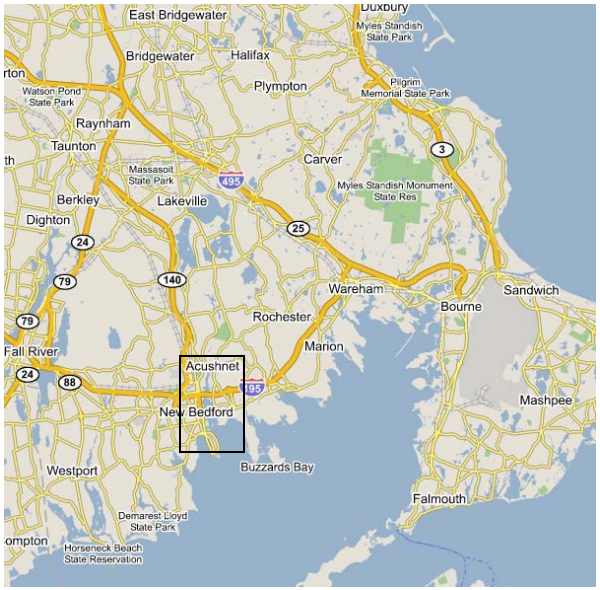
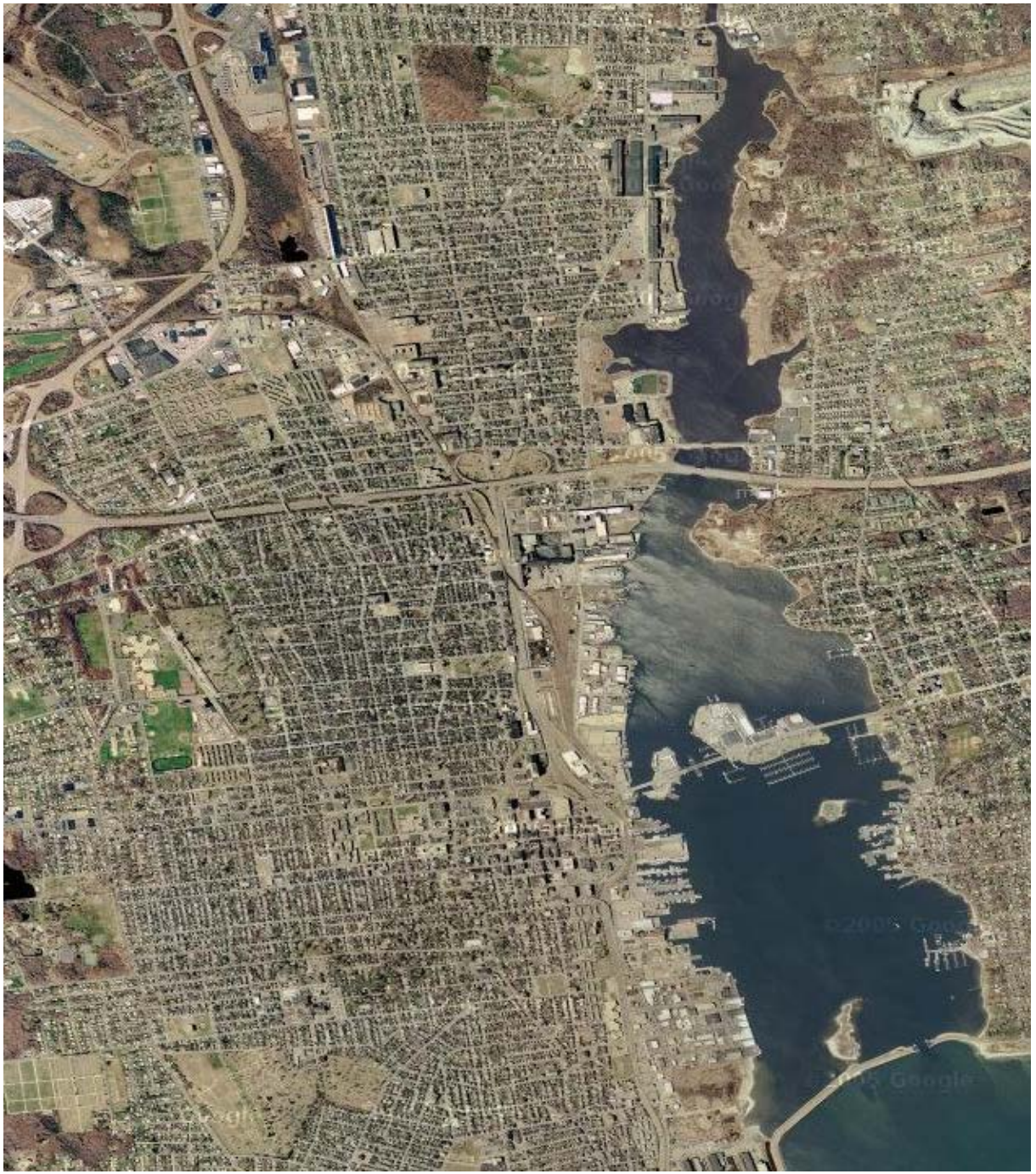
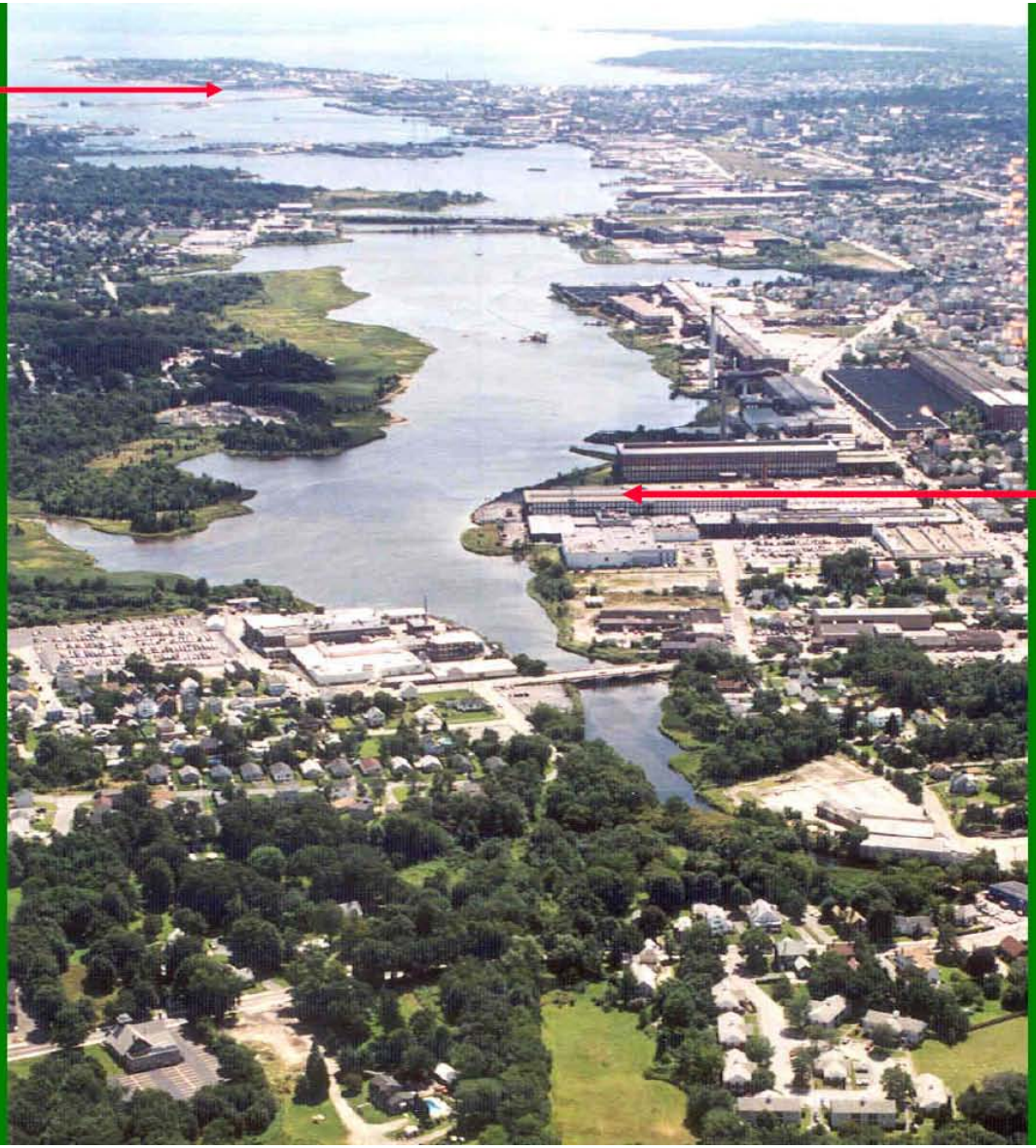
New Bedford Harbor



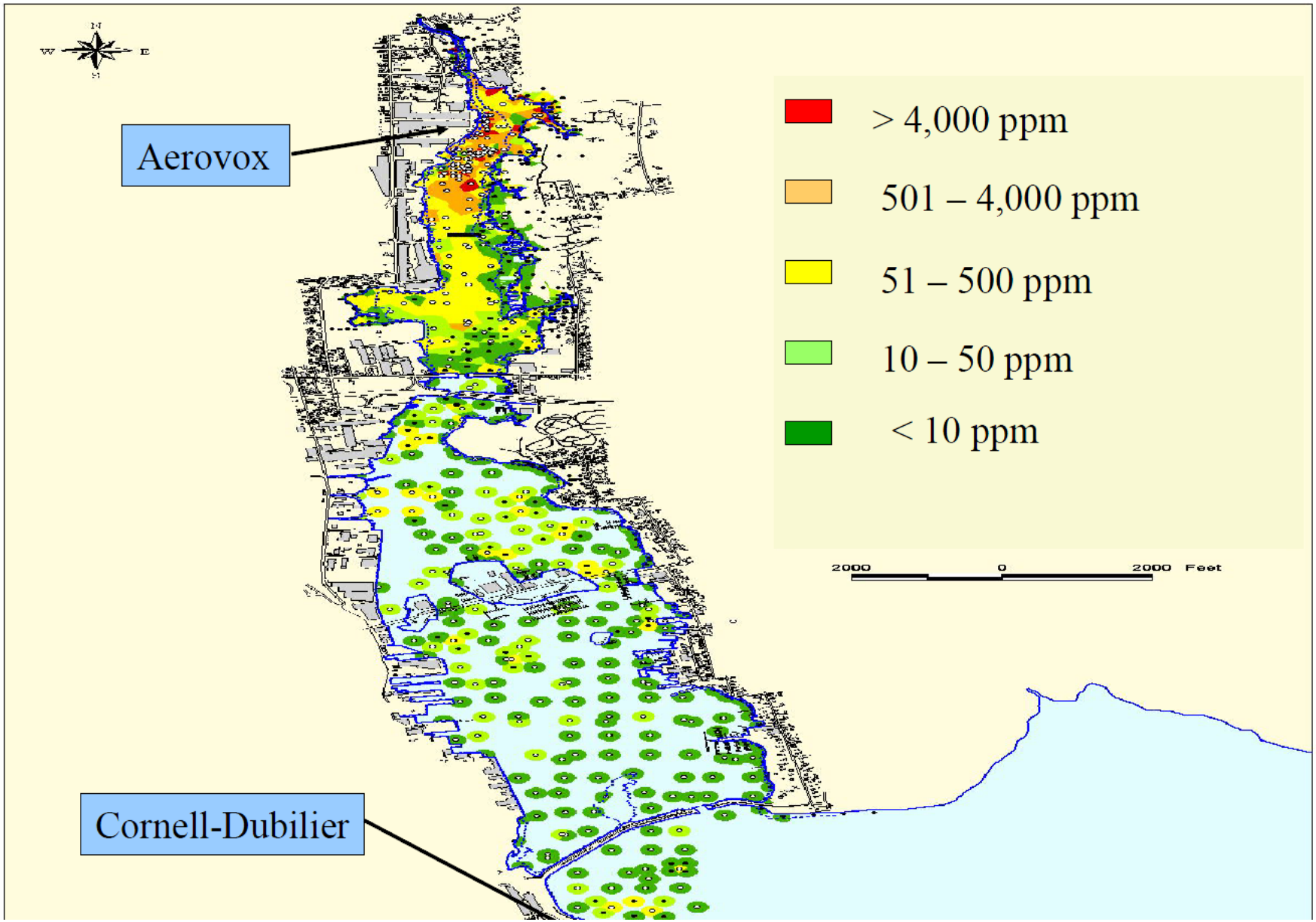


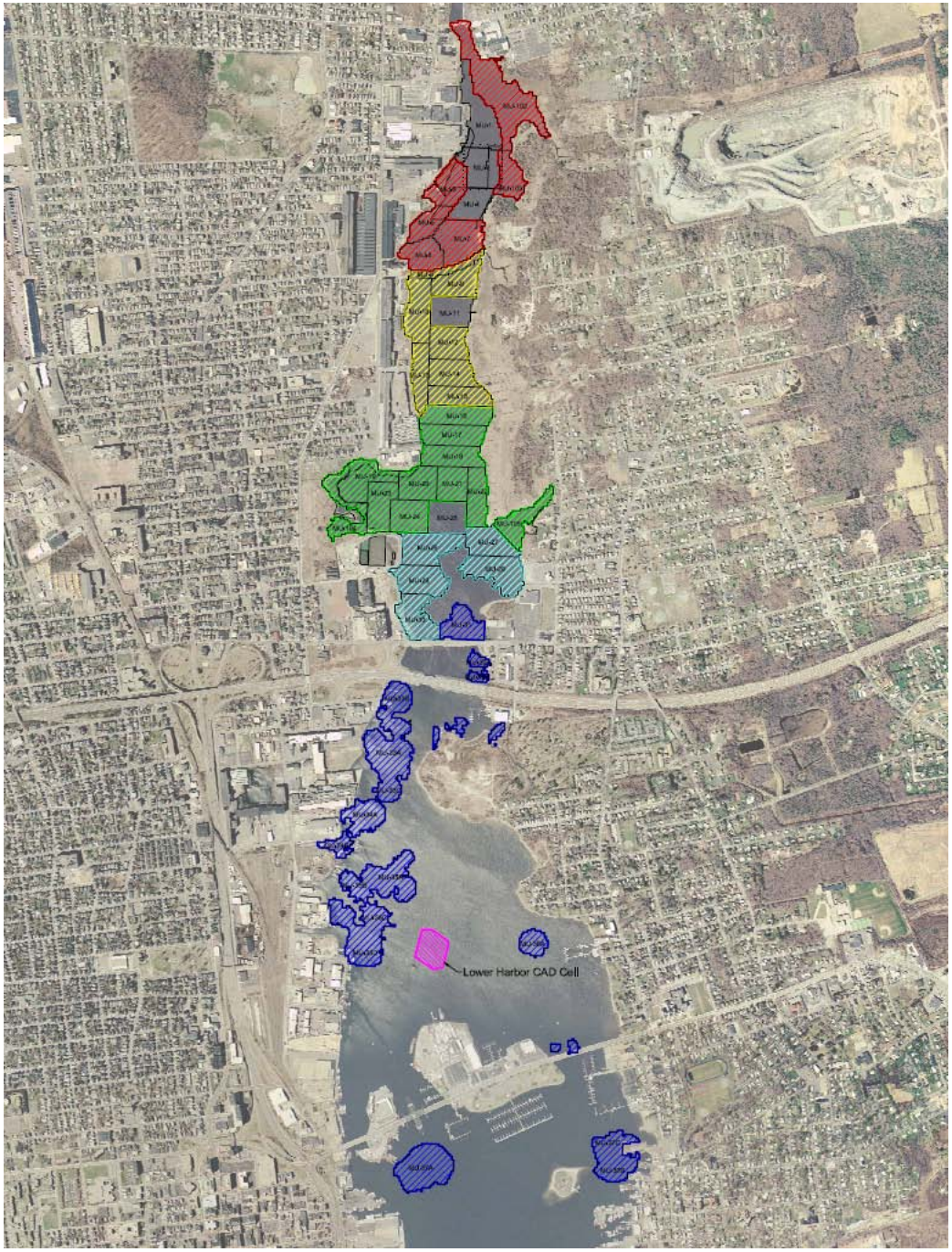
SDMS DocID 507222

New Bedford Harbor



PCBs in sediment – top foot





Dredging Area and Proposed Confined Aquatic Disposal (CAD) Cell Location

Legend

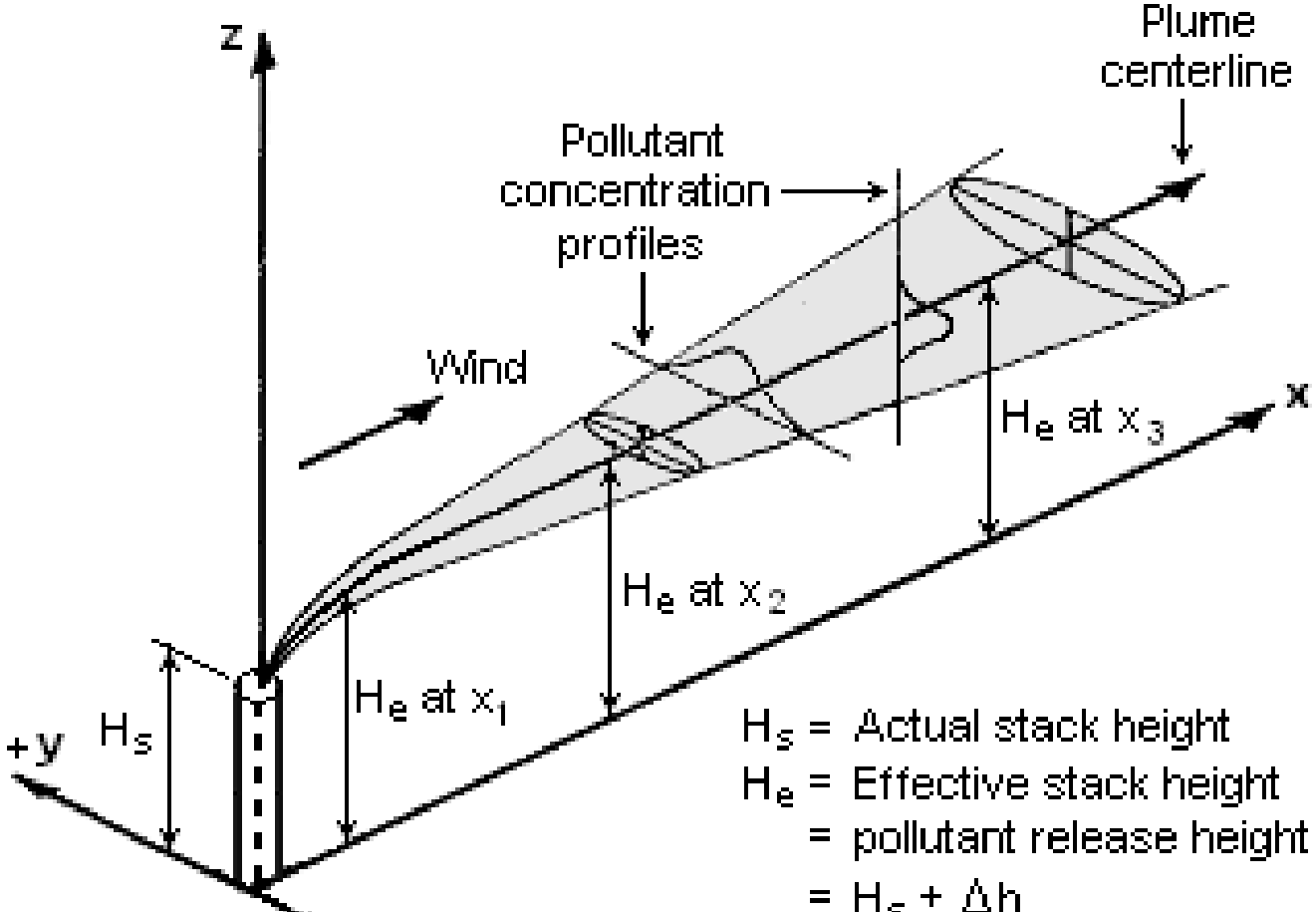
Hydraulic Dredging and Off-Site Disposal
- Composite Area 1
- Composite Area 2
- Composite Area 3

Mechanical Dredging and CAD Disposal
- Composite Area 4
- Composite Area 5

Proposed Lower Harbor CAD Cell

Air Quality Impact Modeling

- *ISC3 (Industrial Source Complex Model)*
  - is a steady-state Gaussian plume model



Final Evalution of Impact of Dredging and CAD Cell Disposal On Air Quality

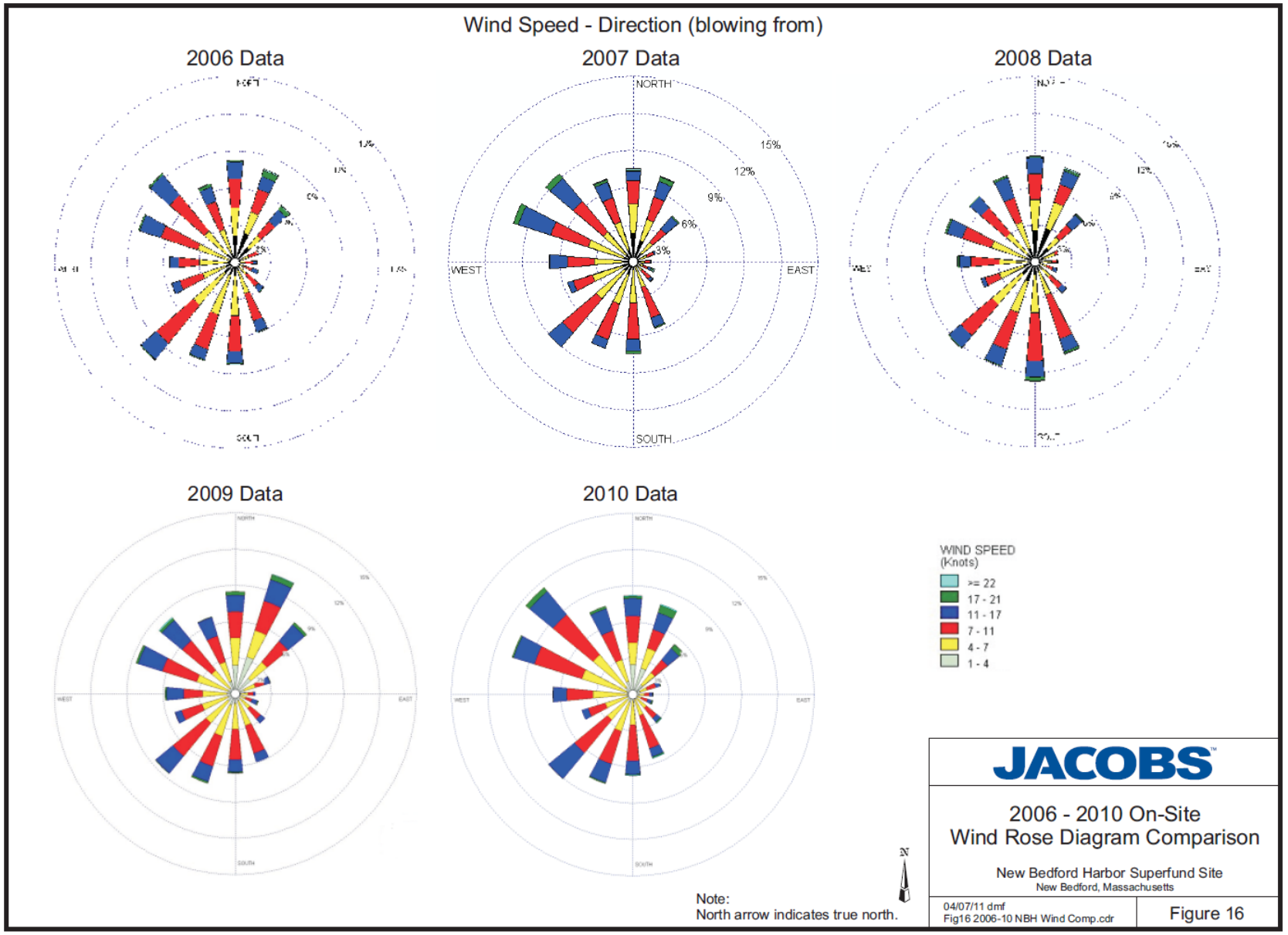
- Assumed Two Year Duration
- Modeled and validated based on 5 years of previous experience.
- Modelling split the harbor into 6 areas based on PCB concentrations.
- Areas 4 and 5 are the areas that will be dredged for placement into the Lower Harbor CAD Cell (LHCC)

Air Quality Impact Modeling

- The ISC models include a wide range of options for modeling air quality impacts of pollution sources, making them popular choices among the modeling community for a variety of applications.

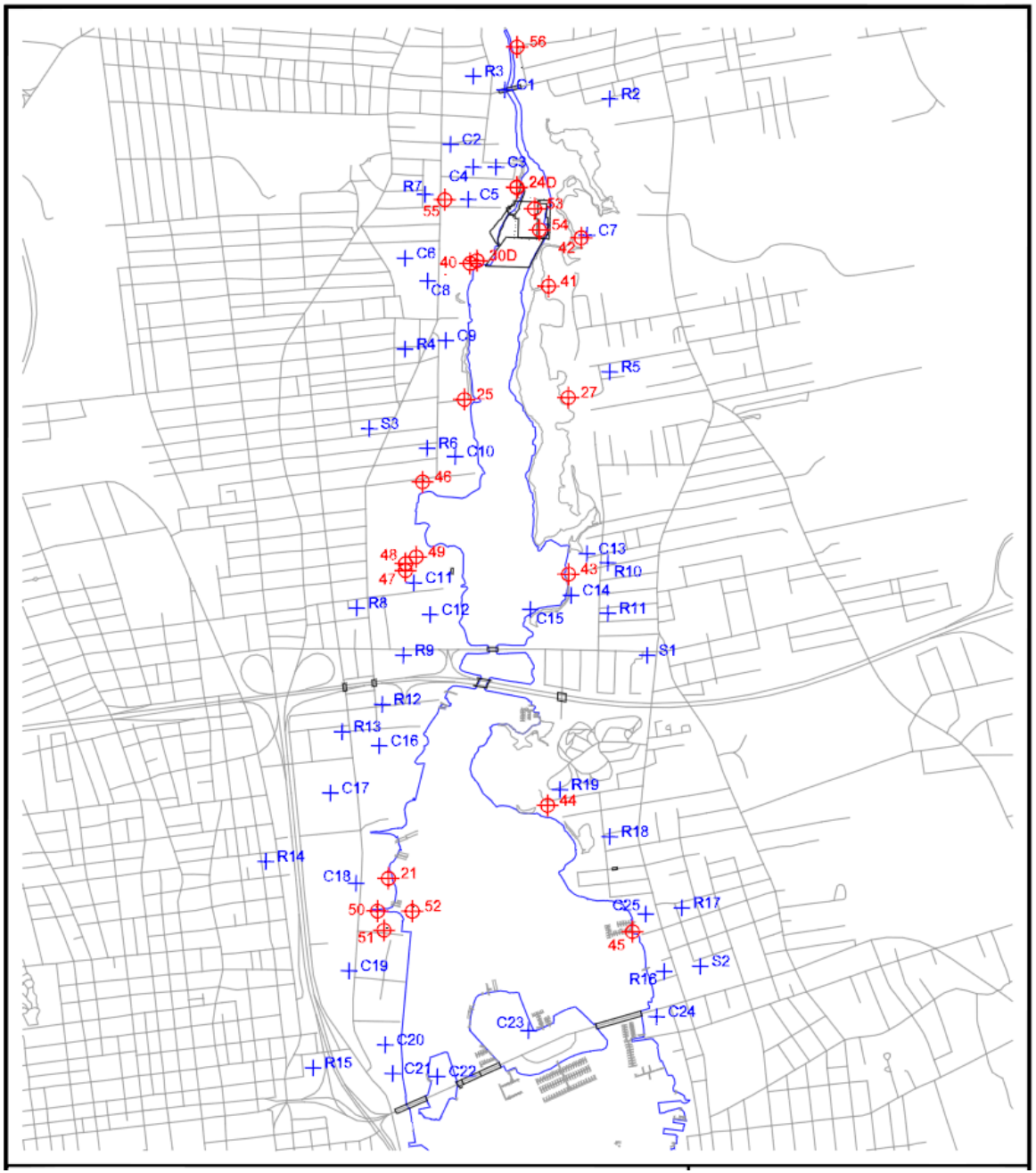
- The ISC model uses site-specific weather data and source/operation pattern.

NBH On-site Weather Data



Air Quality Impact Modeling

- The model was calibrated using data collected during the EPA long-term air monitoring program at New Bedford Harbor.
- Source term was derived from empirical testing of air emissions from sediment.



Monitoring Locations And Receptors

Air Monitoring Station

Discrete Receptors

Dredging and CAD Cell Operation: Assumptions

- Mechanical Dredging at relatively lower contaminated harbor areas for two years

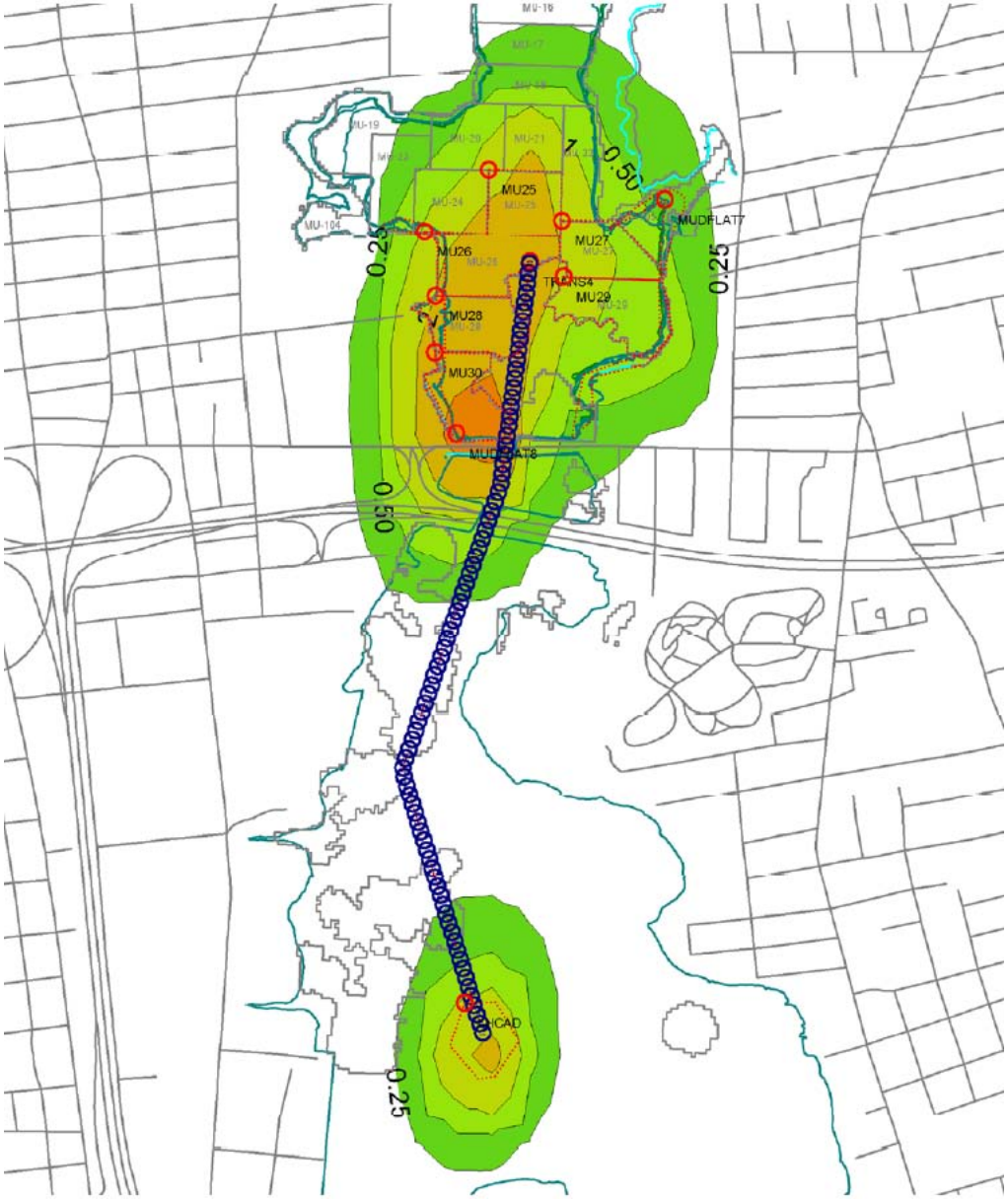
- Dredged Sediments will be disposed to Lower Harbor CAD Cell

- CAD Cell will be capped after two-years operation

PCB Emission Flux / Duration

Type/Process	Sources	Theoretical Emission Flux Rate (g/m^2-s)	Calculated Location specific Emission Flux Rate (g/m^2-s)	Emission Duration	Note
Background	Mud Flat in Harbor	8.84E-08	8.84E-08	Two 2-Hour Periods per Day	
	Aerovox Parking Area	4.42E-08	4.42E-08	Continuous	
Dredging	distrurbed water surface	2.56E-07 *	Based on PCB concentration in sediment	12 hour/per location	180 and 156 days for dredge season 1 and 2
	Exposed Dredging Bucket	5.31E-08 *	Based on PCB concentration in sediment	1 hour/per location	
	surface of barge (uncovered)	1.49E-07 *	Based on PCB concentration in sediment	2 hour/per location	
Transportation	surface of barge (uncovered)	1.49E-07 *	Based on PCB concentration in sediment	0.78 hour/per location along line for years 1 and 2	assumed a 1000 CY Barge for Upper and Lower Harbor
Disposal	Exposed Dredging Bucket	5.31E-08 *	Based on PCB concentration in sediment	16 and 12 hour/per location years 1 and 2	180 and 156 days for dredge season 1 and 2
	surface of barge (uncovered)	1.49E-07 *	Based on PCB concentration in sediment	16 and 12 hour/per location years 1 and 2	
	distrurbed water surface	2.56E-07 *	Based on PCB concentration in sediment	Continuously emission before capping	270 and 365 days for dredge season 1 and 2

PCB Air Modeling Results



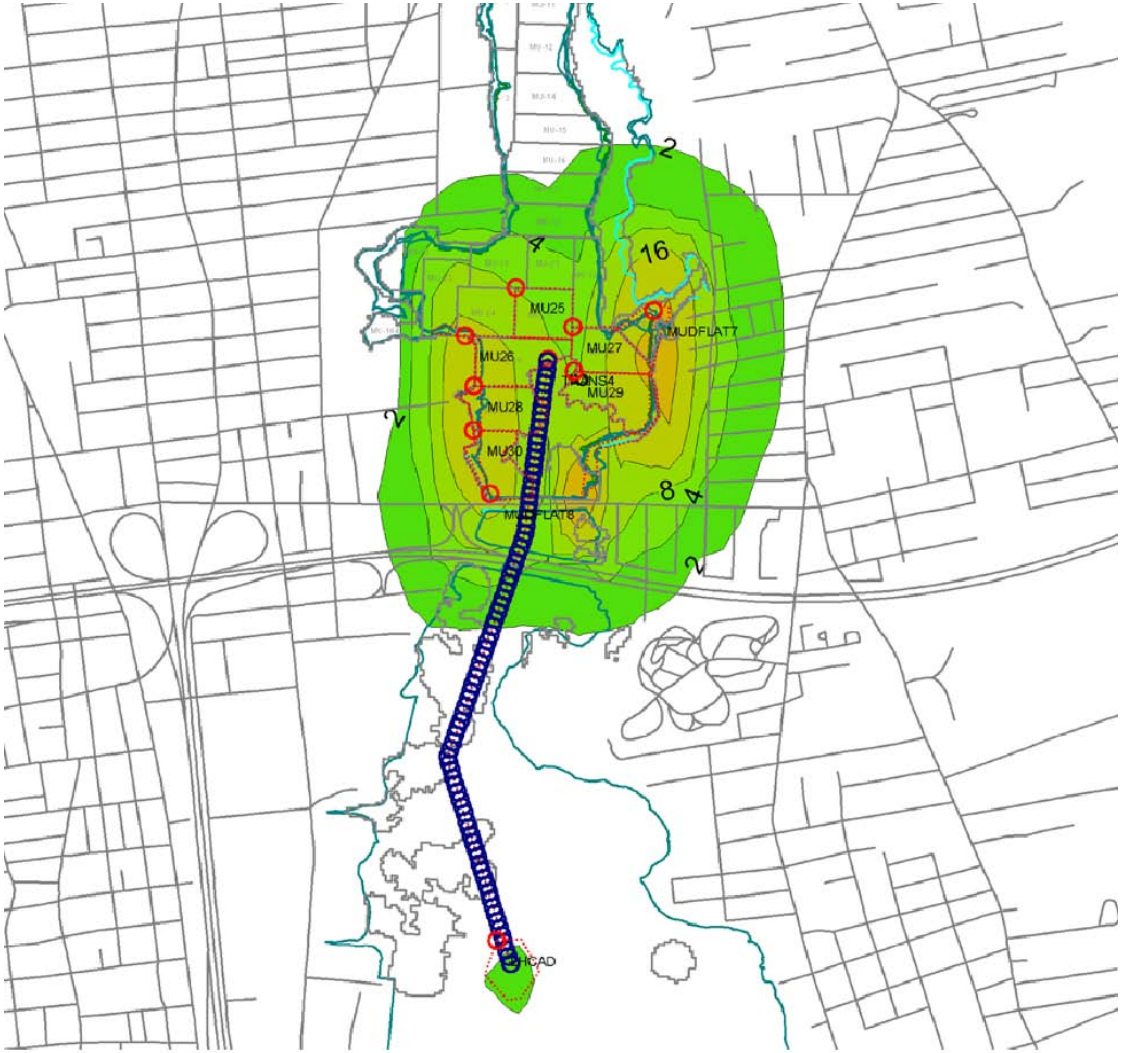
Model Predicted Annual Average Air PCB Concentration in Year -1 of dredging and CAD Operation Only

Concentration in ng/m³

0 0.25 0.5 1 2 4 8 10

Barge Transport Route

PCB Air Modeling Results



Model Predicted Annual Average Air PCB Concentration in Year -1 of all sources

Concentration in ng/m³

0 2 4 8 16 32 64 128 256 400

Barge Transport Route

PCB Air Modeling Results

Model Predicted Annual Average Air PCB Concentration in Year -2 of dredging and CAD Operation Only

Concentration in ng/m³

0 0.25 0.5 1 2 4 8 10

Barge Transport Route

PCB Air Modeling Results

Model Predicted Annual Average Air PCB Concentration in Year -2 from all sources

Concentration in ng/m³

0 2 4 8 16 32 64 128 256 400

Barge Transport Route

Conclusions

Results of the air dispersion modeling of the dredging and CAD activities show that the maximum annual impacts from the planned operations will remain far below the levels predicted from background source terms.

Margaret McDonough, EPA's risk assessment expert will discuss the risk aspect of these potential emissions.

PCB Emission Sources

Category	Location (Process)	Source Type	Emission Duration	Emission assciated with
Background	Mudflat	Area	Intermittent and Long-Term	Background
	Hot spot (Arevox)	point	Continuous and Long-Term	Background
Dredging operation	distrurbed water surface	Area	Short-Term	Remediation
	Exposed Bucket	Area/point	Short-Term	Remediation
	surface of barge (uncovered)	Area/point	Short-Term	Remediation
Emissions during barge transport	open to area	Line	Very Short-Term	Remediation
Emissions during filling of the CAD	distrurbed water surface	Area	Long-Term	Remediation
	Exposed Bucket	Area/point	Short-Term	Remediation
	surface of barge (uncovered)	Area/point	Short-Term	Remediation