



Data Submittal for Dissolved Oxygen Monitoring on 21 July 2003 Providence River and Harbor Maintenance Dredging Project

Event Monitored: CAD Cell 4R – neap high tide disposal on 21 July

Applicable Water Quality Certification Condition:

- 40 – dissolved oxygen monitoring during neap tide periods in June, July, August, September

Associated Files:

- Prov_R_DO_1-summary – Microsoft Word document containing this summary
- Prov_R_DO_figure1 – pdf document showing monitoring locations (8 ½ x 11)
- Prov_R_DO_figure2 – pdf document presenting monitoring data (11 x 17)

Criteria Exceedences: No criteria are specified in the Water Quality Certification for this monitoring. No issues of concern were identified during the monitoring.

Summary:

Condition 40 of the Water Quality Certification for the project specifies that monitoring of dissolved oxygen (as well as temperature and salinity) be performed following CAD cell disposal events during neap tide periods in June, July, August, and September (3 days each month). The dissolved oxygen monitoring was not performed during June, as disposal into CAD cells was not performed during the neap tide period for the month. During the neap tide period for July, disposal into a CAD cell was only performed over a one-day period (21 July). A full disposal monitoring event (#9) was performed on this day, and additional dissolved oxygen monitoring was performed as a part of the event. The results of the dissolved oxygen monitoring are summarized below, and the results of the associated disposal monitoring event #9 have been reported separately (submitted on 28 July).

Monitoring of dissolved oxygen was performed in conjunction with the high tide disposal event that took place on 21 July. High tide was predicted to occur at 1446, with a height of 4.3 feet and a range of 3.1 feet to the following low tide. The disposal event occurred at 1500. Maintenance material that was removed from the top of cell 7R by Dredge 51 (being unsuitable for open water disposal) was disposed into cell 4R (see Figure 1). Dredge 55 was also working in the area during the monitoring event, removing parent material from cell 6R.

Water quality monitoring was performed at six stations along a transect extending through cell 4R. One station was located up current of cell 4R, one was located directly over the cell, and four stations were located down current (see map inset of Figure 2 for locations). Measurement of dissolved oxygen, salinity,



and temperature were performed over two time periods, one approximately 30 minutes following the disposal event and one approximately 1 hour following the disposal event.

A subset of the salinity and temperature measurements are presented in the two graphs in the upper portion of Figure 2. Salinity values displayed the characteristic increase with depth that has been observed in previous disposal monitoring events with values of approximately 20 PSU in the upper water column and an increase to approximately 28 PSU in the lower water column. Temperature displayed the inverse pattern with values of approximately 23°C in the upper water column decreasing to approximately 20°C near the bottom.

Profiles of dissolved oxygen concentration with depth are presented in the graphs in the lower portion of Figure 2. Measurements approximately 30 minutes following the disposal are depicted by the blue profiles. These measurements were performed at all stations except the furthest down current. The up current station (1) and station directly over the disposal cell (2) displayed surface concentrations of approximately 7 mg/L increasing to approximately 14 mg/L at mid depth, and decreasing again to approximately 5 mg/L near the bottom at station 1 and to 3 mg/L directly over the cell. The closest down current station (3) displayed a more uniform upper water column with concentrations of approximately 15 mg/L, decreasing to approximately 8 mg/L near the bottom. Moving down current, stations 4 and 5 displayed profiles that were progressively similar to the up current station (1) and station over the cell (2). At stations 4 and 5, the highest values were near the middle of the water column, decreasing to below 5 mg/L at depth at station 5.

Measurements performed approximately 1 hour following the disposal are depicted by the red profiles in the graphs in the lower portion of Figure 2 (note that the measurements at station 6 were performed approximately 2 hours following the disposal). All of these profiles displayed highest concentrations near the middle of the water column. These concentrations ranged from approximately 12 to 14 mg/L, with the highest values located at the further down current stations. Surface concentrations ranged from approximately 7 to 10 mg/L, with highest values located at the further down current. Near bottom concentrations ranged from approximately 7 to 10 mg/L with the lowest concentration directly over the cell and highest concentrations at the up current and 1500 foot down current stations.