



The John Street Roundhouse

Adaptive Reuse of a 1920's Wood Frame Engine House

An 80-year-old, unheated, uninsulated train shed is transformed into an environmentally sustainable, commercial space with heritage

WOOD DESIGN & BUILDING

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Above and on the cover: *Wood Design & Building* unveils the winners of the 2009 Wood Design Awards, including the Richmond Olympic Oval by Cannon Design Architecture Inc., Vancouver, BC

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*An 80-year-old, unheated, uninsulated train shed is transformed
into an environmentally sustainable, commercial space with heritage*



HISTORY

Built in 1929 by the Canadian Pacific Railway, this Douglas fir framed Roundhouse had 32 engine repair bays covering almost 100,000 sq.ft. A 20,000-sq.ft. machine shop was built several years later along the rear wall.

The semi-circular geometry of the Roundhouse is based on the center point of the 120-ft. long turntable that was designed to deliver engines to each of the 32 repair bays. Every column line for each of the structural bays emanates from this center point. Each of the 32 bays is 14-ft. wide at the engine doors, 120-ft. long, and 29-ft. wide at the back wall.

The Roundhouse was the first direct steaming facility in Canada. This meant that the engines did not have to be fired up to move them. The steam came from a central plant and was piped into the Roundhouse, and then into engine boilers when needed. With no fires and no coal smoke inside, the risk of fire was diminished and the white-washed interior stayed clean and bright. The continuous glazed clerestory and wall of windows along the rear of each bay also added to the high light level of this workplace making it unusual for its time.

The Roundhouse was in continuous service from 1929 through to 1988. At its peak, this facility serviced over 60 engines and train cars a day.

The switch from steam to diesel in 1947 required the addition of concrete block fire walls, further subdividing the interior space. The Roundhouse continued to be used through a period of modernization in 1962 until the last engine left and the doors were closed in 1988.

As downtown Toronto grew up around the railway lands, redevelopment and demolition pressure increased. In the 1950s it was only public protest and a determined City Hall that forced the Gardiner Expressway to bend around Fort York and the Roundhouse, preserving both. In 1991 the Roundhouse was recognized as having national historic and architectural significance by the Heritage Sites and Monuments Board of Canada (HSMBC) and was described as “arguably the finest surviving Roundhouse in Canada.”

CLEAN-UP, PHASE 1

The first phase of the clean-up and re-use of this brownfield site was the result of a land deal in the mid 1990s between the city, CPR's Marathon Realty and the Metro Toronto Convention Center. The city got the Roundhouse and almost nine acres of former rail yards around it, and the Convention Center got to build an addition that was six stories below the Roundhouse running from the rail corridor to the Gardiner Expressway.

In 1995, Hotson Bakker Architects provided an inventory of the Roundhouse and the disassembly and re-assembly drawings for Bays 1-11 – which had to be taken down, stored while the exhibition halls and parking structure were excavated, and then re-assembled on their roof when it was finished. The Coal and Sand Tower and the Water Tower were moved adjacent to the Roundhouse.



Above and opposite: An industrial heritage building adaptive reuse success: In its heyday, this Douglas fir framed Roundhouse had 32 engine repair bays covering almost 100,000 sq.ft. Today, it is the downtown showcase home of Leon's Furniture.



Above and opposite: The old growth Douglas fir structural frame of the Roundhouse was in remarkably good condition. A series of strap braces were installed where timbers had begun to split and twist; and missing pieces of cross bracing, railings and walkways were matched and replaced with new or recycled timber pieces sourced from across Canada.

The last part of the assignment at that time was to move several small wooden buildings and the turntable bridge into the Roundhouse and restore the exterior of the remaining 21 Bays. This work was completed by 1997 and the building remained unoccupied until Steam Whistle Brewing leased Bays 1-11 in 1999.

CLEAN-UP, PHASE 2

The city was always deeply committed to preserving the Roundhouse and creating a rail interpretive center so the Real Estate Division, with Special Projects Manager, Glenn Garwood, started looking for innovative ways to finance these objectives.

The second phase of the clean-up started with the city setting up a head lease for the entire Roundhouse with Barry Zagdanski's State Building Group. Developers saw an amazing

location: visible from the Gardiner expressway, surrounded by condominiums and a nationally significant, iconic heritage building, with new structured parking underneath.

State approached Leon's Furniture with an idea for a different kind of retail operation: a showroom set in a restored, loft-like wooden building surrounded by new condominiums. Terry Leon loved the idea, deciding that if a customer couldn't carry a purchase out of the showroom it would be delivered from an off-site warehouse. He also decided that this Roundhouse showroom could become a laboratory to test new urban furniture products.

With the head leasee agreeing to pay their 60-year-lease upfront, the city would be able to fund the complete rehabilitation of Roundhouse Park and the development of the Toronto Rail Heritage Center within the Roundhouse.

The Master Plan for Roundhouse Park extended the railway museum into the park with tracks radiating from the turntable for the display of engines and rail cars. A community of four small wooden railway buildings are also being restored and located together, and the coal sanding tower stabilized and restored.

CLEAN-UP, PHASE 3

The approach was to create a balance between the preservation of the 'heritage story' or patina of the building and its elements, with the requirements for Leon's showroom. The goal was to transform an 80-year-old, unheated, un-insulated train shed into an environmentally sustainable, commercial space without compromising the heritage character.



The turntable that had been stored in the Roundhouse was removed, restored, and re-installed in the turntable pit that was reconstructed 12 years earlier. This meant that rolling stock, which had been stored inside the building, could be moved outside so work could begin.

The old growth Douglas fir structural frame was in remarkably good condition. A series of steel bands or strap braces had to be installed where timbers had begun to split and twist. Years of water damage to several purlins and beams resulted in severe deterioration that required their replacement. As well, pieces of cross bracing, railings and walkways were missing. Matching new or recycled timber pieces were sourced from across Canada and were installed using traditional timber detailing methods such as scarf and mortise and tenon joints.

The interior was cleaned with a low pressure, soda wash process that minimized surface abrasion and removed paint and grime (accumulated coal smoke and diesel residue) from the interior brick walls, timber frame and the underside of the mill deck roof. This preserved the patina of age and use which is part of the building's story.

After undertaking a careful inventory of all the stored artifacts, a preservation and protection plan was completed for the base building work. The 1950s era concrete block partitions were removed. To create an interconnected space for Leon's, three new openings were created in the brick fire wall between Bays 22 and 23. Two hundred and thirteen wood sash windows were repaired, restored, cleaned and repainted. Eighteen pairs of engine doors were repainted and the damaged and poorly repaired doors were restored. Fire exits were added and a new entry door and canopy were installed at the end wall of Bay 32, facing Bremner Blvd. A loading dock and canopy were installed at the rear of Bay 22. To reduce heat loss a curtain wall was installed behind all of the engine doors. The roof membrane was replaced, the mill deck repaired and insulation added to the entire roof, to eliminate leaks and to reduce heat loss. The remaining seven engine pits were covered with a removable steel deck and a slip sheet was installed over the original floor. A new 4-in. concrete floor slab was poured to create a level and continuous surface. All electrical service for Leon's was cast into this slab. The heating and cooling equipment uses district steam heat and deep water cooling, which will represent a significant reduction of energy use over the operational life of the building. The life cycle energy savings represented by the adaptive re-use of this industrial building is the single most sustainable aspect of the project.

The transition from base building work to Leon's tenant fit-out work was almost seamless. The showroom work included



Above: Leon's completed showroom is a powerful, curving space that compels visitors to experience the sweep of the 15 restored engine house Bays.

free-standing pavilions to create condo layouts, mechanical mezzanine platforms, offices, washrooms, lighting and service areas. Leon's completed showroom is a powerful, curving space that compels visitors to experience the sweep of the 15 restored engine house Bays.

The Turntable Courtyard has 32 sets of tracks, re-installed for rolling stock to be displayed as part of the museum's interpretive program, is paved with brick laid between the rails and has a pipe railing installed around the pit itself.

ROUNDHOUSE PARK

The Don Station, The Crossing Shanty and Cabin D were moved to their final locations in the park and four additional wooden buildings will be located in the park to form a community of railway artifacts for interpretive purposes. They will be connected to the Roundhouse by a rail line that runs out from the turntable to the corner of Simcoe and Bremner.

CONCLUSION

The John Street Roundhouse is an industrial heritage building adaptive reuse success because of three essential factors. The first factor was the existence of a nationally significant, industrial heritage building in a downtown brownfields site. The second factor was a group of willing and committed stakeholders that included the City of Toronto, the Toronto Rail Heritage Association, State Building Group (the developer) and Leon's and Steam Whistle (the tenants). The final essential factor was that stakeholders shared the vision of a balanced approach to an adaptive reuse that was able to preserve the heritage story of the timber, glass and brick while animating the building with new uses. 🏠

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