

Blackwell

EVA'S PHOENIX

2018 CANADIAN CONSULTING ENGINEERING AWARDS SUBMISSION

EVA'S PHOENIX



1: BUILDING INTERIOR

PROJECT SUMMARY

A precedent-setting adaptive reuse project, Eva's Phoenix transforms 41,200 square feet within a 1930s municipal waterworks complex into a 50-bed residence and skills training centre for homeless and at-risk youth. This project both raises the bar for safe, uplifting, non-institutional supportive housing; and serves as a catalyst for a heritage-designated building redevelopment. Acting as structural engineers, Blackwell met numerous project challenges and constraints to realize this ambitious conversion project.

PROJECT HIGHLIGHTS



2: EVA'S PHOENIX EXTERIOR

INNOVATION

Eva's Phoenix is a neighbourhood within a building. Extensive interior alterations of the existing heritage-designated two-storey warehouse and double-height storage facility were undertaken to transform the space into a youth transitional residence.

The new residence now consists of ten townhouses facing onto an internal street, all securely within the existing unassuming warehouse brick walls. The interior is awash in natural light from a series of prominent skylights overhead. The townhouses have shared ground-level living rooms and kitchens linked to private bedrooms on the 2nd level. In addition to the residential program the building now contains offices, classrooms, meeting and counselling space, a teaching kitchen, a workshop, and a full-service commercial print shop that offers youth employment opportunities.



3: TOWNHOUSES FACING INTERNAL STREET

Numerous structural alterations were undertaken to achieve such a significant re-use of space. Such alterations include: a new basement level, a new suspended ground floor, two inter-storey mezzanine levels, extensive roof-top skylights, large openings in the existing suspended second level, re-supporting the adjacent warehouse roof with a new 3-storey tall fire-wall, structural reinforcing of existing two-storey warehouse to accommodate a potential future 3rd floor vertical extension, and reinforcing of the timber/steel roof for future snow pile up from adjacent condo tower development.

Constructing a residential development within an existing warehouse building provided a unique set of challenges. Structural modifications were delivered through innovative infill alterations and adaptive re-use solutions.

To meet space requirements, the design team opted to excavate from within to create a new basement level. The existing floor slab was thus sub-excavated and as part of the foundation work, footings were reinforced to support new building loads. Because each footing condition was distinct, a variety of reinforcement methods were employed: multi-staged underpinning, permanent caisson shoring walls, and deep benched footings.

Moving upwards, the mezzanine levels are suspended in such a way as to allow maximization of head room for the second storey of the townhouses. In pursuit of this goal, the structural depth of these mezzanines was kept minimal using closely spaced floor joists with thin concrete slabs along with strategically located columns and matched-depth cantilevered steel beams.

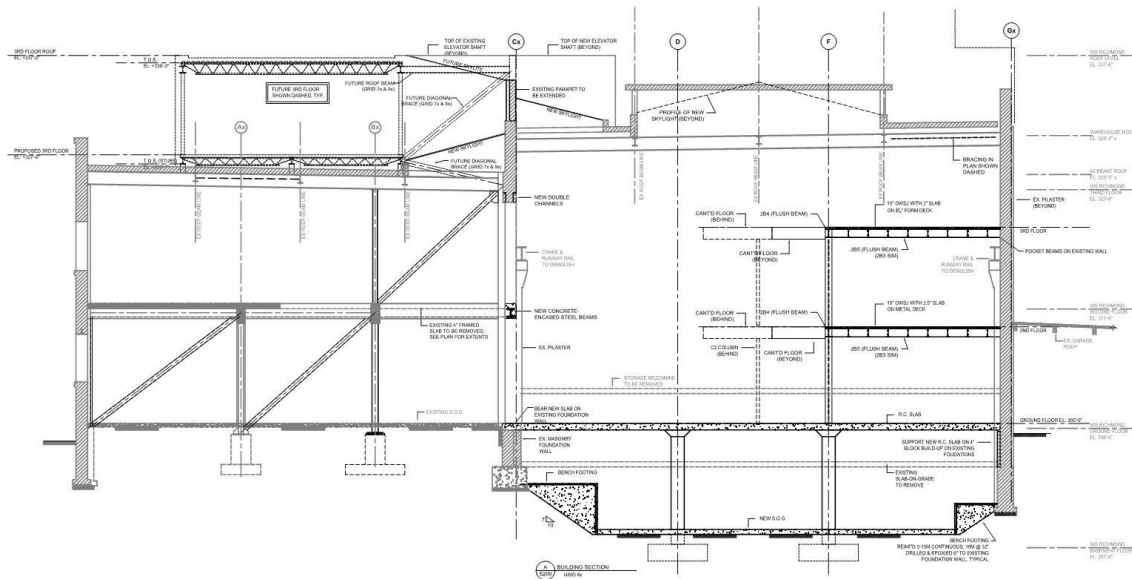
Reinforcing of the existing structure for a future 3rd floor extension was incorporated into the structural scope to maximize construction resources and minimize future interventions. Strategic insertion of new bracing elements and gravity-supporting elements were located to minimize the effect on the current project and optimize structural efficiency for the future 3rd floor.



4: UNDER CONSTRUCTION

COMPLEXITY

The existing building, though well-constructed, presented many structural constraints. Such as narrow floor plates, existing nominal footings, offset roof levels between conjoined buildings, minimum head room for new mezzanine levels, excavating for new basement within an existing building, and significant requirement for roof openings.



Eva's Phoenix - Building Cross Section Showcasing Key Structural Elements: New Basement, Foundation Reinforcement, Mezzanine Structure, Roof Skylight, and Framing Elements.

5: BUILDING CROSS SECTION

The former waterworks building lacks exterior windows on two sides. Because the building code requires all bedrooms to have exterior windows, and new window openings in the façade were not permissible due to heritage considerations, another solution was needed for the townhouses to be up to building code. The design team worked with the building department to devise a creative alternative: expansive skylights covering 45% of the roof.



6: ROOF STRUCTURE

With that creative design solution came a complex structural challenge. The roof structure would now be required to perform with a 45% reduction in roof framing, supporting its load and additional snow loads expected from a yet-to-be-constructed 12- storey adjacent condo development. This issue of reinforcement was met with a unique structural system. A network of diagonal and perpendicular in-plane braces was designed to support the roof diaphragm; creating two expansive trusses in the roof plane, spanning the length and breadth of the roof. Existing steel roof girders were upgraded with welded flange plates and rolled sections as well. With forethought and construction phasing in mind early in the design process, the roof reinforcement was completed in small easily-erected segments from the interior via a scissor lift and prior to erection of the mezzanine levels.

SOCIAL AND ECONOMIC BENEFITS

Eva's Phoenix offers safe and inclusive long-term shelter, education, and skills training to marginalized youth aged 16-24 in transition from homelessness to independent living. Eva's provides transitional housing for 50 homeless youth at a time, offering them their own bedroom in a communal house for up to a full year. Additionally it provides employment and pre-apprenticeship programs for 150 homeless youth each year. Eva's distinctive programming gives youth the skills and support required to develop life skills in pursuit of independence and

employment. Eva's has become an influential model for other facilities for homeless youth across Canada.

As the first crucial renewal project on a previously underused and neglected city block, the building is a forerunner of re-use development to come. A food hall, a YMCA, and a new condo tower will ultimately share the site, and an existing park will be enhanced. By using Eva's as a redevelopment catalyst in an increasingly desirable district, the City of Toronto makes a courageous statement about inclusivity, equality, and the projected future of the urban environment. Providing young residents at Eva's Phoenix with a secure and discrete home that is also an oasis unto itself.

ENVIRONMENTAL BENEFITS

Through detailed daylight modelling, the design team ensured that virtually all occupied floor area other than the basement-level print shop is within 23 feet of a window or a sky-lit space providing 'borrowed' light. This daylighting strategy, coupled with high-efficiency LED fixtures, dramatically reduces power loads. Strategically located 'street lighting' in the atrium turns on only when daylighting falls below a set lux threshold.



7: DAYLIGHTING STRATEGY

On this stringently budgeted project, new elements were incorporated only when the clients' program, zoning bylaws, or the building code required them. Exposing 800 square feet of existing clerestory and heavy timber roof deck lent a distinctive material quality while meeting stringent renovation requirements arising from the building's heritage designation. The project team salvaged light fixtures from an about-to-be-demolished building and brokered a donation of surplus bedroom flooring stock that otherwise would have likely gone to a landfill. Youth enrolled in the building maintenance and repair program at Eva's did all the wood capping on the guards and handrails.

MEETING THE CLIENT'S NEEDS

According to Eva's executive director, Jocelyn Helland, *"Eva's Phoenix was designed to be a warm, welcoming space that says, 'You are cared for, you belong, and you deserve a great future, no matter what's happened in the past.'"*

The vision for Eva's Phoenix was to create a sustainable, warm and welcoming space to help homeless youth and at-risk youth transition to independent living. The client wanted a space that was safe and boldly non-institutional and that accommodated the various needs and comfort levels of its residents as they received the care and skills training needed.

To meet the client's needs, the following key design aspects were implemented to include:

- A careful layered sequence of public, semi-public and private spaces that builds on the comfort of youth as they acclimatize
- A highly developed section creating visibility and exposing the building's vitality
- A decentralize staff and program areas to encourage a flux of activity
- A calming color scheme and tonality
- A house-based format that fosters life skills and interaction amongst roommates