



Data Submittal for Water Quality Monitoring Event #3 on 4 June 2003 Providence River and Harbor Maintenance Dredging Project

Event Monitored: Fifth disposal event – CAD Cell 1R – high tide disposal on 4 June

Applicable Water Quality Certification Conditions:

- 26c – dissolved metals and TSS for a high tide disposal within the first 100 disposal events
- 26e(1) – dissolved metals and TSS for disposal when the starter CAD cell is approximately 20 feet from the surface
- 33b – toxicity for a high tide disposal occurring within disposal events 2 through 11

Associated Files:

- Prov_R_3_summary – Microsoft Word document containing this summary
- Prov_R_3_tables – Microsoft Word document containing station and sample ID information (Table 3-1), and analytical results (Tables 3-2, 3-3, and 3-4)
- Prov_R_3_figure – pdf document showing the sampling locations (Figure 3-1)

Criteria Exceedences: None

Summary:

The fifth disposal event into cell 1R took place at 1157 on 4 June, at the predicted time of high tide for Providence (3.8 feet at 1157). The material being disposed had been removed from the top of cell 4R to the east of disposal cell 1R (see Figure 3-1). Dredge 51 had been inactive for the entire flood tide as it had filled the scow and was awaiting the high tide for disposal. The dredge returned to work over cell 4R approximately 30 minutes following the disposal event.

Pre-disposal monitoring was performed during the last of the flood tide. A reference sample was collected up current (south) of the dredging and disposal locations prior to disposal (UCR1 on Figure 3-1 and Table 3-1). Although turbidity values were low (approximately 3-4 NTU through the water column), the surface water was discolored (brown) and had occasional patches of scum. Salinity ranged from approximately 8 PSU at the surface to nearly 30 PSU near the bottom. This appearance and salinity are consistent with a large freshwater discharge from the Seekonk associated with the large rainfall event several days prior.

The disposal occurred at the time of the predicted high tide (1157), and the scow was slowly maneuvered back to the dredge just east of the disposal cell. Some discoloration and small patches of oil sheen were noted at the surface immediately following the disposal, but dispersed within a short time. ADCP measurements performed over cell 1R immediately following the disposal event and relocation of the scow identified an area of elevated backscatter within and above the cell, with little movement beyond the cell



boundaries in the near-slack tidal conditions. As the tide began to ebb, two distinct plumes of similar elevated backscatter were identified in the lower portion of the water column along a cross-channel line approximately 140 feet down current of cell 1R, one area down current of the dredge and one down current of cell 1R. Turbidity values ranged from 3 NTU at the surface to 11 NTU near the bottom in the area down current of the cell. This plume was identified further down current (approximately 380 feet from cell 1R) approximately 45 minutes after the disposal, with associated turbidity ranging from 3 NTU at the surface to 10 NTU at depth.

As the tide continued to ebb, the monitoring was unable to identify a turbidity plume beyond the 380 foot transect. No measurements above background conditions (4 NTU) were observed along the 1500-foot down current compliance transect for metals. 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 3-1).

Dredge 51 continued to work removing maintenance material from over cell 4R during the remainder of the ebb tide, and water samples were collected from within the identified turbidity plume approximately 200 feet down current of the dredge mid way through the ebb tide (DRG1 on Figure 3-1).

Subsequent monitoring down current of the compliance transect (station CM1) was unable to identify any disposal (or dredging) related turbidity plumes. As a result, the compliance samples for toxicity were collected off Fields Point at the high water slack tide as required by the Water Quality Certification (sampling time for this station was advanced approximately 30 minutes because of an incoming ship that was scheduled to pass prior to high tide).

Results of the analysis of TSS and dissolved metals are presented in Table 3-2. TSS levels at the 1500 foot down current location were lower than at the reference location for the mid and bottom depths, but were higher than the reference location for the surface sample. The highest reported TSS (40 mg/L) was collected from the surface 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 0.47 to 2.9 ug/L. Highest copper concentrations were reported for the surface samples at all three locations.

Results of the *Arbacia punctulata* fertilization test are presented in Table 3-3, and the mean fertilization was above 99% for all of the collected samples, with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (Fields Point) or in an additional near field sample at 1500 feet from the disposal cell (metals compliance transect). The additional



sample (not required in the WQC) was collected at the 1500-foot compliance point to provide additional information to aid in evaluating the monitoring program results. Results of the *Arbacia punctulata* embryo survival and development test are presented in Table 3-4. The mean embryo survival was above 89% for all samples, with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (Fields Point) or in the additional near field sample at 1500 feet from the disposal cell (metals compliance transect). The mean normal embryo development was above 94% for all samples, with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (Fields Point) or in the additional near field sample at 1500 feet from the disposal cell (metals compliance transect).