water side. **Additive Alt:** 30' X 60' dock.	$3.7 Million + Additive Alt of $0.8 Million = $4.5 Million
8	**Dock:** Demolish everything outside the bldg footprint. Repair piles under bldg. **Bldg:** Keep same footprint, restrict loads. Expected life +/- 5 years.	$4.9 Million
9	**Dock:** Repair piles, keep same footprint. **Bldg:** Keep same footprint. Expected life +/- 5 years.	$3.2 Million
Major Upgrades		
Master Plan Phase I (Fisherman's Terminal and Bldg Repairs)	**Dock:** Construct new sheetpile bulkhead 600' X 110'. **Bldg:** Repair with same footprint.	$22.3 Million
Master Plan Phase II (Marine Terminal)	**Dock:** Construct new sheetpile bulkhead 520' X 70' plus catwalks and dolphins to accommodate tankers.	20.2 Million
Do Nothing	**Dock:** Piles and deck are shot. Load limits will continue to decrease. **Bldg:** Could collapse if dock fails. No remaining service life of structure.	???

Notes: