Data Submittal for Water Quality Monitoring Event #7 on 11 July 2003
Providence River and Harbor Maintenance Dredging Project

Event Monitored: CAD Cell 3R – high tide disposal on 11 July

Applicable Water Quality Certification Conditions:

- 26c – dissolved metals and TSS for a high tide disposal within the first 100 disposal events

Associated Files:

- Prov_R_7_summary – Microsoft Word document containing this summary
- Prov_R_7_tables – Microsoft Word document containing station and sample ID information (Table 7-1), and analytical results (Table 7-2)
- Prov_R_7_figure – pdf document showing the sampling locations (Figure 7-1)

Criteria Exceedences: None

Summary:

The seventh monitored disposal event took place on 11 July, at approximately the time of predicted high tide for Providence (5.9 feet at 1856). Dredged material taken from the top of cell 7R was released into cell 3R (see Figure 7-1) during a spring high water slack tide. Spring tide conditions represent the largest tidal fluctuations and strongest ambient currents experienced in the monthly lunar cycle. At the time of the disposal event, two dredges were working in the area (see Figure 7-1). Dredge 55 was anchored and working in cell 6R removing parent material (disposed offshore). Dredge 51 was spudded and working in cell 7R, removing unsuitable maintenance material that was being disposed into cell 3R.

Prior to and after the disposal event, ambient currents in the study area were small in magnitude and mixed in direction. As a result, there was no significant ambient current. This is important because the transport of the disposed dredged material is dependent on ambient current conditions.

Pre-disposal monitoring was performed at the end of the flood tide under the slack water current conditions described above. A reference sample was collected south of the dredging and disposal locations prior to disposal (UCR1 on Figure 7-1 and Table 7-1). Turbidity values ranged from 2 NTU to 4 NTU through the water column. Salinity ranged from approximately 20 PSU at the surface to 28 PSU near the bottom. Water samples were collected from within the identified dredging turbidity plume approximately 200 feet away from Dredge 55, prior to the disposal event (DRG1 on Figure 7-1).

The disposal event occurred at 1848, 6 minutes before the predicted high tide (1856), after which the scow was slowly maneuvered to the south of the disposal cell and back into position with Dredge 51 over cell 7R.

Similar to previous surveys, some discoloration and small patches of oil sheen were noted at the surface immediately following the disposal. ADCP measurements collected over cell 3R following the disposal event and relocation of the scow identified a plume within and above the cell and for a distance of 500 feet north of the cell. Specifically, 20 minutes after the disposal event, turbidity measurements collected within the cell ranged from 3 NTU to 40 NTU and turbidity measurements collected 500 feet north of the cell ranged from 6 NTU to 11 NTU. No plume was measured to the south of the disposal cell (maximum turbidity of 4 NTU was observed to the south).

One hour after the disposal event, no significant current was observed indicating that slack tide conditions persisted longer than expected. The plume was contained between the cell and 500 feet north of the cell. The maximum turbidity measurement collected outside of the cell was 7 NTU just north of the cell. Slack water conditions continued until approximately 1.5 hours after low water slack, when a small southerly (ebbing) current was established. By this time, the disposal plume appeared to be limited in extent to the cell area and limited in magnitude to less than 10 NTU.

Since no discernable turbidity plume was observed along the down current compliance transect, the timing and location of compliance sample collection were based on measured current velocities and the calculated travel time and direction from the disposal cell (CM1 on Figure 7-1). Turbidity measurements at the 1500-foot down current compliance transect for metals were 3 NTU throughout the water column at the time of sampling.

Dredges 51 and 55 continued to work throughout the monitoring period, with Dredge 51 removing unsuitable maintenance material overlying cell 7R and Dredge 55 removing parent material from cell 6R

Results of the analysis of TSS and dissolved metals are presented in Table 7-2. TSS levels at the 1500-foot down current location were lower than at the reference location for all depths. The highest reported TSS (36 mg/L) was collected from the mid-depth location down current of the dredge. Dissolved silver concentrations were below the reporting limit of 0.5 ug/L for all samples, well below the acute water quality criterion of 1.9 ug/L. Dissolved copper concentrations were all below the acute water quality criterion (4.8 ug/L) with concentrations ranging from 0.64 to 2.0 ug/L. Highest copper concentrations were reported for the surface samples at all three locations.