

## **EXPLANATION OF CONSENT AGENDA ITEM E.2.c.(7) February 22, 2017**

### **ITEM:**

Consideration of approving a purchase order to CH2m under their GEC continuing contract for a middle reach surge study (see the attached map for the affected area), Study in an amount not to exceed \$98,976.

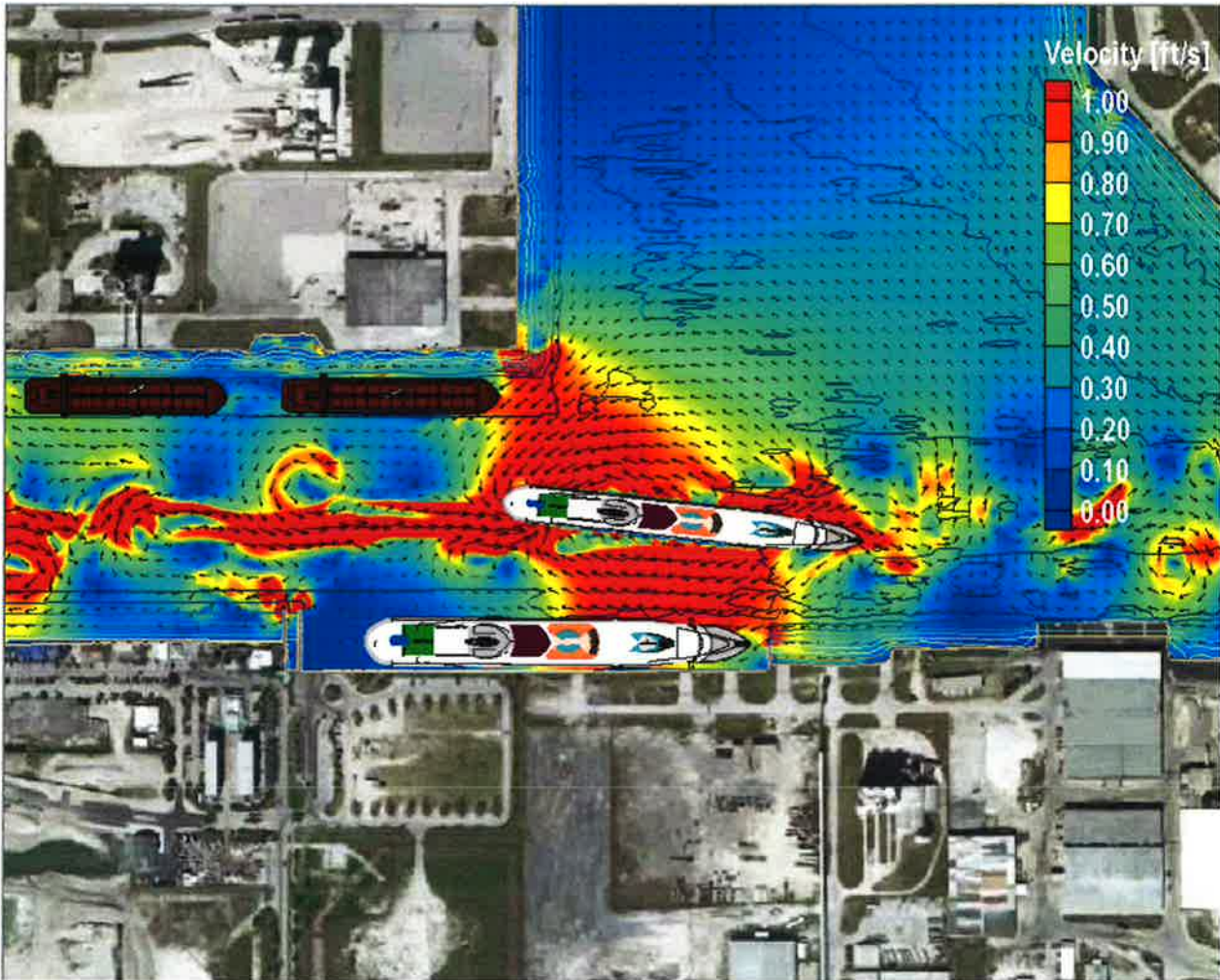
### **EXPLANATION:**

With the widening of the channel and the future expansion to larger cruise terminals on the south side of the port we are looking at the impact of larger size ships to include Oasis and Post-Panamax class of ships passing through the channel and what affect it will have on vessel moorings in the middle reach and the Trident Basin.

Passing vessels will generate hydrodynamic effects that need to be considered for both mooring design and scour protection design of cruise terminal berths. Ship hydrodynamic effects to be evaluated include both large-scale pressure field effects (Bernoulli effects) from passing cruise ships, as well as short-period (Kelvin) wakes caused by tugs, for instance.

Vessel sizes and velocities will be taken from previous harbor wide surge modeling projects. Passing vessel induced water level changes and currents will be determined using the depth-averaged Vessel Hydrodynamics Longwave Unsteady (VH-LU) model developed by Coast & Harbor Engineering that was also used to determine loads on the berthed vessels at CT1 and the North Cargo Piers due to passing cruise ships. Short-period wake heights generated by tugs at 12 knots will be calculated using the maximum wake height produced within multiple methods.

The forces generated by the water level changes and currents on the moored cruise ships will be documented for later use in the design of the south side cruise terminal berths.



**Funding Review by Finance (Pat Poston):** The total NTE amount of \$98,976 will exceed the budget by \$98,976. However there are funds available in the unused contingency budget. If this item is approved, \$98,976 will be transferred from project 2273, and no change will be required in the FY17 Capital Budget. [Budget item 2270 - Master Plan & 2273 - Contingency]

**Staff Recommends Approval**

**Prepared by Tom Foxhoven/ Bill Crowe, P.E.**