



Data Submittal for Water Quality Monitoring Event #2 on 21 May 2003 Providence River and Harbor Maintenance Dredging Project

Event Monitored: Second disposal event – CAD Cell 1R – low tide disposal on 21 May

Applicable Water Quality Certification Conditions:

- 26b – dissolved metals and TSS for a low tide disposal within the first five disposal events
- 33a – toxicity for the first low tide disposal event

Associated Files:

- Prov_R_2_stn – Microsoft Excel document with station and sample ID information (Table 2-1)
- Prov_R_2_data – Microsoft Word document with analytical results (Tables 2-2 through 2-4)
- Prov_R_2_figure – pdf document showing the sampling locations (Figure 2-1)

Criteria Exceedences: None

Summary:

The second disposal event into cell 1R took place at 0721, 41 minutes after the predicted low tide for Providence (0.3 feet at 0640). Dredge 51 was actively working just south of the disposal cell prior to and following the disposal event, removing maintenance material from over cell 3R and a surrounding buffer (see Figure 2-1).

Pre-disposal monitoring was performed during low water slack tide and early flood tide. A reference sample was collected up current (south) of the dredging and disposal locations prior to disposal (UCR2 on Figure 2-1 and Table 2-1). The background monitoring revealed a relatively uniform water column of low turbidity water (~4 NTU).

Post-disposal monitoring was conducted down current (north) of the CAD Cell 1R. A turbidity plume of limited intensity (e.g., a maximum of 10 NTU compared to a background of 4 NTU) was observed up to 1000 feet down current of the cell. All turbidity measurements collected 500 feet or greater down current of the cell were less than 10 NTU above background. Monitoring was also performed around Dredge 51, and a limited plume (turbidity values up to 10 NTU) was observed immediately down current (north) of the dredge. A dredge plume sample was collected and analyzed for the required analytes (DRG1 on Figure 2-1; Table 2-1).

As the tide continued to flood, the monitoring was unable to identify a turbidity plume beyond 1000 feet down current of the disposal cell. 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, samples were collected at the predicted transect location corresponding to where the plume was expected to pass based on measured current direction and plume trajectory (CM on Figure 2-1). Timing of the sampling along the 1500-foot down current transect was based on measured current velocities and the calculated travel time from the disposal cell to the 1500 foot transect.

Subsequent monitoring down current of the compliance transect (station CM) was unable to identify any disposal (or dredging) related turbidity plumes. As a result, the compliance samples for toxicity were collected at the I-195/Washington St Bridge (195 on Figure 2-1) at the time of high water slack tide as required by the Water Quality Certification.

Results of the analysis of TSS and dissolved metals are presented in Table 2-2. Elevated concentrations of TSS were observed in some of the down current samples (as high as 69 mg/L in the bottom water at the compliance transect - station CM). The TSS concentrations were not associated with high field-measured turbidity, field measured ADCP backscatter, or field observations of a plume, therefore, the data are currently being reviewed. 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 0.62 to 1.8 ug/L.

Results of the *Arbacia punctulata* fertilization test are presented in Table 2-3, and the mean fertilization was above 98% for all samples, with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (I-195 bridge) or in an additional near field sample at 1500 feet from the disposal cell (metals compliance transect). (Additional samples not required in the WQC were collected at the 1500 ft 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 2-4. The mean embryo survival was at or above 86% for all samples, with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (I-195 bridge) or in the additional near field sample at 1500 feet from the disposal cell (metals compliance transect). The mean normal embryo development was at or above 88% for all samples. A statistically significant difference in embryo development was noted between the reference sample and the additional near field sample collected at 1500 feet from the disposal (mean % of normal development of 93.8% for the reference versus 89.2% at the near field 1500 foot down current location). However, there was no statistically significant difference between the reference sample and the sample collected at the down current compliance point (I-195 bridge).