



Data Submittal for Water Quality Monitoring Event #8 on 14 July 2003 Providence River and Harbor Maintenance Dredging Project

Event Monitored: CAD Cell 3R – spring low tide disposal on 14 July

Applicable Water Quality Certification Conditions:

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

Associated Files:

- Prov_R_8_summary – Microsoft Word document containing this summary
- Prov_R_8_tables – Microsoft Word document containing station and sample ID information (Table 8-1), and analytical results (Table 8-2)
- Prov_R_8_figure – pdf document showing the sampling locations (Figure 8-1)

Criteria Exceedences: None

Summary:

The eighth monitored disposal event took place at 1449 on 14 July, at approximately the time of predicted low tide for Providence (-0.2 feet at 1431). Dredged material removed from the top of cell 7R was released into cell 3R (see Figure 8-1) during a spring low 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 8-1). 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.

Pre-disposal monitoring was performed late in the ebb tide cycle. Water samples were collected from within the identified dredging turbidity plume approximately 300 feet down current from Dredge 51, during ebb tide prior to the disposal event (DRG1 on Figure 8-1). Continued monitoring revealed an initiation of flood tide conditions (flow with a northward component) earlier than predicted. As a result, the reference sample was collected up current (south) of the dredging and disposal locations prior to disposal (UCR1 on Figure 8-1 and Table 8-1). Turbidity values ranged from approximately 3 NTU to 6 NTU through the water column. Salinity ranged from approximately 19 PSU at the surface to 28 PSU near the bottom. Given this current pattern, reference measurements could potentially have been influenced by dredging activities. However, given the location of the dredging relative to the sample location (Figure 8-1), potential influence was expected to be limited.

The disposal event occurred at 1449, 18 minutes after the predicted low tide (1431), 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 monitoring events, some discoloration and small patches of oil sheen were noted at the surface immediately following the disposal. ADCP measurements collected over cell 3R immediately following the disposal event identified an area of elevated backscatter within and above the cell and for a distance of approximately 300 feet north of the cell.

Approximately 15 minutes after the disposal event backscatter water quality measurements were performed directly within the disposal plume over cell 3R (CELL on Figure 8-1 and Table 8-1). A maximum turbidity measurement of 48 NTU was collected at the bottom of the water column. Although not required by the water quality certification, samples were collected at this location for metals analysis and toxicity testing to further characterize potential impacts associated with disposal.

The relatively strong flood currents in the area resulted in transport of the disposal plume in a northerly direction. Within one-half hour, a plume was detected at approximately 500 feet north of cell 3R with maximum turbidity of 23 NTU. At this point in time, backscatter measurements performed over cell 3R revealed the disposal plume had dissipated in the area of the cell. Sixty minutes after of the disposal event, elevated backscatter measurements were noted extending from 300 feet to 1000 feet north of the cell 3R. A maximum turbidity value of 35 NTU was measured at 550 feet north of the cell near the bottom. Eighty minutes after the disposal event, elevated backscatter measurements identified a plume extending from 300 feet to 1200 feet from cell 3R. Dredging activities associated with Dredge 55 were ongoing adjacent to the disposal plume monitoring area (down current of cell 3R – see Figure 8-1) and likely contributed to the elevated backscatter and turbidity measurements.

Monitoring along the 1500 foot down current compliance transect revealed a low but measurable increase in turbidity over background (maximum value of 11.5 NTU). The timing and location of compliance sample collection (CM1 on Figure 8-1) were based on these observations and the calculated travel time from the disposal cell.

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 8-2. TSS levels at the 1500 foot down current location were slightly higher than TSS levels at the reference location for all depths. The highest reported TSS (110 mg/L) was collected from the bottom directly over the disposal cell (non-required sample). The highest TSS down current of the dredge (58 mg/L) was reported at the surface. 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 0.52 to 2.1 ug/L. Copper concentrations in the non-required samples collected directly within the plume over the disposal cell were slightly higher than



reference concentration for the surface and mid depths, but lower than the reference concentration for the bottom depth. Results of the *Arbacia punctulata* fertilization and embryo survival tests for the non required sample (collected directly within the disposal plume over cell 3R) have not yet been finalized and will be presented in the full summary report.