

Project Name: Cedar Creek OU2A

Project Location: Cedarburg, Wisconsin, USA

Award Category: Environmental Dredging

Project Owner: Craig Dousharm, Mercury Marine,

Team Members:

JF Brennan Co., Inc., Infrastructure Alternatives, Inc., Rams Contracting, Ltd., Cardno & Natural Resource Technology, Inc.

Paul Olander, JF Brennan Co., Inc. La Crosse, WI, USA

Date: May 7, 2018



The dredge Palm Beach operating within the tight confines of Wire and Nail Pond. Although this pond is quite narrow laterally, it was well over 20 feet in depth in some locations. The long ladder of the Palm Beach equipped with the Vic Vac™ attachment allowed the Team accurately and effectively navigate the rocky, undulating surface below. (Photo courtesy of JF Brennan Co., Inc.)



Project Overview Summary

The project selected for submittal by JF Brennan for the WEDA Environmental Dredging Award is the Cedar Creek PCB Remediation project. Performed for our client, Mercury Marine, under USEPA SuperFund, the project is known as Cedar Creek Operable Unit 2A. During the 3 phase project, JF Brennan performed both mechanical and hydraulic dredging as well as upland removal of over 78,000 cubic yards of PCB impacted sediments within Cedar Creek and almost 900 feet of underground structures in historic Cedarburg, Wisconsin. Following dredging, over 22,000 cubic yards of sand was placed using Brennan's patented BCS to bolster and further support the benthic community within 3 different reaches of the project area and approximately 3,500 truckloads of contaminated material were removed from the site for proper disposal.

The sediments targeted by this project were contaminated by PCB-containing hydraulic fluids, decades ago. An extensive characterization of the Site has been performed over the past two decades, with the most recent pre-design investigation (PDI) sampling occurring in 2014 and 2015 (Anchor QEA, October 2016). PCB levels in the sediment, measured during the PDI ranged from non-detect to 345 mg/kg (Anchor QEA, June 2016). Sediments containing PCBs at concentrations in excess of 50 ppm are regulated under the Toxic Substances Control Act (TSCA) and must be disposed of in Resource Conservation and Recovery Act (RCRA) Subtitle C-licensed facility.

There were a number of restrictive project requirements with safety implications. Among these were tight timelines, work in close proximity to existing and occupied residences, removal of PCB contaminated sediments from underground structures in confined spaces, work in proximity to and, in one case, underneath historical structures as well as having a project site in the middle of one of the most historic cities in the state of Wisconsin. Weather, of course, was a challenge with the project running through all four seasons.

The Project Owner, Mercury Marine, began the process of paving the way for the remedial effort years before the first cubic yard of sediment or soil was removed. Mercury Marine has spent countless days meeting with residents from the Cedarburg community, making house calls to educate residents on the workings of the projects. They have personally spoken with each household that was directly impacted by the work. They have held numerous public meetings in which the phases and impacts of the work were covered and Q & A sessions were held to address any further comments that the public felt necessary covering. Presentations and tours were given to students from grade school through college to provide a first-hand account of how environmental remediation is performed in today's world. The success of this Project would not have been possible without the effort put forth upfront by the Mercury Marine Staff. Their willingness to spend the time and prepare the community has payed huge dividends and for this, all parties and stakeholders involved are grateful.

Award Category: Environmental Dredging

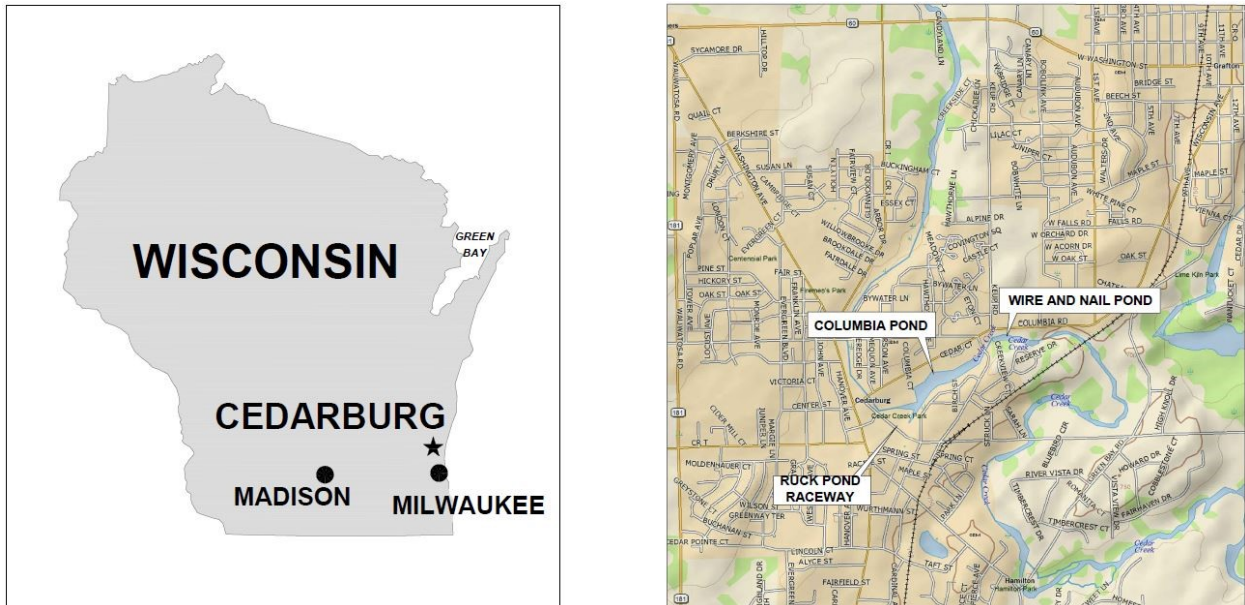


Figure 1: Project Location Overview

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Environmental Benefits

The primary environmental benefit of the work conducted at the Cedar Creek OU2A Site is the removal of polychlorinated biphenyl (PCB) from the Cedar Creek watershed and it’s associated, mapped flood plain, specifically Ruck Pond Raceway through Columbia Pond and ending at Wire and Nail Pond Dam to de minimis concentrations. Through the process of removing contaminated sediments and soils, numerous other environmental benefits are also realized, which include but are not limited to removal of accumulated sediment and debris thus resulting in a greater and more useful water depth for the aquatic biota, removal of non-native invasive species and replacement with native materials as well as a jumpstart towards the highly anticipated removal of this portion of Cedar Creek from the list of Wisconsin Fish Consumption Advisory Waters, just to name a few.

Challenges

The work on Cedar Creek provided a full gambit of environmental challenges for the Project Team to overcome. These challenges included shallow water conditions, which disallowed, standard practice construction equipment access to remove the target material from specific areas, the presence of TSCA



mapped sediment concentrations pocketed throughout the tight confines of Columbia and Wire and Nail Ponds, the footprint of the work was conducted literally in the backyards of the affluent City of Cedarburg, Wisconsin as well as the ever changing weather conditions and harsh winters that marine based operations offer in the Upper Midwest.

Mitigation

Environmental mitigation measures were a top priority during design and implementation of the work carried out on Cedar Creek OU2A. Various types of measures were employed throughout the phases of the project, examples of the types and measures are listed below:

- **Prevention and Control Measures:** When constructing the Sediment Processing Areas (SPAs), the Project Team utilized robust materials with projected life spans that would long exceed the short duration of the Project. In many cases additional material types were utilized to further fortify these areas.
- **Remediation Measures:** All of the upland Remedial Areas (RAs) were regraded and replanted with native species following the removal of contaminated soils.
- **Compensatory Measures:** Although all of the wetland areas disturbed during the lifecycle of the Project would be fully restored to pre-existing conditions or better by the completion of the Project, the Project Owner provided funds to the Wisconsin Wetland Mitigation Credit Program as if the wetlands would be permanently lost.

Drawing Parallels with Engineering with Nature

Though not directly tied to the U.S. Army Corps of Engineers (USACE) Engineering with Nature Program (EWN), the Project team did incorporate certain facets of their approach to the USACE's principles. Examples include, performing the work in collaboration with the USEPA Superfund Program and the various entities with the Wisconsin Department of Natural Resources and broadening the range of benefits to both the residents of Cedarburg and local wildlife community by revegetating shorelines and wetlands with avian friendly wetland species as well as providing locally found fill materials for potential spawning sites for resident ichthyos.

Innovation

Taking steps beyond "traditional" environmental protection

The Project team has been at the forefront of environmental protection from the grassroots of the effort. The Project Owner has voluntarily stepped forward to perform the remediation of the Cedar Creek watershed, which began in the mid-1990s. They have continued a tradition of "doing what's right" for both the community and the environment.

Breaking New Ground

This project, as well as many projects around the country, employed state of the art technology to tackle many of the environmental challenges to the site presented. Examples of the technology used on this specific site include removing thin deposits of light, soft, contaminated sediment by way of the Vic Vac™ and effectively broadcasting precise thickness sand covers by utilizing the patented Brennan BCS™.



Both of these technologies paid dividends to the project and the environment as a whole, but one such technology was utilized in which this project may have “broken new ground”.

One specific area within the Project footprint was extremely difficult to access by man or woman alone, much less by conventional earthwork equipment. Its location lies below the Columbia Pond Dam, in a heavily wooded mix and clutter of sparsely soiled, rock islands and flood plains. Even without the foliage in full bloom, one cannot see from one end to the other. This area is home to many fish which live in its pools and animals who hide from the surrounding urban atmosphere during the day and roam the banks of the creek by night. This area required remediation of upland soils as well as sediments. Conventional construction habits would have mobilized equipment to clear cut this area to allow more effective access to the target contaminants. After much consideration, the Project Team asked themselves “there must be a better way to do this.” And through this an idea was born.

A collaborative effort between Brennan and Veolia Environmental Services mobilized a Supersucker® pneumatic vacuum truck to the nearest adjacent parking lot area and deployed a long line suction hose to each of the target areas. From there, crews utilized hand tools to loosen the surficial soil and sediment and sent it through the transfer hose and back to the confines of the truck. Crews likely utilized more physical effort to perform the removal in this manner but the results left a miniscule impact on the surrounding environment in comparison to more destructive conventional approaches.

Sustainable Approaches

The original dredging design specified the use of traditional construction equipment including an excavator equipped with a clamshell bucket to remove the sediments, place them into a small barge and transport the material to an off loading area where it would have been trans-loaded to an area for dewatering and stabilizing. The capping would have followed a similar process only in reverse. By using hydraulic removal and hydraulic placement of the caps the project team was able to effectively and efficiently move materials with far less equipment there for reducing the use of fuel, air emissions and even stabilization agents that would have increased the amount of material needed to be transferred to the landfill again reducing air emissions and preserving valuable landfill space.

Economic Benefits & Transferability

Initially, the Cedar Creek OU2A Project was bid as a mechanical dredging remedy. The team of Brennan, Infrastructure Alternatives (IAI), RAMs Contracting, Cardno and Natural Resource Technology (NRT), proposed an alternative approach which involved the majority of the contaminated sediment removal to be performed by way of hydraulic dredging. Through the hydraulic dredging alternative method, economic and environmental benefits were gained. Sediment transport was performed through a closed pipeline system which significantly reduced the risk of contact with the surrounding environment outside of the SPA. It introduced less turbidity to the water column and was less intrusive to the surrounding ecology. By employing passive dewatering approaches through use of geotextile tubes, less equipment was necessary to stabilize the sediment and thus less fossil fuel was consumed. All of these benefits ultimately led to a more cost effective alternative for the client than the original methodology.

Positive Impacts to the Stakeholders and Economy



The primary stakeholders in the Cedar Creek OU2A Project are the residents of Cedarburg, WI. These residents live adjacent to the waters and uplands in which work was performed and will reap the benefits from the remediation performed here. By way of the remedial action, they receive a cleaner environment to conduct their business and raise their families. The City will likely see increased tourism as the waterways will soon lose the stigma as being “contaminated”. Residents once impacted by the construction have received restored and in many cases improved landscaping and views of their water frontage.

As mentioned above, the City can increase tourism by advertising that the work is now complete. More visitors to town will result in more dollars spent locally.

In terms of the work, the Project employed Midwest Contractors and a large portion of workers from the Project’s home state of Wisconsin. The dollars earned by these businesses go back into the pockets of the local workforce and subsequently passed on to other local business. This effort was Midwest workers and companies coming together to help other Midwesterners, which is the essence of Midwest hospitality.

Outreach and Education

The Project Owner has spent countless days meeting with residents from the Cedarburg community, making house calls to educate residents on the workings of the projects. They have personally spoken with each household that was directly impacted by the work. They have held numerous public meetings in which the phases and impacts of the work were covered and Q & A sessions were held to address any further comments that the public felt necessary covering. Presentations and tours were given to students from grade school through college to provide a first-hand account of how environmental remediation is performed in today’s world.