

Collaborative Strategy for Dredging and Environmental Restoration Projects: Annapolis, Maryland

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Abstract

When Annapolis was chosen as a stop for the 2005-2006 Volvo Ocean Race (VOR), the premier round the world sailing yacht competition, City planners were tasked with preparing the City Harbor and Channel for the fleet's arrival in May 2006. Unlike previous VORs this planning would include dredging to support a new class of racing yacht 70-feet long, designed to draw 14.8 feet of water. This need sparked City officials who had for some time been contemplating increasing harbor depth to allow entrance of deeper draft vessels. Planners realized the cost associated with such work could be prohibitive to Annapolis' budget goals. To solve this potential dilemma, the City hired the design firm KCI Technologies, Inc. KCI and the City teamed to pursue a collaborative strategy to complete the work in parallel with environmental restoration efforts in the region.

Initial concepts for the dredging and associated material placement were generated and advanced by KCI. At the same time, all necessary background information was compiled for the dredging including a material characteristics assessment, updates to hydrographic surveys, and consultation with VOR yacht design firms to assess controlling parameters. During the preliminary designs, Greenbury Point, owned by the U.S. Naval Academy was identified as a possible location for beneficial use of the dredged material. The Greenbury Point peninsula, located at the mouth of the Severn River, was identified because of its close proximity to Annapolis Harbor and the need for environmental restoration at the site, including stabilization of a potentially failing berm, existing fresh water ponds, and wetlands associated with an historic Dredge Material Placement (DMP) site. Greenbury point also contained opportunities for wetlands creation through dredge material placement utilization and reforestation.

The team also recognized that the project could potentially serve as a model for local DMP. Local officials noted that the space availability for DMP sites, especially on the larger scale of regional DMP sites, is continuously being reduced through land development while capacity requirements remain at least stable.

Based upon the preliminary designs, the City of Annapolis requested Congressional funding for the project through the Aquatic Ecosystem Restoration portion of the Water Resources Development Act (WRDA), also known as a Section 206 project. With the background data provided by the team, initial Congressional funding was allocated to the project with the U.S. Army Corps of Engineers (USACE) tasked with completing the work.

After choosing several potential scenarios for advancing the project, KCI, Annapolis, and USACE assembled potential shareholders including the Maryland Port Administration (MPA), U.S. Naval Academy, U.S. Fish and Wildlife Service (USFWS), Maryland Environmental Service (MES), and Anne Arundel County Soil Conservation Service to ascertain the potential benefits to the region from the project. By providing positive leadership and direction to the project, team leaders were able to forge a consensus among all partners through a mutually beneficial Collaborative Strategy approach. This Collaborative Strategy sought simply to provide a “win” for all involved team members.

With a Collaborative Strategy in place, and with a strong interest in providing environmentally beneficial uses of dredged material, MPA agreed to earmark an existing DMP site for disposal of the Annapolis Harbor dredge material in exchange for participation in the Greenbury Point restoration portion of the project. In addition a time-optimized design for the dredging and material placement was produced which allowed the dredging of Annapolis Harbor to be completed in early 2006. During the same period KCI continued Section 206 project development based upon inputs of team members, drafting a Scope of Work and cost estimates for the entire project. This information was used to secure further funding from Congress from which design of the Section 206 portion of the project is currently advancing.

Introduction

When Annapolis was chosen in the fall of 2002 as a stop on the 2005-2006 Volvo Ocean Race (VOR), City planners were tasked with preparing the City Harbor and Channel for the fleet’s arrival in May 2006. Annapolis Harbor is one of the busiest recreational boating centers in the country and is proclaimed “America’s Sailing Capital”. Estimates for the VOR stopover put the tourist revenue for Maryland at \$50 million dollars when including the Baltimore Harbor portion of the event as well.

Unlike previous VORs this planning would include dredging to support a new class of racing yacht 70-feet long, designed to draw 14.8 feet of water. This need sparked City officials who had for some time been contemplating increasing harbor depth to allow entrance of deeper draft vessels. Planners realized the cost associated with such work could be prohibitive to Annapolis’ budget goals. To solve this potential dilemma, the City hired KCI Technologies, Inc. to provide project direction and engineering. KCI and the City teamed to pursue a collaborative strategy to complete the work in parallel with environmental restoration efforts in the region. The overall

project would eventually include full design and permitting for the dredging work, including an evaluation of beneficial use options for the dredged material, a geotechnical and environmental investigation, hydrographic surveys, construction phase services and design of a DMP site with associated environmental restoration components at Greenbury Point (Figure 1) including reforestation, protection of existing freshwater ponds (Figure 2), berm stabilization (Figure 3), removal of invasive species, and wetland/DMP construction.

A Model Project

The possibility of creating a DMP site at Greenbury Point also presented an opportunity for regional dredged material management. A DMP site at Greenbury Point tied directly to environmental restoration would accomplish several goals and serve as a model for similar future projects in the region. For one, the new DMP site would provide a much needed resource for the highly maritime Severn River area. The project would also provide a site associated with environmental restoration of unique and relatively isolated habitats proximate to dredging areas. In the context of regional dredge material management these goals could be significant for future needs.

DMP facilities within the Chesapeake Bay, as in other portions of the country have focused upon larger volume sites. These larger sites usually have been located away from population centers due partially to negative environmental perception. The sites also in most cases included a regional component to their use so that smaller dredging projects may require transport of material over significant distances to reach the facility. With the potential project at Greenbury Point, the team saw the possibility of filling a need by constructing a localized smaller DMP site that would serve the immediate project area and the associated environmental restoration work would provide the means for positive public recognition of the project.

The potential Greenbury Point project would provide a working model for meeting future regional and local placement needs. This model would rely on direct ties with environmental restoration to gain support while also utilizing land that in the past may not have been considered for such projects. It is envisioned that this model could then be implemented throughout the region to create a system of smaller local DMPs to supplement existing large regional sites.

Before the overall project concept including the potential Greenbury Point DMP site could move forward team leaders would need to create a viable strategy for accomplishing the project goals.

Collaborative Strategy

Several challenges were identified early on that could potentially slow project progress including a fixed deadline, a large number of potential stakeholders, and

limited funding. The means by which potential pitfalls were handled and transformed to produce success can be attributed to a Collaborative Strategy which was utilized by the project team throughout the project execution. The strategy was primarily focused on delivering a “win” to all involved parties, and was composed of the following phases; 1) Definition of the Project Concept; 2) Identification of Stakeholders; 3) Development of Project Goals; and 4) Implementation. These phases provided a framework of how the project would proceed. The project team recognized that these phases themselves however were not mutually exclusive of one another and overlap was expected.

Definition of the Project Concept

The first phase of the Collaborative Strategy required effective definition of the project concept. The amount of information necessary to provide a definition for a project will vary based on the goals and project direction of any given project. In the case of the subject project, definition in sufficient detail for further development was gained with completion of the initial design study. This initial study stretched from early 2003 to the end of 2004.

The objective of the initial design study initiated in 2003 was to create several options for dredging the harbor along with the placement of the resulting dredged material. In addition, KCI identified technical constraints, estimated quantities of dredged material, identified permitting requirements, and developed concept-level cost estimates.

Initially, Annapolis Harbor had a controlling depth of about -13 feet at mean low water (MLW). Therefore, three scenarios for dredging were investigated at depths of -17 and -20 feet below mean low water (MLW). In addition, dredged material volumes and characteristics were determined based on preliminary data. Volumes were calculated for each option at each depth. Concurrently, a bulking factor was estimated based on the geophysical conditions at the site. The study also addressed scheduling for dredging to avoid interruption of recreational boating and fisheries impacts and included recommendations for removal of mooring points. Recommendations were also made for determining horizontal and vertical location of an existing 16-inch diameter water main crossing Annapolis Harbor. It was determined through this investigation that the water main would not have to be relocated to facilitate the dredging.

The initial design study also evaluated a half dozen potential options for disposal of the material from Annapolis Harbor. From the evaluated options, two concepts were identified for further study. In both concepts dredged material would be placed behind a stone-armored dike off-shore which would be utilized to create a tidal wetland. The dredged material would be filled to a depth just above mean tide with material placed to provide upland habitat as well. The material could either be mechanically dredged or hydraulically dredged and pumped to the site.

Upon completion of the initial study in the fall of 2004, KCI was tasked with continuing project development. Hydrographic surveys of the project area were completed at this time to assess existing conditions within the main channel and harbor for use as the basis for the final design.

At the same time, dredging contractors were contacted to ascertain market pricing for similar projects within the region. A tidal frequency analysis for Annapolis was also conducted to establish the probabilities of certain tidal heights occurring while the VOR yachts were present in May 2006. Further important background data were gathered through meetings with the naval architecture firm, Farr Yacht Design, tasked with the design of several of the new Volvo 70 vessels and consulting the design rules for the boats contained in *The Volvo Open 70 Rule of 2003*. These design rules specified how the yachts could be constructed and included the maximum allowable dimensions of the racing yachts. Meetings were also conducted with Ocean Race Chesapeake and the Annapolis Harbormaster's Office to ascertain local expectations for the dredging project. The new yachts for the VOR would draw 14.8 feet of water and were to be equipped with a hydraulic keel canting mechanism. With this information, calculations were completed for several scenarios. It was decided that the planned dredge depth would be set at the 99th percentile tidal frequency depth, or -17.0 feet below MLW. Expected in-situ material quantities for the 50-foot wide 3,500-foot long channel dredging came to approximately 14,000 CY.

With specific project parameters in place, preliminary design drawings were completed in November 2004. Permit applications were prepared and submitted based on the evolving design to expedite processing. To assure that permit approval would not delay the project, an open dialogue with regulatory personnel was maintained throughout the project. This allowed for modifications to the permit application to be made expeditiously, since a material placement site was not chosen until later in the design phase.

A geotechnical and environmental investigation for the project area included a boring program with sample analysis. Borings were conducted from a barge with a tripod-mounted SPT sampler. Environmental analyses were conducted for SVOCs, metals, PCBs, pesticides, TPH, and organic carbon. Testing was also conducted to ascertain the viability of using polymer technology combined with Geotube dewatering containers to dewater the dredge material.

Stakeholder Identification

Phase two of the Collaborative Strategy involved identification of potential stakeholders. In beginning this phase, a list of possible stakeholders was created. When developing the potential list of stakeholders several questions were considered which included; Is the potential stakeholder able to provide funding? Does the potential stakeholder own the property or adjacent lands which could affect the project? Is the entity a regulatory body which may impact permitting? Has the entity

previously been involved at the site and can their institutional knowledge provide benefit to the project? Is the entity a public group able to affect the project? Can the potential stakeholder provide services or positive forward momentum for the project? Once a stakeholder list was produced and the strategic decisions regarding the project concept were in place, the timeframe for inclusion of each stakeholder was also decided.

Phase two of the Annapolis Harbor – Greenbury Point project began with initiation of contact with Congressional representatives. This occurred in 2004 to ascertain the potential for procuring federal funding. The most likely vehicle to obtain federal resources for the site was determined to be Section 206 of the Water Resources Development Act (WRDA) which provides funding for use by the USACE to restore degraded aquatic ecosystems. Two Maryland Congressional districts would be directly affected including the 3rd district represented by Benjamin Cardin (D), which encompassed the Annapolis Harbor portion of the project, and the 1st Congressional district represented by Wayne Gilchrest (R) which encompassed Greenbury Point. Additionally the senior Senator from Maryland, Paul Sarbanes (D), was also briefed on the project.

The Congressmen when provided with the initial study information recognized the benefits a WRDA Section 206 project would bring to the area and the positive reception environmental restoration would have in the community. With bi-partisan political backing, Congressman Cardin was able to gain funding for the project starting in FY05 through the WRDA Section 206 program. The initial request totaled \$850,000 for FY05 of which \$185,000 was finally allocated. In the tight budgetary environment of recent years with the war in Iraq and Hurricane Katrina this was considered validation of the project worth. Indeed, the project became the only Section 206 project funded through the Baltimore Division of USACE for the year.

Once the USACE became involved it was important to provide them the project information already generated as well as the goals of the project. This information was provided to the USACE through several meetings. At this time USACE also began a Preliminary Restoration Plan (PRP) for the project which would touch base on the items needed to proceed to their feasibility level report.

Development of Project Goals

An initial stakeholder meeting was convened in June 2005 to discuss project plans and to ascertain buy-in from each group as well as to identify how each would or could contribute to the planning and execution of the project.

Phase three involved identification of the benefits each stakeholder stood to gain from the project. The first step in this process involved identification of the goals of each stakeholder, and then ascertaining how some or all of these goals could be met. A discussion of each organization's structure as well as the specific goals a stakeholder may have for the project was conducted to further refine how they would fit into the

project. Upon gathering this information for each group, the project scope was established to achieve the largest possible number of goals for each stakeholder, while ensuring that at least one goal would be met for each stakeholder. This step provided the means of identifying a “win” for all involved stakeholders.

In the case of the subject project the key to identification of a mutually beneficial project was derived during the initial stakeholder meeting of June 3, 2005. At this meeting, the preliminary project plans and goals were presented by KCI and the City of Annapolis. This meeting represented the start of phase three of the Collaborative Strategy. A meeting setting allowed immediate feedback and a quick assessment of stakeholder view points. Since the project was under a tight time constraint, this was a critical component and provided significant positive results for moving forward with project development.

Critical items including the existence of a potential failing berm and the U.S. Fish and Wildlife Service Integrated Natural Resources Management Plan (INRMP) of 2001 were first acknowledged at this meeting. The INRMP provided a list of potential environmental restoration items for the Greenbury Point area. In addition, all stakeholders had the chance to have questions answered at once which provided for streamlined progress. The meeting also provided a forum for each stakeholder to gain a sense of buy-in to the project.

The result of the meeting was the immediate focus of project resources on the berm at Greenbury Point. In addition the meeting also provided the idea of adding the Maryland Port Administration (MPA) as a stakeholder and defined their potential role. The MPA is responsible for keeping the main channels and harbors of the Port of Baltimore open and as such is responsible for dredging 3.2 MCY of material annually. Thus MPA would be able to provide DMP capacity for the project if necessary should Greenbury Point not be ready to receive the dredged material from Annapolis Harbor by the fall of 2005. The work would also provide the MPA participation in an environmental restoration project associated with dredged material which would meet their ongoing goal of providing environmental stewardship along with dredging requirements. Additionally, as addressed previously, the Annapolis Harbor - Greenbury Point project stood to provide a model of how to provide DMP volume through a series of small regional sites to meet ongoing capacity needs. A follow-up meeting in June 2006 brought MPA in as a stakeholder on the project.

Following the June meetings, a preliminary geotechnical analysis was completed on the berm and a second stakeholders meeting was held in July 2005. This meeting brought to the table new stakeholders including Anne Arundel Community College (AACC) and the Maryland Environmental Service (MES). AACC’s involvement was based upon earlier work completed to help stabilize the existing berm area which included planting of wetland vegetation at the toe of the berm. The result of the meeting was an agreed upon timeline to complete the dredging, and a tentative scope of work (SOW) for the Greenbury Point restoration. KCI was tasked with generating a more detailed SOW for the Section 206 project along with associated design cost

estimates and schedule. This meeting began the framework for the last phase, Four, of the Collaborative Strategy.

Implementation

The implementation phase of the Collaborative Strategy included providing the necessary delegation of work and scheduling to set the project in motion following identification of overall project goals. This was a critical phase which could have been affected by a myriad of issues such as poor or non-focused leadership, ineffective task delegation, or funding issues. Initiation of the implementation phase was also critical to maintaining project momentum as the project moved into the execution phase. As with any process, once the momentum is in place it is easier to keep moving forward. In the Annapolis Harbor – Greenbury Point project case two diverging courses for portions of the project would emerge as the project moved into Phase Four.

Because of the dredging deadline of May 2006 and a permitted dredge window from October to December 2005 based upon proximity to oyster bars, all plans and specifications for the dredging portion of the project were completed by September 2005. To complete the plans in the limited time available the project team utilized a method of time critical project design. Procurement for the project was provided by MES because of the short project window and a pre-existing agreement with Annapolis. In October the dredging project received three bids with the winning bid of \$328,109, within 2% of the initial engineer's estimate produced in the fall of 2004. The project team provided construction phase services during construction as well as post dredge hydrographic survey support as well. The 14,700 CY of dredged material from the project as per the agreement between Annapolis and MPA was taken to an MPA facility. MPA designated the Annapolis material for the newly reconditioned Cox Creek DMP site which was brought into service early for the purpose. The dredging work started in November 2005 and was completed on time and under budget in March 2006 in advance of the May 2006 deadline. Step 4 - Implementation for the dredging portion of the project had been successfully fast tracked based on well developed preliminary planning, attention to potential permitting issues, and with the full support of stakeholders.

Implementation of the 206 portion of the project faced tougher hurdles. With the draft SOW in place by the end of August 2005 the project was set to continue through the USACE project pipeline, first going through a Feasibility Phase followed by the Planning and Design Phase. The initial PRP completed by USACE in August 2005 determined that due to the amount of work and permitting required it was unrealistic to expect completion by the May 2006 VOR imposed deadline. Thus the agreement between Annapolis and MPA to utilize an existing DMP site became critical. The availability of the MPA DMP also removed the impetus of the May 2006 deadline from this portion of the project.

Events outside of the project teams control would also slow project progress. Response to Hurricane Katrina required utilization of a broad range of USACE resources from the Baltimore District including personnel. The Section 206 portion of the project was thus relegated to standby mode for the remainder of 2005 and through the beginning of 2006. By mid-2006 USACE was once again ready to fully commit to continuing Section 206 project development. Another stakeholders meeting was held in October 2006 and currently USACE is completing their Feasibility Study utilizing a new fast track project development plan. The Section 206 project continues to center around the goals developed as part of Phase Three of the Collaborative Strategy during the summer of 2005 as the USACE prepares to begin the design phase of the project. Additional funding of \$100,000 has been requested under FY 2007 to continue project design. Present scheduling anticipates overall completion of the Section 206 project construction within two to three years.

Summary

The Annapolis Harbor – Greenbury Point project provided many challenges to the project team. The project included providing dredging for Annapolis Harbor within a limited budget and a fixed time constraint defined by the arrival of the VOR race in May 2006. These parameters were met and the VOR race arrival was a success. Greenbury Point was identified as a potential beneficial use site for the Annapolis Harbor dredged material because of its proximity to the dredging area and the opportunities for environmental restoration there. These environmental restoration opportunities included wetlands creation through DMP, reforestation, removal of invasive species, and stabilization of a potentially failing berm. The project was also identified as a potential model for future DMP sites based upon local capacity goals and environmental restoration needs.

The project team utilized a Collaborative Strategy in undertaking the project which sought to provide a “win” for all involved stakeholders. This strategy was composed of several steps including; 1) definition of the project concept, 2) identification of stakeholders, 3) identification of goals, and 4) implementation of the plan. This collaborative approach lead to the successful completion of the initial Annapolis Harbor dredging portion of the project in time for the VOR arrival in May 2006. The strategy has also provided the successful framework from which the Greenbury Point WRDA Section 206 portion of the project is progressing through the design phase.



Figure 1: Annapolis Harbor – Greenbury Point Project Area



Figure 2: Freshwater Pond at Greenbury Point



Figure 3: Berm area of Greenbury Point