

Architecture Matters

A KEY LINK BETWEEN CONSERVATION OF OUR BUILT ENVIRONMENT, SUSTAINABILITY AND CLIMATE CHANGE

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EVERGREEN BRICKWORKS, TORONTO. REHABILITATION AND ADAPTIVE REUSE OF AN ENTIRE INDUSTRIAL HERITAGE CULTURAL LANDSCAPE BASED ON PRINCIPLES OF SUSTAINABILITY. PHOTO: GOOGLE

THE IMPACT OF ARCHITECTURAL DESIGN upon our environment, its sustainability and resilience in the face of global pressures and dangers such as climate change, can be enormous. Two areas at which Ontario architects are excelling at are green building (natural conservation) and heritage preservation (cultural conservation). The fact is, however, that these two fields are based upon the same foundation: *to preserve that which we value*. Indeed, built heritage conservation, in the forms of rehabilitation and adaptive use, is actually a type of green building in that it reuses materials, preserves embodied energy and encourages smart growth in our mature neighbourhoods, rather than sprawling outwards into our agricultural lands. It helps reduce the need to construct additional infrastructure and minimizes travel fuel and other wasteful practices such as filling our landfills with ever-expanding building demolitions.

So the harmonization and synergy of practising sustainable building and heritage conservation at once can have an even more powerful positive impact on our cities, neighbourhoods and natural environment. There is no better endeavour to fulfil the promise of “People, Planet & Profits” (or the pillars of sustainable development supporting socio-cultural, environmental and economic objectives respectively). A new publication titled *Building Resilience: Practical Guidelines for the Sustainable Rehabilitation of Buildings in Canada* also shows how heritage conservation demonstrates best practises for sustainably rehabilitating all of our existing buildings. Ottawa Conservation Architects and Urbanists MTBA Associates Inc. were retained by Parks Canada’s Federal, Provincial, Territorial Collaboration on Historic Places (FPTHPC) on behalf of all these jurisdictions to write this on-line document. These



IR JOHN A. MACDONALD BUILDING REHABILITATION ADDITION AND ADAPTIVE REUSE, OTTAWA. WELLINGTON STREET VIEW ACROSS FROM PARLIAMENT BUILDINGS; REHABILITATION OF THE ORIGINAL 1932 BANK IS COMPLETE; CONSTRUCTION OF THE NEW ADDITION IS ALMOST COMPLETE IN THIS PHOTO. THE PROJECT IS ON TARGET TO ATTAIN A GREEN GLOBES® 70 SUSTAINABILITY RATING (EQUIVALENT TO LEED SILVER). ARCHITECTS: NORR/MTBA PHOTO: DOUBLESPEACE

pan-Canadian guidelines for design professionals and building owners alike are based upon the foundational principle that,

“Building Conservation contributes to creating a sustainable built environment and resilient communities.”

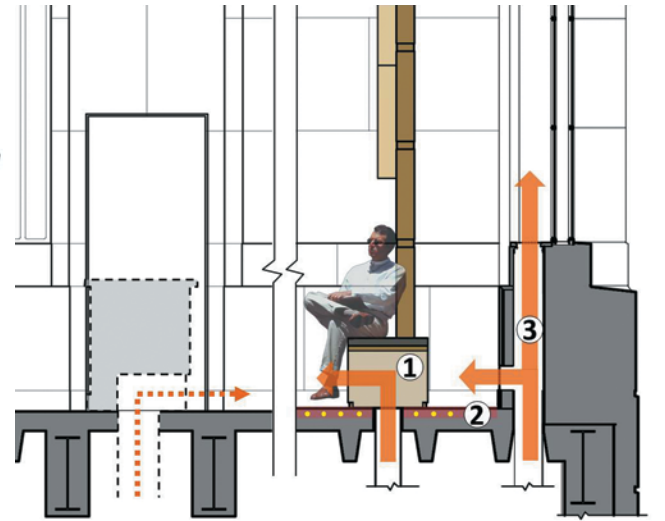
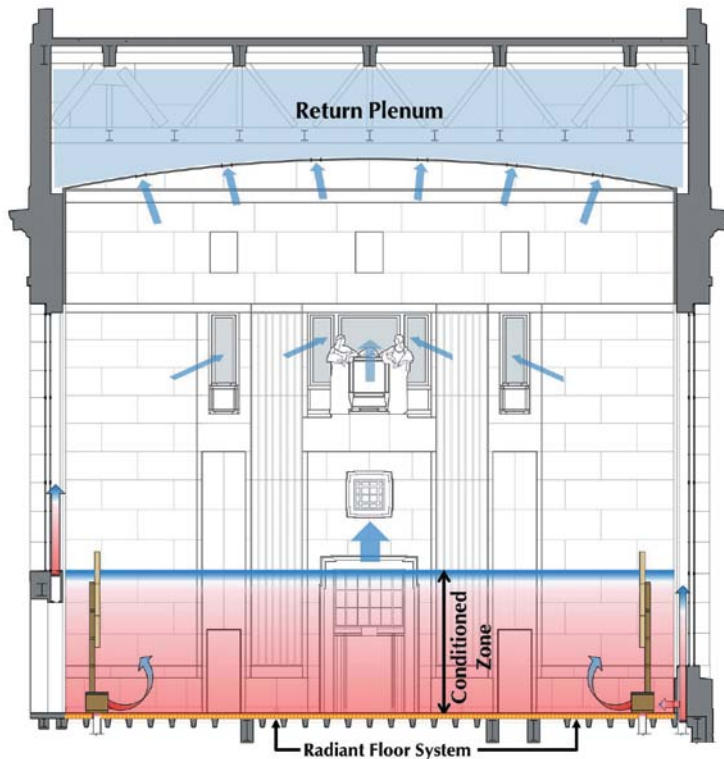
This article takes the reader briefly through the core values and practical applications of this National guidance document that is supported by the Ontario Government. It emphasizes the nexus and holistic synthesis of both natural and cultural conservation, as a core competency of these architects.

Building Resilience is intended to be a useful tool for all existing building rehabilitations, providing best practices to optimize their climate change action potential, while protecting inherent building value, but is particularly suited to the greening of heritage buildings. Given that buildings account for half of our natural resources used, plus a third of both energy produced and of greenhouse gas (GHG) emissions, there is a strong causal link between

conservation of our built environment, sustainability and climate change. *Building Resilience* explains the broader context and the important keys to “understanding your building,” outlines specific retrofitting and practical guidelines on a building component-by-component basis, and illustrates this through actual case studies on historic and modern building renovations.

Part One of *Building Resilience*, “Intro & Context,” explains:

- in more detail the relationship between conservation, sustainability and climate change. It shows the facts that addressing the rehabilitation of our existing buildings – not transportation; not new construction – is the single most important area to make positive improvements to our environment and to combat climate change. For example, the global *Intergovernmental Panel on Climate Change (IPCC)* has said that, “...improving energy efficiency in existing buildings encompasses the most diverse, largest and most cost-effective mitigation opportunities...”



Original System:
Teller Counter + HVAC

Rehabilitation System:
1. New "Speaker Bench" + HVAC
2. New Radiant Floor System
3. Reused Heritage System

PARTIAL EXCERPT OF A CASE STUDY EXAMPLE. THE SECTIONS ILLUSTRATE THE HYBRID AND HERITAGE SENSITIVE HVAC SOLUTIONS TO THE MAIN HALL, WHERE THE OCCUPANCY LOAD INCREASED TEN-FOLD. SIR JOHN A. MACDONALD BUILDING REHABILITATION, ADDITION, ADAPTIVE REUSE, OTTAWA
ARCHITECTS: NORR/MTBA PHOTO:

- key related points from other experts in the field help deliver the message, such as Carl Elefante of Quinn Evans Architects, Washington, DC; "The accumulated building stock is the elephant in the room. Ignoring it, we risk being trampled by it. We cannot build our way to sustainability; we must conserve our way to it."
- the importance of integrated solutions for sustainable rehabilitation. Heritage conservation architects and engineers have for decades understood the necessity of fully integrating the work of the whole range of disciplines involved in this work; sustainability consultants also now know that optimum solutions are only found through holistic approaches. This is yet another element common to natural and cultural conservation.

Part Two of Building Resilience, "Understanding Your Building,"

explains:

- the importance, prior to engaging into the rehabilitation project, of gaining a comprehensive understanding of the building's values, its integrity and evolution over time, its physical properties and their relationships, materials, assemblies, planning logistics, design intents and root causes of degradation, in order to effectively upgrade it while protecting its character and economic values;
- details on how fully knowing the building means understanding it as a "whole building ecology" or an interconnected environmental system that includes interdependent components such as design and spatial relationships; systems and operating functions; built assemblies, traditional characteristics such as "breathability," and possibly even



SIR JOHN A. MACDONALD BUILDING REHABILITATION, ADDITION, ADAPTIVE REUSE, OTTAWA. HISTORIC INTERIOR VIEW OF MAIN BANKING HALL WHICH WAS CONVERTED INTO A CONFERENCE CENTRE AND HALL OF STATE FOR THE HOUSE OF COMMONS.
ARCHITECTS: NORR/MTBA PHOTO:



REHABILITATED MODERN EXTERIOR ENVELOPE ASSEMBLY. BUCHANAN COMPLEX, UBC.
IMAGE: PERKINS + WILL

socio-cultural/economic functions, that all contribute and that are all impacted upon intervening;

- the usefulness of diagnostic tools, modelling and calculations against baseline, to assist in both the understanding of the causes of any problem conditions and in assessing energy performance/ impact. These include life cycle assessment, energy modelling, thermography, data logging and others;
- inherently sustainable elements that need to be identified and incorporated into retrofit solutions, such as thermal mass, exterior shading, high ceilings allowing thermal stack effect, loose fit/adaptable planning, passive heating/cooling, indigenous materials, and others;
- the unique challenge of sustainably rehabilitating heritage buildings of the Modern period, where relatively untested assemblies and materials have degraded and the “repair or replace” issue is more complex, impacting the evaluation of maintaining building value;

Part Three of *Building Resilience*, “Building Component Guidelines,” is the illustrated guidance component of the document, where common considerations for rehabilitation projects, particularly those including energy retrofits and/or environmental benefit objectives, are recommended and illustrated in a building component-by-component basis. It also explains:

- general guidelines for all sustainable rehabilitation projects;
- material and assembly-specific guidelines such as wood, masonry, concrete, metals, glass, plaster and stucco, as well as such aspects as durability and local sourcing;
- component guidelines from site & context to exterior form, to interior arrangements and features, to structural, mechanical and electrical systems, to roofs, windows and even to operations and maintenance considerations.

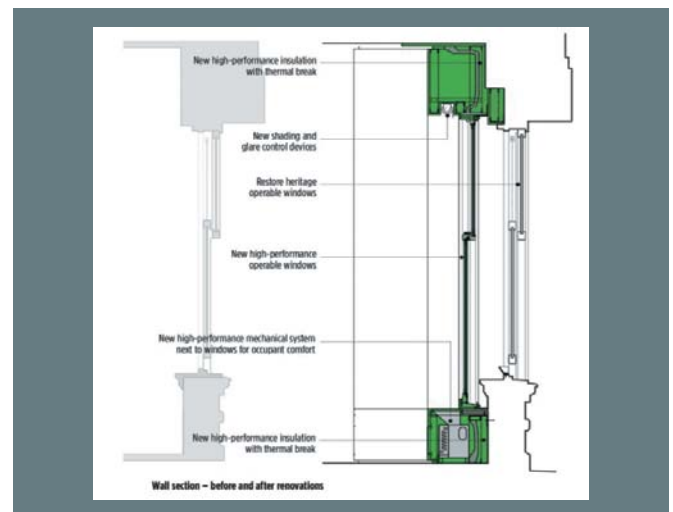
This is the core of the Guidelines where each of the elements is read individually and in concert with the general guidelines and each section includes:

- overall descriptions and approaches;
- inherently sustainable elements as part of existing characteristics;
- common sustainability challenges;
- interrelationships between the subject component and others;
- the component-specific guidelines.

Part Four of *Building Resilience*, “Further Information,” includes, among other features, a series of case studies from across Canada of sustainable rehabilitations of existing buildings, primarily heritage buildings. Like the core guidelines of Part 3, these are well illustrated and laid out in a common format. They highlight key sustainability strategies used, list the inherently sustainable features maintained or enhanced and outline the biggest challenges associated with the project.

Building Resilience will help building owners and designers execute best practices in understanding their existing buildings and planning, designing and constructing their sustainable rehabilitations, to contribute to the fundamental effort for buildings and communities to become more resilient and less polluting. People, planet and profits depend on it.

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EXTERIOR WALL SECTION BEFORE AND AFTER REHABILITATION. SUSTAINABILITY UPGRADES ARE INTEGRATED INTO A NEW WALL ADDED INSIDE OF THE EXTERIOR WALL. CALGARY PUBLIC BUILDING, C. 1931.
IMAGE: SAB MAGAZINE