Proposed Area D Work Plan for the Buffalo River, New York

Prepared for:

NYSDEC

Prepared by:

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
ASTM	American Society for Testing and Materials
AVS/SEM	Acid volatile sulfides/simultaneously extracted metals
DGPS	Differential Global Positioning System
FFS	Focused Feasibility Study
ft	foot or feet
GLLA	Great Lakes Legacy Act
GLNPO	Great Lakes National Program Office
mg/kg	Milligram per kilogram
NYSDEC	New York State Department of Environmental Conservation
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCT	Project Coordination Team
PEC	Probable Effects Concentrations
PSD	Particle Size Distribution
ROD	Record of Decision
SGV	Sediment Guidance Values
TOC	Total Organic Carbon
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

1 INTRODUCTION

This Work Plan has been prepared by ENVIRON International Corporation (ENVIRON) and MACTEC Engineering and Consulting, Inc (MACTEC), on behalf of the Buffalo River Great Lakes Legacy Act (GLLA) Project Coordination Team (PCT), including the United States Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO) and USEPA Region 2, the Buffalo Niagara Riverkeeper (Riverkeeper), the New York State Department of Environmental Conservation (NYSDEC), United States Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service, NYS Office of Attorney General, and Honeywell. This proposed plan recommends an approach for sampling the Area D Containment Cap in response to the NYSDEC's request for a Focused Feasibility Study (FFS). Results from the proposed sampling will be used in the FFS to evaluate remedial alternatives for the waste fill area, including the on-going use and maintenance of the existing cap as well as removal of the fill.

1.1 Background

In 1997, a slurry wall was installed to separate the upland groundwater in the Area D peninsula from the river, and an armored cap was installed over the nearshore sediments to separate them from surface water and biota. Remediation in the vicinity of Area D included removal and the installation of the Area D cap in accordance with the Responsiveness Summary in the Record of Decision (ROD), which states:

> *The proposed alternative for the Buffalo Color site will address the contaminated sediments around the site. A minimum of two feet of sediments will be removed from the river bank and replaced by a rip-rap/fabriform placed on a geotextile membrane.*

Under the RD/RA section of the ROD, the RD/RA states:

> *The purpose of this Remedial Design and Remedial Action (RD/RA) for the Buffalo Color Area "D" is to isolate and contain the Area D wastes through the following:*
>
> - *Use of a perimeter cutoff wall (slurry, bentonite panel, and/or flexible membrane liner [FML] and cap).*
> - *Continuation of shore stabilization along the entire length of the shore.*
> - *Excavate all fill material outside the cutoff wall to a point intersecting the stabilized shore slope and a line drawn parallel and two feet into the top of the alluvium layer. All excavated materials will be placed within the area to be contained beneath the cap.*
> - *Construct a perimeter groundwater collection system to prevent groundwater movement from the site.*
> - *The groundwater collection system would be expanded into the area of known non-aqueous phase liquid (NAPL).*

Currently, NYSDEC is asking Honeywell to propose a sampling program to evaluate the performance of the cap and to determine whether the cap can be maintained as a permanent component of the Buffalo River in-channel remedy.

2 PROPOSED SAMPLING

The proposed sampling includes geophysical monitoring and chemistry monitoring. Geophysical monitoring, which includes geophysical surveys, will be used to delineate the cap area, while chemistry monitoring will be used to evaluate surface sediment chemistry concentrations on the cap surface. Sediment chemistry concentrations will be evaluated against sediment criteria, including Probable Effects Concentrations (PECs) routinely used by USEPA and NYSDEC sediment guidance values (SGVs). The NYSDEC SGVs do not represent cleanup criteria; the comparison of sediment chemistry results to SGVs will be one factor considered in evaluating remedy alternatives in the FFS. If the sediment chemistry concentrations exceed their respective PEC or SGV values, additional analysis may be conducted to understand the chemical sources and to determine whether those concentrations pose an adverse risk.

2.1 Geophysical Monitoring

Geophysical Monitoring includes multi-beam hydrographic and side-scan sonar surveys to delineate the cap longitudinally and laterally in the river. Sub-bottom profiling may be attempted concurrently. To obtain horizontal and vertical survey data, geotechnical vessels will be equipped with a Differential Global Positioning System (DGPS) receiver interfaced to an onboard navigation computer. Vertical data will be referenced to NAVD88. The geophysical monitoring goals include the following:

- Verify Containment Cap dimensions in the river. The Area D Containment Cap was placed along the Buffalo Color peninsula shoreline. According to construction documents, the cap is approximately 630 ft long and approximately 30 ft wide in most areas (Figure 1); the cap is 50 ft wide at the widest area, tapering to 20 ft wide on the upstream and downstream ends.
- Physical monitoring will include a multi-beam hydrographic and side-scan sonar survey to delineate the cap longitudinally and laterally in the river. Sub-bottom profiling may be attempted concurrently with the other geophysical monitoring methods, but results may be confounded by the hard surfaces that would be reflected in the armored layer, preventing acoustic penetration through the Containment Cap. If the geophysical results do not allow a depth assessment of the Containment Cap, the 2-dimensional limits of the hard surface reflection may be used to indicate the aerial extent of the Containment Cap.
- Results of this task will include the preparation of maps that more clearly delineate the cap area, identify the proximity of the cap to the federal navigation channel, and provide geophysical images of the cap area to characterize distinctive features that may further inform cap placement and stability. The results also will be used to allow a more accurate placement of sediment cores within the boundaries of the Containment Cap, as discussed under Chemistry Monitoring, below.
- This work may be superseded or complemented by the geophysical surveys conducted by USACE in advance of pending navigational channel dredging under the Great Lakes Restoration Initiative (GLRI) program.

In addition to the geophysical monitoring of the cap area, an evaluation of the soil stability adjacent to the Area D slurry wall has been performed. The results of this evaluation will be used to determine what type of support structure is needed to maintain the integrity of the slurry wall if sediment removal adjacent to the cap area is performed. The results of this evaluation will be included in the FFS and considered in the evaluation of the remedial alternatives.

2.2 Chemistry Monitoring

NYSDEC collected two sediment cores (i.e., locations 6-702+50-R and 2-705+00-R) from the Area D Containment Cap area during the 2005 sediment sampling event (Figure 1). The core logs identified the presence of the sediment cap layers and the capped material. Sediment chemical concentrations of PAHs, PCBs, lead, and mercury in the sediment deposits above the cap and in the cap surface were generally low (Figure 1). Below the sediment cap, the core log reported soft silt and clay with petroleum odor and sheen and elevated chemical concentrations at one location (6-702+50-R), at a depth of 5.8–6.2 ft below the sediment surface, demonstrating the presence of the contained, capped material at this location. In addition, the core logs revealed the deposition of up to 4.5 ft of silt above the sediment cap at this same location, indicating significant natural deposition since construction of the cap. This natural deposition contributes to the burial and isolation of the capped sediment material. Notably, this also demonstrates the deposition potential in off-channel areas following sediment dredging.

Under this plan, chemistry monitoring includes the collection of nine sediment cores (Figure 2) at locations to be finalized after reviewing the results of the geophysical monitoring task. Five cores will be collected from the cap area and will contribute to the existing data that includes two cores collected from the Area D cap in 2005 by NYSDEC at locations 6-702+50-R and 2 705+00-R. Four additional cores will be collected offshore of the sediment cap, or at the outer boundary of the cap, depending on the lateral extent of the cap material placed into the river from the shoreline. Core depths will be up to 4-ft below the sediment surface, consistent with the Buffalo River Feasibility Study sediment chemistry guidelines. Sample intervals will occur as follows: 0-6 inches, 6-12 inches, 1-2 ft, and 2-4 ft below the sediment surface. The presence of armoring material may prevent attaining the full 4-ft sample interval at some locations, and shorter sediment cores may have to be collected to prevent penetration through the cap armor and geosynthetic fabric layers. Our intention is to protect these layers and the sediment cap from damage during coring.

Chemical analyses will include polycyclic aromatic hydrocarbons (PAHs), mercury, and lead, which served as indicator chemicals for identifying remedial areas in the Feasibility Study. Polychlorinated biphenyls (PCBs) is the fourth indicator chemical, but chemical analyses for PCBs are unnecessary based on the 2005 sampling event that showed low PCB levels ranging from 0.02 to 0.16 mg/kg in the vicinity of the cap.

The 1991 Buffalo River Area D Sites ROD identified additional inorganic and organic chemicals besides the four indicator chemicals that were measured at elevated concentrations in surface and subsurface soils. These additional chemicals include arsenic, cadmium, chromium, copper, iron, nitrobenzene, and chlorobenzene compounds (1,2-dichlorobenzene; 1,4-dichlorobenzene; 1,2,4-trichlorobenzene). Collected samples will also be analyzed for these constituents. Total organic carbon (TOC) analysis and particle size distribution (PSD) will be also included to characterize the surface deposit material, and the top two surface sample intervals from each core location will be analyzed for acid volatile sulfides/simultaneously extracted metals (AVS/SEM). The measured chemical concentrations will be screened by comparing them to guidance criteria, including the NYSDEC SGVs and PECs routinely used by USEPA. For locations where the measured chemical concentrations are greater than the guidance criteria and sediments may be exposed to environmental receptors, additional analysis may be conducted to understand the chemical sources and to determine whether those concentrations pose an adverse risk.

This task includes the preparation and interpretation of sediment core logs that identify the presence and lithology of the sediment deposits on the sediment cap surface, and chemical concentrations associated

with those deposits. The results of this sampling effort will provide further delineation of the Containment Cap area and further chemical characterization of the naturally deposited sediment material on top of the cap. Results will be presented in an Area D FFS, and comparison of sediment concentrations to guidance values will aid in determining whether additional characterization or additional remedial measures, such as monitoring of the existing cap area, additional capping, or sediment removal, are necessary to gain regulatory closure for the Area D in-channel deposit. The FFS will adhere to USEPA guidance (and appropriate NYSDEC guidance from DER 10) for the development of a focused feasibility study (http://www.epa.gov/fedfac/documents/822memo.htm) and will evaluate the remedy alternatives against such criteria as remedy effectiveness, implementability and cost. However, given the specifics of this site (remedial actions already taken, number of studies conducted, time constraints, etc.) the FFS will likely be an abbreviated document.

2.3 Sample Analyses

Chemical and physical sample analytes includes the following:

- Alkylated and non-alkylated PAHs (modified SW-846 8270)
- Nitrobenzene (SW-846 8270)
- 1,2-Dichlorobenzene; 1,4-Dichlorobenzene; 1,2,4-Trichlorobenzene (SW-846 8270)
- Arsenic (SW-846 6010)
- Cadmium (SW-846 6010)
- Chromium (SW-846 6010)
- Copper (SW-846 6010)
- Iron (SW-846 6010)
- Lead (SW-846 6010)
- Mercury (SW-846 7470)
- Acid volatile sulfides/simultaneously extracted metals (AVS/SEM) (USEPA 821/R-91-100)
- Total organic carbon (Lloyd-Kahn method, modified 9060)
- Grain size analysis (ASTM 2002)

3 DATA VALIDATION AND USABILITY

Data validation will be performed on approximately 10% or more of the samples, or as is consistent with data validation procedures performed to date on the Buffalo River. Missing information, deficiencies, and completeness will be reported as applicable and a data assessment summary will be provided. Data rejected as a result of the data validation and data that is usable as qualified will be included in the data assessment summary. Validation will be conducted in accordance with USEPA guidelines and will be consistent with the data quality levels employed by GLNPO and USACE to date to support the existing characterization of the river.

Analytical laboratories will be selected prior to initiation of field work to perform physical and chemical analyses (sediment, water, and tissue). Samples will be analyzed according to the procedures specified by the current USEPA SW-846, *USEPA Methods for the Analysis of Water and Wastewater*, other standard analytical methods (e.g., ASTM), or specialized methods that have been published in peer-reviewed scientific literature, as identified in the project QAPP. All laboratories used for this project will conduct the work under their respective Laboratory Quality Assurance Plans which can be made available upon request.

4 SCHEDULE AND REPORTING

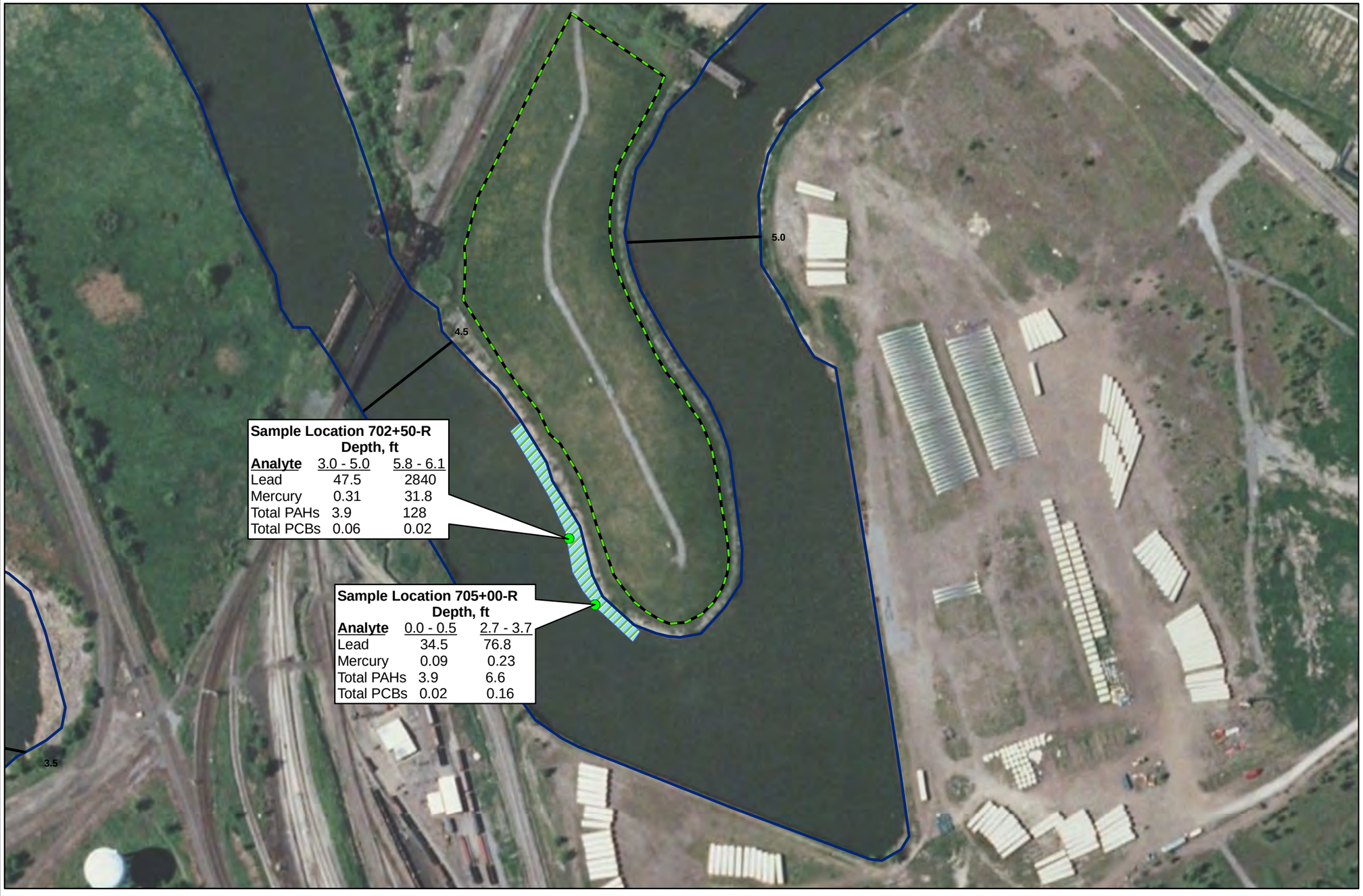
The results of this sampling effort will provide further delineation of the Containment Cap area and further chemical characterization of the naturally deposited sediment material on top of the cap. A FFS will be performed to make a determination whether additional characterization or additional remedial measures are necessary to gain regulatory closure for the Area D in-channel deposit.

The anticipated schedule for implementing the field sampling work and reporting is as follows:

Table 1. Proposed Project Schedule

Task	Target Completion Date
Draft *Proposed Area D Sampling Plan*	January 18, 2011
NYSDEC review of the *Proposed Area D Sampling Plan*	January 28, 2011
Final *Proposed Area D Sampling Plan*	February 28, 2011
Project mobilization and field sampling	April 2011
Analytical processing	May 2011
Area D Focused Feasibility Study	July 2011

Figures



Legend

- 2005 Core Location Near In-Channel Cap Area
- Mile Mark Designations
- Slurry Cutoff Wall
- Buffalo River Area of Concern
- Approximate In Channel Sediment Cap Area

0 140 280 560
Feet

N

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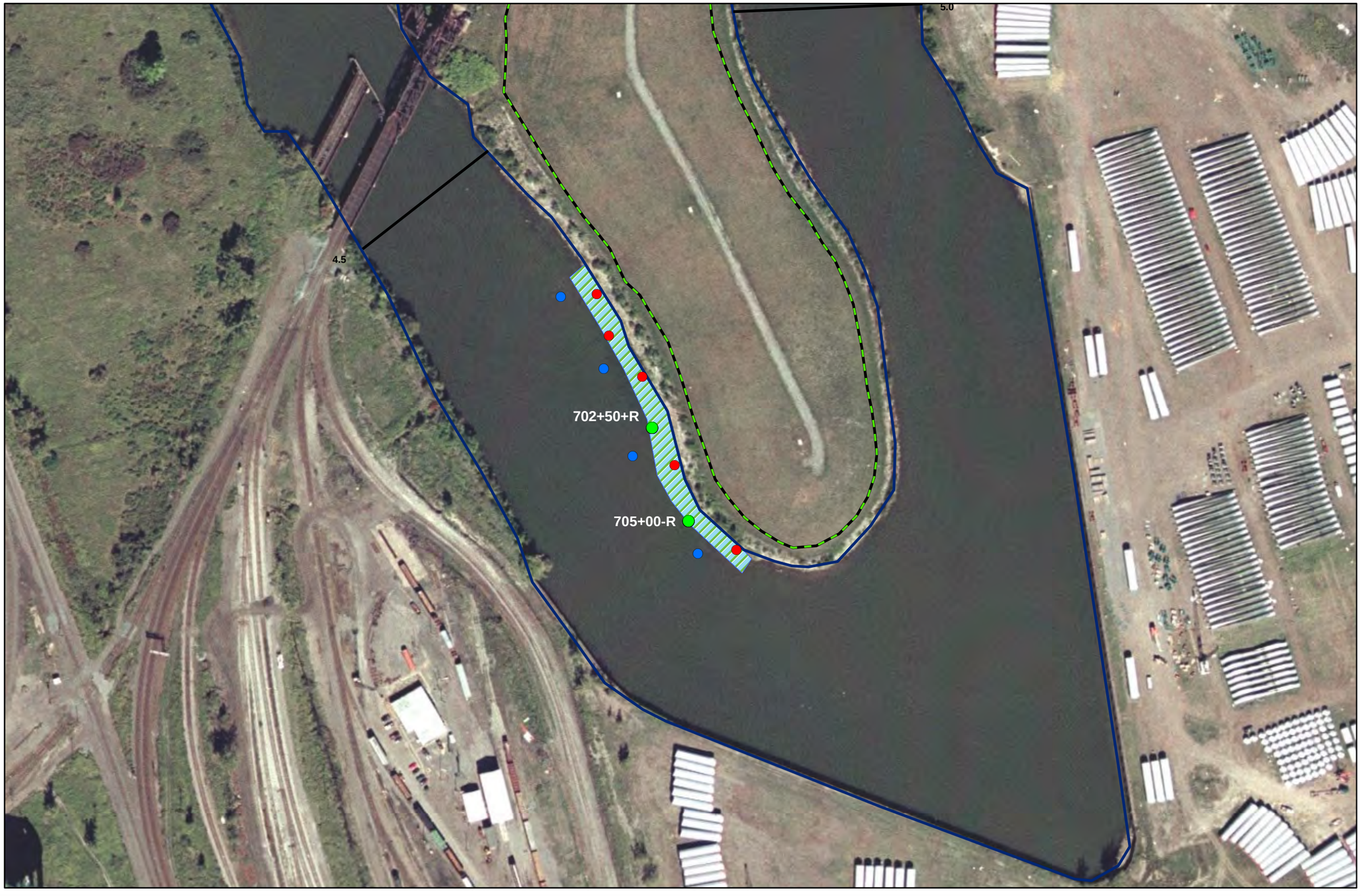
APPROXIMATE SEDIMENT CAP AREA
BUFFALO RIVER

Figure
1

Drafter: B. Radakovich
Contract Number:
File Name: 20110113_SedimentCap_Results.mxd



Legend

- Proposed Sediment Cap Samples
- Proposed Sample Locations Outside of Cap Boundary
- 2005 Core Location Near In-Channel Cap Area
- Mile Mark Designations
- Slurry Cutoff Wall
- Buffalo River Area of Concern
- Approximate In Channel Sediment Cap Area

0 105 210 420
Feet

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PROPOSED SEDIMENT SAMPLING LOCATIONS FOR SEDIMENT CAP AREA BUFFALO RIVER, NEW YORK

Figure 2

Drafter: B. Radakovich
Contract Number:
File Name: 20110112_SedimentCap_Proposed