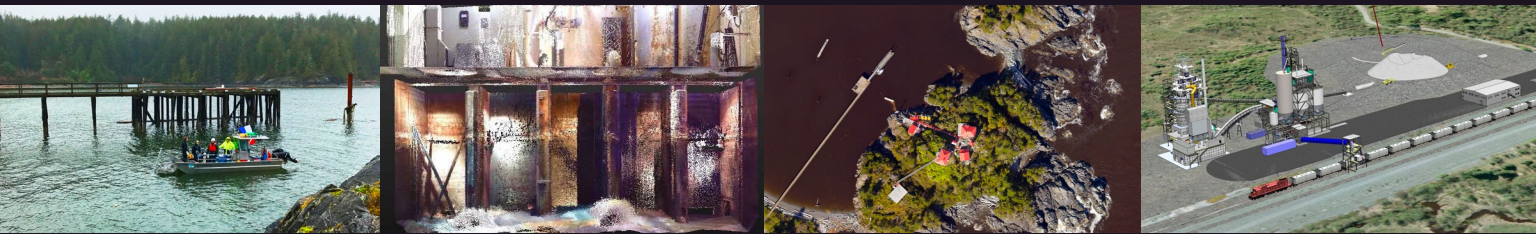


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EXPERTISE. INNOVATION. RESULTS.



3rd QUARTER 2017 NEWSLETTER

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WASTEWATER TREATMENT PLANT PUMP SUCTION ISOLATION GATES

Metro Vancouver | Richmond, BC, Canada

PROJECT HIGHLIGHTS

- Five influent pumps to be individually isolated for maintenance and repair as required
- Concept generation with verification of existing wet well facility and associated equipment
- Detailed design of selected concept
- Multiple safety review meetings focusing on *prevention through design*
- Completion of full tender package, including specifications, drawings, and summary report
- Construction and engineering capital cost estimates



CWA was selected by Metro Vancouver to provide a method to individually isolate each of the five raw sewage pumps for periodic preventative maintenance at their Lulu Island Wastewater Treatment Plant, which provides secondary treatment to wastewater from approximately 172,000 residents in Richmond, BC.

UP TO THE CHALLENGE

The work area in the wet well is classified as a confined space with limited access, making safety for maintenance personnel a priority. To maintain the focus on safety, CWA held multiple safety review meetings focusing on the principle of *prevention through design* throughout the course of the project.

In order to safely isolate the pumps for maintenance, isolation gates on the suction side of the raw sewage pumps were required. The original frames, which were intended to act as the gates, were no longer suitable for isolating the influent pumps from the wet well and needed to be replaced with a safer and more convenient method. Furthermore, the new system needed to allow for regularly scheduled maintenance and emergency repairs that would not alter the existing process functionality.

Other constraints required that the solution be readily available, affordable, easy to install, and quick to implement.

3D TECHNOLOGY

CWA produced a 3D model using 3D scan results and associated record drawings that was used to verify the arrangement of the existing wet well facility and associated equipment. The model of the 3D scan was inserted into 3D

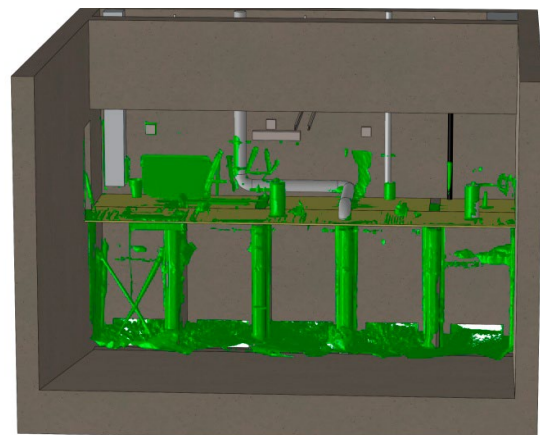
models of each concept to confirm model accuracy and check for interferences or other potential issues.

Using 3D models provided a greater degree of accuracy in assessing the compatibility of the new design with the existing structures, and helped to eliminate potential rework, reduce costs, and improve the construction schedule.

A TAILOR-MADE DESIGN

CWA presented two concepts to Metro Vancouver for review. The preferred solution consisted of five manually-actuated slide gates installed against an existing wall of the wet well that block each influent pump's suction inlet when maintenance is required.

The criteria for the slide gate was identified and meticulously specified for this application. The gate components, materials, and design remained standard in order to provide a short lead time, reduced unit cost, and efficient installation. CWA also supplied construction and engineering capital cost estimates and a full tender package.



NOOTKA ISLAND DERRICK LANDING AND FLOAT RECONSTRUCTION

Department of Fisheries, Oceans, and the Canadian Coast Guard | San Rafael Island, BC, Canada

CWA was retained by the Department of Fisheries, Oceans, and the Canadian Coast Guard to provide the detailed design of support infrastructure for a new Inshore Rescue Boat station at the Nootka Island Lightstation on San Rafael Island, as the existing boat access system had previously been identified as unsafe and potentially posed a risk to the Canadian Coast Guard's personnel during vessel access and egress operations.

CWA designed piles to support the new timber float, pile guides for the removal of the float, piles and a landing structure to support the new 65' and 45' gangways, a concrete abutment to connect the 65' gangway to the shore and the derrick landing, and a lifting beam to lift the 45' gangway prior to float removal.

MEETING DESIGN CHALLENGES

As limited bathymetrical and geotechnical information were available, the pile design was developed to a range of conditions encountered in the field.

To facilitate the removal of the new float during the winter months, CWA developed the design of a pile guide system that could be supported on the float deck for ease of storage and re-installation. The design of the pile guides allows for removal of the float with common tools and assembly components that can easily be handled by personnel without the need for assisted lifting devices or special rigging.

Environmental implications were considered during the design, which was optimized to ensure that environmentally-sensitive areas such as eelgrass would be avoided.

Additionally, galvanized steel was selected for the structural steel platform and gangways, and a coating was specified for the piles to minimize the effect of the corrosive environment.

PROJECT HIGHLIGHTS

- Detailed design of piles, pile guides, landing platform, concrete abutment, and a lifting beam
- Low-maintenance design with the capability of removing the float during the winter months
- Design optimized to ensure that environmentally-sensitive areas would be avoided
- Prefabricated designs for the float and gangways to minimize construction time
- Project design completed on time and on budget

Even taking into consideration the evolving requirements as the design progressed, CWA was able to execute the project design on time and on budget.

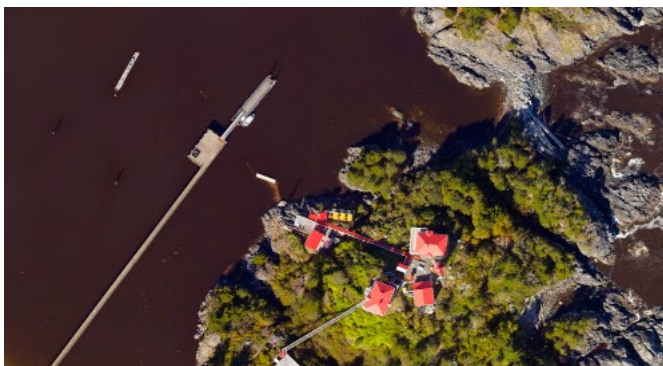
CONSTRUCTION OPTIMIZATION

Work conducted at a remote site typically involves higher costs if on-site assembly and construction are required, as access to labour and materials can be limited. To minimize field work and construction time, CWA's design maximized the work that could be pre-fabricated or pre-assembled prior to transportation to site.

CWA assisted with the implementation of planned procurement and construction sequencing to optimize the timing for installation, increase the quality of construction, and potentially reduce capital costs.

ADDITIONAL SERVICES

In addition to engineering design services and procurement and construction sequencing, CWA's scope of work includes procurement and tender technical support and construction field reviews.



3D MODELLING TECHNOLOGY

Featured CWA Service

Using state-of-the-art 3D technology, CWA improves the safety and functionality of designs for both greenfield and brownfield sites. CWA's full suite of capabilities includes 3D scanning, 3D modelling, finite element analysis (FEA), discrete element method (DEM) modelling, and computational fluid dynamics (CFD).

GREENFIELD SITES

CWA uses 3D technology to model entire greenfield sites for site layout and general arrangement improvements, design optimization, interference checking, simplified 2D drawing generation, and walk-throughs/fly-overs. The models are utilized for early reviews of the design with various stakeholders to meet operational, safety, and maintenance requirements. This allows the stakeholders to participate in the design process to a level that is difficult to achieve with traditional 2D models.



BROWNFIELD SITES

Utilizing 3D laser scans, CWA creates accurate 3D models of existing equipment and infrastructure for brownfield modifications. Inserting 3D models of new designs into the existing model allows CWA's engineers to ensure constructability and viability of the design early in the process. The model is particularly helpful for coordinating between disciplines and avoiding interferences, especially when designing complex mechanical assemblies with moving parts.

CWA BUSINESS PROFILE WITH CBJ

CWA was featured in the March issue of the Canadian Business Journal (CBJ). The profile discusses CWA's history, recent projects, and vision for the future.

Special thanks to Systematic Industrial Construction Corp., Termel Industries Ltd., and Alternative Belting

Enterprises Ltd. for supporting the publication.

The complete article can be found online at:

<http://www.cwaengineers.com/cwa-business-profile-canadian-business-journal/web/>

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