

# WATER DESIGN-BUILD COUNCIL

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## DISTRICT OF COLUMBIA WATER & SEWER AUTHORITY DESIGN-BUILD *Brown and Caldwell*

### DC WATER TURNS TO DESIGN-BUILD FOR WORLD-CLASS BIOSOLIDS PROGRAM

The District of Columbia Water and Sewer Authority (DC Water), led by General Manager George S. Hawkins and Chief Engineer Leonard R. Benson, has embarked on a \$460 million biosolids management program (BMP) at its Blue Plains Advanced Wastewater Treatment Plant, the world's largest such plant, with capacity of 391 mgd. The BMP will transform DC Water's current Class B lime-stabilization processing system into a Class A (pathogen-free) system, which will couple thermal hydrolysis (using the Cambi™ process) with anaerobic digestion. The cleaned digester biogas will be used to power a 13-mw combined heat and power plant. The system will be the largest Class A solids processing facility in the world.



DC Water's biosolids program manager, Brown and Caldwell, was instrumental in assisting DC Water's evaluation of alternative project delivery options. The initial driver for considering alternative delivery was schedule savings and the potential for federal stimulus funds for a "shovel ready" project. The BMP was divided into four projects:

- Site Preparation
- Main Process Train
- Final Dewatering
- Combined Heat and Power

DC Water and Brown and Caldwell identified key issues, as well as advantages and disadvantages, associated with delivery options for this specific solids processing situation. In particular, the Main Process Train (MPT), which had a cost estimate of about \$225 million and included large-scale sludge screening, pre-dewatering centrifuges, thermal hydrolysis process (THP), and digestion processes, appeared well-suited for design-build delivery. This hypothesis was tested by detailed questioning within the construction industry; specifically, market sounding surveys were undertaken to provide direct input from potential bidders and contractors on the key issues for the MPT, including Cambi. The survey results indicated that design-build would be acceptable to procure the MPT – there would be sufficient competition for the project (a significant concern for DC Water). One critical issue answered by the surveys was whether the design-builder should have a direct relationship with Cambi. Survey respondents, which included



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operating services, integrated design-build, and construction firms, were concerned with contract terms and conditions, but clearly recommended that the design-builder should have a direct relationship with the sole-sourced THP provider.

The Cambi process was sole-sourced by DC Water in 2009. The MPT delivery method then needed to be finalized, and there were several options within the design-build umbrella. Cambi facilities in Europe had been successfully procured via design-build or a similar delivery method. Due diligence was therefore conducted on prior Cambi and other similar large vendor-equipment-dominated water and wastewater projects. To gather more intelligence, DC Water and Brown and Caldwell executive management visited the United Kingdom and Ireland, and met with owners of several Cambi installations to collect information on their experiences working with Cambi through a prime contractor.

As a result of the investigations and with the buy-in of the general manager and its board of directors, DC Water continued on the path of design-build for the MPT. To further ensure adequate competition, DC Water offered a stipend for the two non-selected short-listed teams. Design-build's advantages for these situations include a single point of responsibility for both design and construction, the ability to short-list teams through qualifications and select on a combination of price and technical ratings, faster project delivery, fewer change orders, and earlier determination of total price. Design-build also allowed the design work to proceed to the level required to adequately define the degree of technical requirements DC Water desired for the RFP, while allowing the design-build team limited flexibility for ingenuity in its proposal.

To identify potential risks, and associated mitigation strategies, that were possible with a design-build procurement of the MPT, Brown and Caldwell's program management team, along with legal advisors, facilitated workshops with DC Water stakeholders. A primary risk identified was that the project might not meet specified performance requirements. Since DC Water was concerned with high-quality construction and equipment that would be reliable, durable, and cost-effective over the long-term, it decided on a more prescriptive design-build approach with greater development of project scope and quality than typically used in design-build procurements, but the advantages were clear and aligned with DC Water's objectives. To save time with this approach, DC Water asked Brown and Caldwell to develop the bridging documents.

Brown and Caldwell completed much of the design to a significant preliminary-design level – this included not only P&IDs, but also dimensioned layouts to make certain that efficient operation and maintenance needs were satisfied and that the small site and building footprints had sufficient space. Traditionally, price-based design-build procurements focus on the capital cost, while the operability and maintainability, and life cycle cost considerations are sometimes compromised – this potential problem is minimized by the higher-degree definition of technical requirements within the prescriptive format. For instance, equipment requirements were written to allow only



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equipment that DC Water deemed acceptable. To counter the potential creative limitations of the prescriptive approach, proposers were allowed to develop technical alternatives to the base project. The DC Water selection committee evaluated each technical alternative and determined whether that alternative would proceed as part of the proposer's technical and price proposal. In addition to meeting the prescriptive requirements, the design-builder had to demonstrate required performance guarantees, including separate guarantees for the Cambi THP, to achieve final project acceptance.

The MPT design-build procurement attracted six teams for the qualifications phase of selection in 2010. Statements of qualifications were evaluated within a range of criteria, including: experience, team organization, personnel details, and other factors. Three teams were selected for the proposal phase. The RFP contained detailed information, including major technical requirements and more than 200 drawings. DC Water held confidential proprietary meetings with the proposers. During these meetings, proposers were permitted to present proposed designs and approaches. DC Water would not endorse or agree with the information, but if proposers were "going down the wrong path" then DC Water would let them know not to continue. Proposals were evaluated on a 60-40 point split basis between price and non-price factors. The winning proposer was selected in April 2011 and received a notice to proceed on June 30, 2011. Contract price was just under \$210 million.

Final design for the MPT is almost complete, yet foundation construction is well underway. The overall biosolids program will be commissioned in 2014 and completed in early 2015. DC Water's management and staff are pleased with the progress of the MPT project to date. The prescriptive design-build approach and its successful selection outcome worked well for DC Water's initial foray into design-build; all three proposers indicated that the proprietary meetings were very useful and recommended using them in the future. DC Water intends to use design-build for upcoming procurements, although perhaps not as prescriptive in nature as the MPT.

## CASE STUDY PROVIDED BY:

*Phil Braswell and Lisa Reynolds, leaders with Brown and Caldwell's Biosolids Program Management team at DC Water. Brown and Caldwell wishes to acknowledge DC Water's evaluation committee and technical advisors, particularly Contracts Manager Gus Bass and Construction Manager/Design-Build Advisor Brent Christ for contributing to this project spotlight.*



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