



# 157 Coxwell House

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## INTRODUCTION

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157 Coxwell House is a colorful single-family Stipulated Sum (Design-Bid-Build) project that brings life to a typical, Toronto residential street in the Beaches. Its expressive use of color and ingenious use of materials attests to the architect/developer's ability to push conventions. It is a three-story 800 square meter residence raised on piles over a sloping terrain. The house features a bridge, a roof terrace, and a number of other unique environmental features. Designed and developed by the architect, it serves as an example of how the design knowledge of architects can add value to impossible urban sites.

**Owner & Architect**

Rohan Walters, B.Arch, B.E.S.

**Builder/Contractor/Project Manager**

Rohan Walters

**Consultants & Engineers**

Blackwell Engineering; Christian Bellini, Structural Engineering  
Shaheen and Peeker; Ozbert Benjamin, Soil Testing Engineers  
HRCMS Ltd.; Larry Hill Scaffold Safety Consultant

**Financing & Insurance**

Robert Kazakoff Builder's Mortgage  
CIBC - CMHC  
NTI Insurance Brokers  
Henry Builder's Risk Insurance

**Electric**

Patrick Electric, Winston Patrick, Electrical

**Plumbing**

Acores Plumbing; Joe Faustino, Plumbing  
Boreal Painting; Lionel Tissot, Interior Painting/Ext.Doors  
Urban Graphics Inc.; Jim Anastasopoulos, graphics & printing

**Roofing**

Cherrywood Roofing; Douglas Moss, Roofing and Flashing

**Cabinetry**

Hardy Cabinet Making; Rolland Hardy, Wood conduit and baseboard

**Construction**

Pitamic Construction; Edwin Pitamic, Foundations and Piers  
EBS Construction; Dino Helical Piles

**Materials & Furnishings**

Marathon Industries; Dennis Hutzul, Heating Supplies  
Imar Steel Ltd.; Jerry, Guido and Pia, Structural and Misc. Steel  
Loreto Drywall; Loreto Drywall and taping  
Glass Cell Fabricators; Ron Armstrong, Water/Sewer Insulation  
Automated Door; Systems Garage Door and Fire Shutter  
Scaffold Russ Dilworth Ltd.; Doug Thomas, Scaffolding Supply  
Rona/Lansing Building Supplies  
Downtown Lumber Building Supplies  
New Canadian Lumber Building Supplies  
Home Hardware Misc. Supplies  
Wintac Building Supplies Building Supplies  
High Park Wallpaper and Paint Exterior Paint Supply  
David Picket Misc. Carpentry  
Warehouse Plastics Plexiglass  
Acoustical Gypsum Floors Light weight concrete  
Niagara Protective Coatings; Dean Karachi, Epoxy Coatings  
RainHandler TM Rain, dispersal system  
Posi -Slope Enterprises Inc. Sloped Roofing  
World of Comfort; Melvyn Ing HVAC  
The Bath People; Sergio Silva, Bathtub

**DESIGN INTENT**

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The design intent for 157 Coxwell House evolves around contextual design using unconventional methods that are economic, efficient and aesthetically pleasing. According to Rohan Walters, there is reluctance in Toronto's design culture to develop alternative styles of building and financing, yet his goal was contrary to the established norms. As a result, he built a dignified house on a difficult site: a house which is responsive to the needs of its occupants; a house which is in sync with the necessary scale of living; a house which is built with economic, durable and multi-functional materials; a house which is environmentally sustainable.

## LOCATION/CONTEXT

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**157 Coxwell House is located in Ward 32- Beaches-East York, Toronto. Looking South on Coxwell Street, showing homes on the West side, facing the Coxwell House.**

According to 2006 Census Canada Ward 32 – The Beaches-East York was home to 55,880 people and consisted of 24,385 households in 2001. Ward 32 is situated in south-east Toronto. It is bounded by Coxwell Avenue and Leslie Street to the West, Victoria Park Avenue to the East, Danforth Avenue to the North and Lake Ontario to the South. Ward 32 has a physical area of 9 square kilometers. The population of Ward 32 grew by 2.5% between 1996 and 2001. 28% of occupied private dwellings were in semi-detached houses, 26% were in single-detached houses and 26% were in low-rise apartments in 2001. In 2001, 54% of occupied private dwellings were owned while 46% were rented.<sup>1</sup>

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<sup>1</sup> <http://www.toronto.ca/wards2000/ward32.htm>

## Obstacles & Challenges of the Location



**Unusual soil condition: a filled marsh, also known as Mancour Playground park.**

The obstacles and challenges of the project involved the following: limitations of building space; budget limitations; building on unstable soils/engineered fill (50% marsh/50% compacted fill); bringing value to an undesirable lot; introducing innovative use of materials and color in the design, as well as in the construction methodology; elevating a structure above ground; gauging above-grade distance and height; connecting electrical and mechanical systems to a suspended structure; meeting building codes and observing an ecological approach.

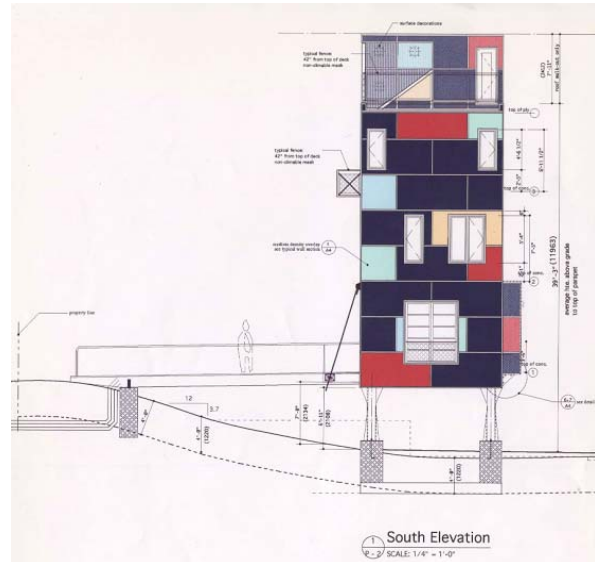


**Site preparation revealing fill material.**



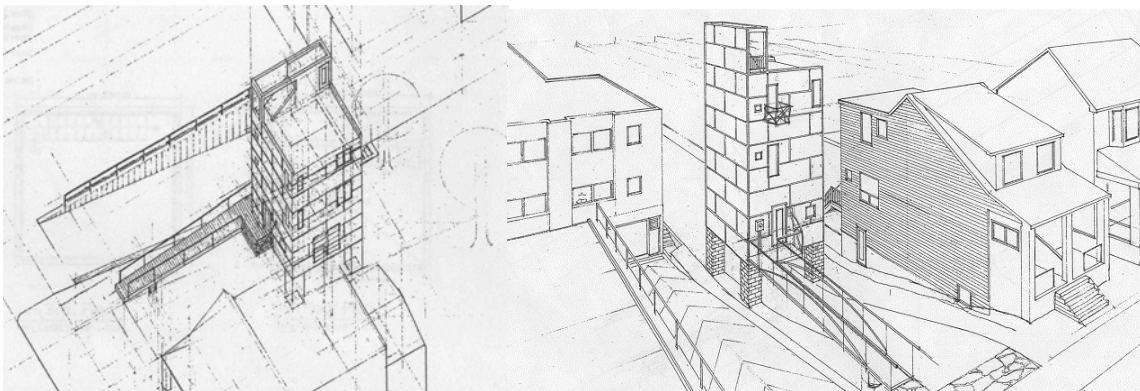
## The PROCESS

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### Attainment of the project

Rohan Walters first became aware of the Coxwell site when a realtor hired him to investigate why the lot was not moving on the market. The investigation revealed that a 5' wide right of way went through the length of the 23' wide site. Moreover, the steeply inclined site's soil was found to be composed of over 20' of fill built over a marsh. Walters offered the company \$35,000 to "take it off their hands" but they refused as asking price was \$135,000. Two years later the realtors offered the site to Walters for \$50,000. Walters seized on the opportunity and embarked on constructing a 16 by 16 foot three-story structure on helical piles, which he now owns and operates.



Drawings submitted to support financing documentation with the CIBC and mortgage brokers, as well as engineering consultants.

### Budget, Financing and Insurance

Rohan Walters allocated a construction budget of \$100,000 dollars for the project, which included the price of the lot at purchased at \$50,000. He then hired a broker and took out a mortgage for the construction of the project with Robert Kazakoff Builder's Mortgage. He contributed 25% of from a personal line of credit

towards the financing of this project. The remaining financing (75%) came from a CIBC CMHC insured loan. He also purchased builder's risk insurance via NTI Insurance Brokers and Henry Builder's Risk Insurance. The 800sqf house cost \$187.5 per square foot.

## **LEGAL METHODOLOGY**

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### **Contracts**

In case of 157 Coxwell House the architect acted as a general contractor because of the small scale of the project. There was no need to draft general contracts with addition to bonds or sureties. The bidding contracts and agreements drafted between the owner/designer/builder and consultants, contractors and subcontractors only. The legal documents consisted of one or two page agreements between two parties that were modified simultaneously by the parties involved. There were also agreements made with suppliers who had their specific standards of payment and delivery. However, the architect suggested that he would seek to hire professional construction lawyers to complete larger projects.

### **Risk Management As a Builder**

To mitigate risk, Walters included limited out clauses for all essential elements (start date and finish date for work). These agreements were used for steel, rough mechanical, carpentry, roof, and helical piles contractors. In addition backup suppliers and contractors were contacted and hold-back agreements were used where possible.

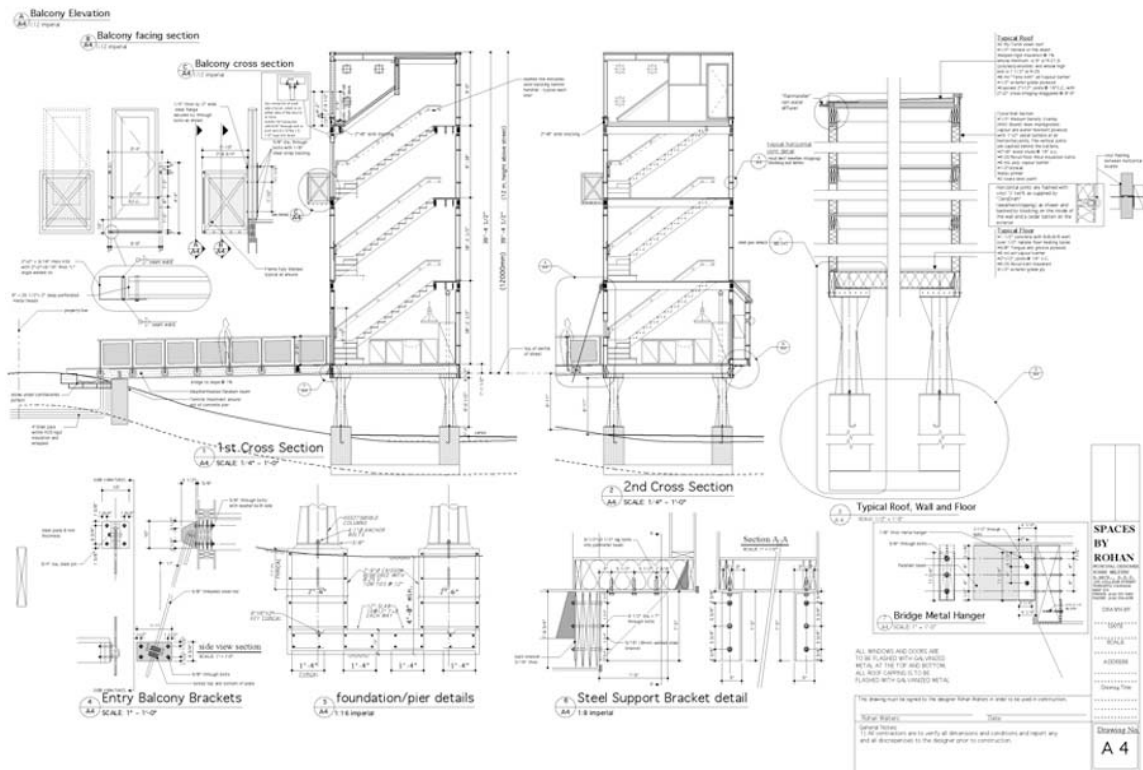
## **CONSTRUCTION METHODOLOGY**

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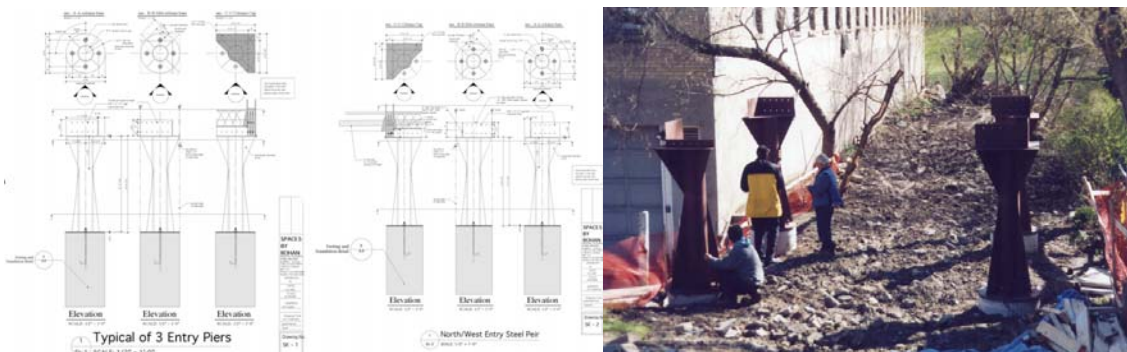
### **Schedule & Construction**

The architect acted as the General Contractor and established a Construction schedule. He hired all subcontractors and suppliers, supervising all architectural aspects of construction and coordinated with mechanical and structural consultants on relevant aspects. The construction schedule was set at six months and a preliminary estimate for the cost of the project was set using the R.S. Means Method. After setting the budget Walters explains that he worked backwards, choosing materials and construction processes that would best fit the budget and the design intention. Much time and resources went into finding a solution for the unstable soil condition. Helical piles driven 47' into the ground were used as a foundation. A system of light-weight concrete slabs and wood frame construction walls were used for the entire project. and it was clad in resin-impregnated plywood panels, an abundant material used in an unconventional way. Walter's used the simple formula of typical construction sequencing to build this project: **site substructure – servicing – superstructure – enclosure – interior limits – finish, close & cost.**

**NOTE: SEE DETAILED SCHEDULE ATTACHED.**



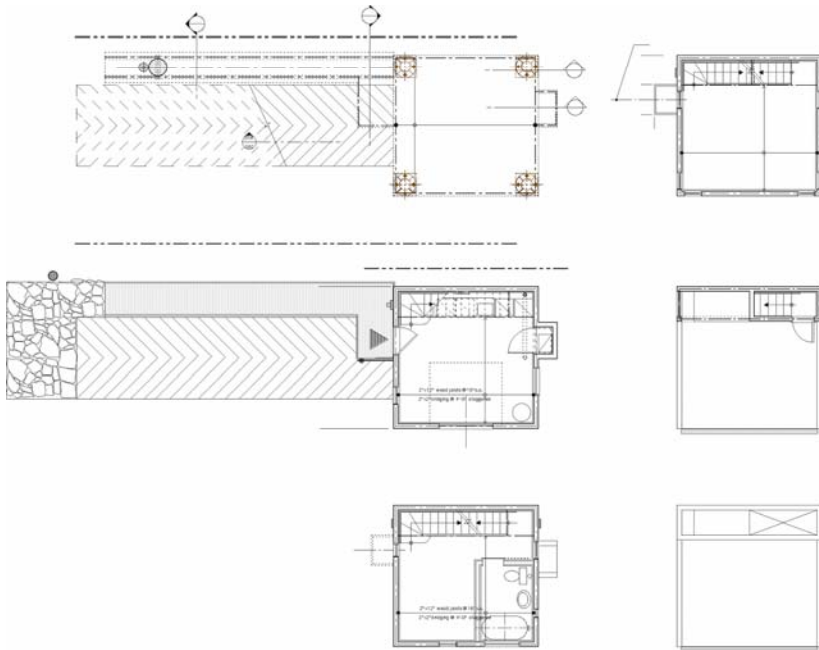
Left: Water emerges to the surface as the piles are being driven into the ground, showing the marshy nature of the natural soil condition. Filling the marshy soil. Right: Photos of the house at various stages during the six-months construction phase.



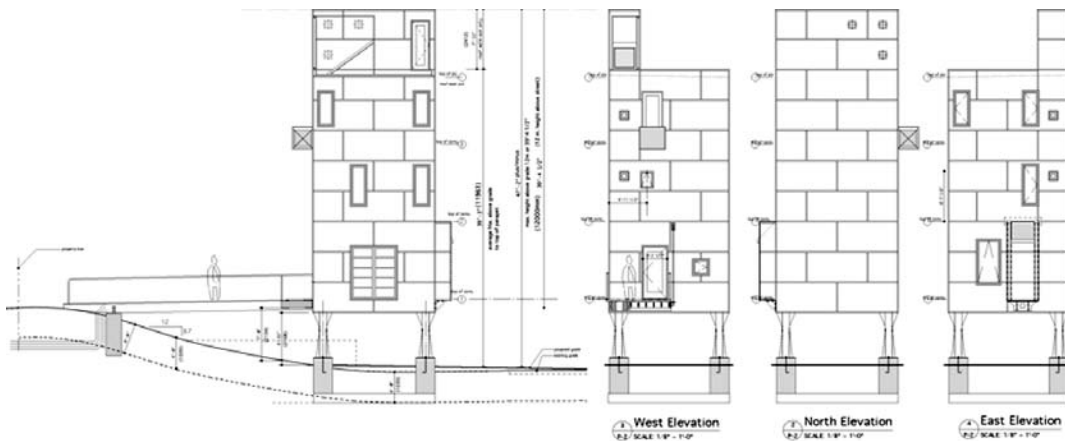
Left: Helical piles - Drawings. Right: Photo of the architect investigating, analyzing and managing the construction on the site.

## PROGRAM

Programmatic usage of the house is based on sensible accessibility, usage and comfort of the occupant. The bridge provides a connection, a bridge/walkway, to the first floor of the house. The first floor is designed as a kitchen/living space – ascending the stairs to the second floor that contains a leisure room and a bathroom. The third floor is a bedroom with a small balcony that leads up to the very top level: the rooftop patio. Parking space is located underneath the house, between the supporting helical piles. It is accessible from the street and slopes down along the side of the walkway. The garden extends in the back of the house, towards the park and is fenced off.



## Floor plans



## Elevations



## SPECIAL PROJECT FEATURES

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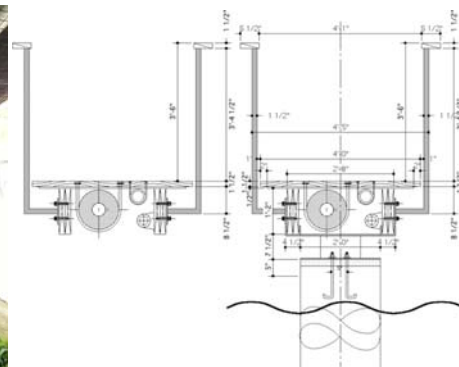
**Radiant Floor heating system:** A radiant floor heating system has been installed in each of the light weight concrete floor slabs – this system operates with an 'on-demand' water heater. In the summer, the concrete floor slabs act as heat sinks and help keep occupants cool.



**Radiant floor heating system under construction.**

**Natural Ventilation:** Coxwell house is a vertical arrangement of spaces, this allows for use of the stack effect. Cool air moves from the first to the third floor without any mechanical devices. Coxwell House did not require a heat recovery ventilation system. Walters avoided this by providing convincing calculations to the City Engineer that the house had sufficient natural in-filtration and ex-filtration of air. Moreover, the use of non-combusting appliances such as in-floor radiant heating, a direct vent furnace and a condensing dryer ensured that no internal air is combusted and helped make the case that the natural ventilation system as a whole meets the intent of the building code.

**Coupled sewage and water line:** Coxwell house is raised on stilts. All utilities are connected to the city grid through by an 'umbilical cord' placed under its bridge spanning from the entrance to the sidewalk. Ontario Building Code (OBC) requires that a heating cable be attached to any pipe less than four feet below grade or outside of an insulated envelope. Instead of adding an exterior heating cable Walters placed the sewage pipe beside the water line along the bridge and encased both within an insulation jacket. This solution allows for the recovery of heat from the sewage pipe and saves energy. It also ensures heating to the water main during blackouts.



The *umbilical cord* bridge/walkway showing coupled sewage and water lines.

**Green roof:** The structure of the house has been dimensioned to accommodate for a green roof terrace. This provides extra insulation on the top floor and creates a fifth element to the façade of the project.

**The bridge walkway:** The bridge walkway, besides being the *umbilical cord*, serves as an element that compromises the difference in the topographic grade between the sidewalk and the main entrance on the first floor.

**Garage Door:** There is a garage door installed in the kitchen. The garage door provides extra lighting during the day, excellent ventilation in warm weather, and serves as a fire escape – it improves the quality of light, air and security of the dwelling.

**Building Envelope:** One of the most distinctive elements of this project is its envelope. The Coxwell house is clad in brightly colored resin-impregnated plywood panels, a material commonly used in concrete formwork, applied as an expressive and inexpensive alternative to cladding materials on the market.

**Windows:** The north street façade has minimal openings: two doors and one small window, while the south façade has generous openings. This allows for passive heat gain in the winter as heat is stored in the thermal mass of the concrete slabs and reduces heat loss thanks to the triple-pane window system. ["Large south-facing, triple-glazed windows make maximum use of solar energy and minimize heat loss. Sunlight is collected through the windows and absorbed by the thermal mass of concrete walls, which retain and slowly release warmth during cooler night times. (...) No matter the weather, the house stays comfy at half the cost of a standard, similarly sized home."]<sup>2</sup>

**Resin-impregnated plywood:** The skin of 157 Coxwell House is composed of painted resin-impregnated plywood, also known as a signmaker's board. This type of plywood, once used for billboards, is now frequently used to make concrete forms because of its availability and durability (it can be reused multiple times). The plywood is also water-resistant and acid-resistant – it is often used in marine construction. Walters chose this material for its durability, as well as for its structural properties that function as an addition to structural support.

**Color:** The vibrant colors of the house (the combination of dark blue with shades of pastel pink, green and yellow) are derived from the Group of Seven paintings. The color palette establishes a reference to the landscape and brightens up the otherwise undermined and understated Toronto street.

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<sup>2</sup> *Utopia Towards a New Toronto. Home Improvement: In Appreciation of Innovative Houses*, p.75.

## ASSESSMENT OF PROJECT

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This project shows how unconventional design and construction methods can render a marginal plot into a singular work of architecture. The integrity of the finished project attests to the architect's ability to act as developer, designer and builder of the project. It was interesting to discover that Rohan Walters works very closely in the construction process and allows for the input of consultants and contractors to influence design decisions. Moreover, economy is also a strong guiding factor in the project and shows how by working backwards from a tight budget, a significant project can be achieved. The project was completed in just six months and came in on budget. The spatial configuration, the lifting of the ground floor and the expressive use of materials are all successful features of the project. The circulation and utilities bridge is also an ingenious move. We would question the placing of the gas meter directly beside the front entrance. Also, a visit of the site revealed wires and tubing on the exterior of the south side of the building. Both of these details detract from the clarity of the design of the bridge as the sole 'umbilical cord' for this floating color box. Despite these minute factors, 157 Coxwell House has been received well by the neighbors and the architecture community, receiving media attention and propositions from potential buyers.



Open House on January 19, 2003.

## BIBLIOGRAPHY

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Jason McBride & Alana Wilcox. **Utopia Towards a New Toronto.** *Home Improvement: In Appreciation of Innovative Houses.* Coach House Books, Toronto. 2005.

## About Rohan Walters: Professional Background

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Rohan Walters is the principal designer of Spaces By Rohan Inc., an independent design firm working with architects, engineers, interior designers, businesses, property managers and homeowners creatively solving their design needs since 1987. He holds a Bachelor of Architecture and a Bachelor of Environmental Studies from the University of Waterloo. Spaces By Rohan Inc. has also been responsible for the complete development, design and construction of two 'alternative' homes in the Toronto: 157 Coxwell Avenue and 1292 College Street. Both projects were recently acknowledged in UTOPIA, Towards A New Toronto, Coach House Books, 2005. These houses represent the ability to craft necessary, artistic, economically appropriate solutions in a positive and unexpected way. Rohan Walters' work has been featured in the Globe and Mail, The Toronto Star, City TV and various other media. Rohan has taught at the Institute Without Boundaries (IWB), George Brown College, lectured at Ontario College of Art and Design (OCAD), lectured at the Ontario Society of Professional Engineers.