

The Best in Industrial Construction

The Top Five

▶ CN Intermodal Yard

General Contractor: Standard General
Consulting Engineers: UMA Engineering Ltd.

Industrial Contractors Inc./
 Muskeg River Contractors
Engineer: Muskeg River
 Contractors (Fluor/AMEC)

▶ Glenmore Water Treatment Facility

General Contractor: Graham Construction and Engineering Ltd.
Consulting Engineers: Associated Engineering Ltd. (structural),
 UMA Engineering, CH2M Hill Canada,
 Thurber Engineering Ltd. (sub-consultants)

▶ Shell Canada Scotford Expansion U & O Module Assembly

General Contractor: Aecon Industrial Ltd.
Engineer: Bantrel Inc.

▶ Muskeg River Mine Pipeline Assembly Fabrication

General Contractor: PCL

▶ Williams Energy Hydrocarbon Liquids Conservation Project

General Contractor: PCL Industrial Contractors/Fluor Constructors Canada
Engineers: Fluor Canada/DPH Engineering Inc.

Just getting a project done on time and on budget is a significant accomplishment in Alberta's overwhelmed industrial construction market.

The five projects selected as the best of 2001 managed that feat and then some. All over came significant challenges in bringing in projects that will play long-term roles in ensuring Alberta's prosperity for years to come.

The CN Intermodal Yard in Edmonton is cementing Edmonton's reputation as a centre for moving freight by both rail and truck—literally. The \$15 million yard, which opened in October, serves as a connector between the rail and trucking transportation infrastructures—a place where trucks can drop off or pick-up containers or trailers transported long distance by rail.

The new Edmonton terminal includes a 93,000-square-metre concrete pad, 19 kilometres of track, fully contained site drainage, access roads, lighting, an operations building, and



The CN Intermodal Yard. Inset: Crews putting down roller compacted concrete.

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The Glenmore Water Treatment Plant expansion. Inset: The octagon shaped reservoir installed at nearby Glenmore Park.

a maintenance facility. The new terminal is located between two mainline tracks and the Yellowhead Highway, providing excellent road and rail access.

Two main features stand out at the Intermodal Yard. The first is the use of roller compacted concrete (RCC) placed over a compacted granular base on the large concrete pad to support the wheel loads from the 85,000-kilogram stacker cranes used to load containers on and off trains. The RCC was placed in two 200-millimetre lifts with a light surface scarification on the surface of the first lift to improve the bond between layers. Incorporating the use of RCC, which was placed in just under one month, allowed the terminal to be completed on time and on budget.

The second feature making the CN Intermodal Yard stand out is its pres-

ervation efforts at the adjacent Kinokamau Lake in partnership with Ducks Unlimited. The 23 hectare elongated shape lake is a dedicated wetland and waterfowl habitat, the only one of significant size within the City of Edmonton. Situated within an industrial site formerly owned by the Crown to the north, Inland Cement in the middle, and private landowners to the south, the decision to work around the lake was made from day one.

It was only after environmental affairs were settled that CN proceeded with the terminal's construction. In the fall of 1997, after CN took ownership of the site, it started the project's environmental approval process. The following year was spent preparing the environmental impact assessment and seeking approvals from the Canadian Transportation Agency, Canadian Wildlife Service, and

Environment Canada. CN hired Edmonton engineering firm UMA and environmental consultants Green Plan to assist.

According to Tom Edwards—CN's Technical Services Engineer who helped co-ordinate the onerous environmental approval process—noise, wildlife and water quality were all significant concerns. The north end of the site, home to coyotes, rabbits and deer, remains as undisturbed as possible. Scheduling of the grading operations worked around the April to August breeding period of local waterfowl and wildlife.

The south end of the site near the Kinokamau Lake is not only residence for waterfowl, but also muskrat, and has become one of Alberta's first conservation easements.

"The title of the land remains with CN, but Ducks Unlimited has rights to

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Piperack modules constructed by PCL Industrial for the Muskeg River Mine.

manage the habitat,” explains Edwards.

Ducks Unlimited was also instrumental in locating the causeway across the lake, at the shortest distance near its southern tip. A two-metre culvert was installed in the causeway to equalize water levels. The site’s surface run-off drains into a pond designed for a one in 100 year storm. Only after treatment through a separator is the stormwater pumped into the lake.

Since environmental approvals were granted in mid-1999, CN has followed through with quarterly reports to the Canadian Transportation Agency. Even before the construction began, an emergency response shelter was established to mitigate any spills that could occur during construction.

Two cultivated fields in the south part of the site required re-vegetation to become a more natural habitat for the ducks. This area was seeded with barley to establish a good ground root structure and hardy grasses.

Working in partnership on preserving the Kinokamau Lake has been well worth the effort. This past February, Ducks Unlimited awarded CN its Golden Award for its role in helping preserve this wetland and waterfowl habitat, which will be enjoyed by others for generations to come.

The expansion of the Glenmore Water Treatment Plant in Calgary by Graham Construction and Engineering is an example of value engineering at work.

The \$24 million project—phase one of a four-phase program to upgrade

the 70-year-old plant to meet future water demands—involved process improvements to meet more stringent water quality requirements, a 600-million-litre per day pump station, and a 50-million-litre treated water reservoir. The pump station includes eight horizontal centrifugal pumps with a total horsepower of 5,300 hp.

Design of the pump buildings had to fit in with the architecture of the surrounding buildings at the site—some of which date back to the 1930s, says Hugh Savage of Associated Engineering. Architectural sub-consultant R.J. Goodfellow proved up to the task.

The project also involved service tunnels, filtered water conduits and pipelines, and a gatehouse over the buried concrete reservoir.

“Approximately 25,000 cubic metres of concrete were poured less than 10 months,” says Savage. “Two tower cranes, one which travelled on rails inside the reservoir, were used to place all the concrete.”

Fitting the 10,000-square-metre reinforced concrete reservoir in the heavily congested site amongst the buildings, underground piping, and ducts posed a major design and construction challenge, says Savage. Here’s where the value-engineering came in. Designers answered the challenge by locating, “the structure outside the treatment plant under playing fields at nearby Glenmore Athletic Park.”

“A unique pentagon shaped structure was designed to fit the reservoir



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Piperack modules built by Aecon Industrial for the Shell Scotford Refinery expansion.

in the available land," says Savage. The park is now being re-landscaped to cover the reservoir.

Work on the Albian Oilsands and Shell's Scotford Refinery provided two of our top five industrial projects in 2001.

PCL Constructors Inc. and the Muskeg River Contractors (Fluor/AMEC) completed the Piperack Modules and Conveyor Galleries for the Muskeg River Mine Project in October. The \$30-million job involved

the construction of 106 piperack modules, 41 conveyor gallery modules, and 20 roof truss assemblies.

The project included the erection of 3,900 tonnes of structural steel for the module frames and conveyor galleries. The structural steel, procured in England and South Africa, was shipped in sea containers by ship and rail. Once off-loaded at the Nisku yard and assembled, fabricated pipepools were installed in the individual modules one-by-one. Over 105,000 units of pipe fabrication, totalling 29 kilometres in length with an average pipe size of 15 inches, was fabricated and hydro-tested at PCL's fabrication yard.

The piping was then heat-traced, insulated and clad, completing the module piping scope. Cable trays were installed on the upper levels of the structural steel and the modules were prepared for shipping. All the modules were blocked four feet off the ground, allowing transport equipment to back under and self-load the individual modules. This eliminated the need for load-out cranes.

The module assembly and delivery program met all their incentive milestones, which were based on productivity and schedule.

While PCL and its partners worked on the mine end of the Albian Oilsands Project, Aecon Industrial and Bantrel were busy working on the downstream end of the project at Scotford. Their \$31-million contract involved assembly of 241 piperack modules for the expansion of Shell's refinery at Scotford. The construction of this project involved the erection of 6,500 tonnes of structural steel, prefabrication and installation of 110,000 metres of piping, and installation of 20,000 metres of electrical cable tray.

The modules were completed over a 10-month period, with the first module delivered to the site in February. During a six-month period, Aecon was delivering two modules a day. All the work was done at its yard in Edmonton.

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The project was completed on time and on budget, and earned these words of praise from a member of the owners' project team: "your efforts and attitude have set a new benchmark for module construction in Alberta."

Rounding out the top five industrial projects of the year is the Williams Energy Hydrocarbons Liquid Conservation Project at Fort McMurray built by PCL Industrial Contractors and Fluor Constructors Canada.

This joint venture EPC project, worth \$200 million, consisted of the complete installation of two new plants at Suncor's Fort McMurray oilsands operation and an extension to an existing Williams Energy Plant at Redwater. The scope of work included all engineering, procurement and construction of the two Fort McMurray facilities, the foundation and underground piping installation at Redwater, and the supply of shop

fabricated piping for both locations. The majority of work was performed on a direct-hire basis, and included foundations, structural steel, equipment, piping, electrical, instrumentation, pipe fabrication and module assembly.

The project offered a number of challenges, not the least of which was building three separate facilities in two different locations. Adding to the challenge was a change of ownership partway through the project when Williams Energy bought TransCanada Midstream.

The schedule was tight, with significant overlap of engineering and construction activities. It was completed in 15 months.

And it involved managing a lot of different concerns. Construction of one of the plants was in the middle of Suncor's operational facility, and occurred during the same time frame as its Project Millennium expansion.



A crane working on the Williams Energy Hydrocarbon Liquids Conservation Project.



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