Adapting Canada's Built Legacy Webinar Series
Part 1: June 17, 2025
Session Abstracts

Session 1: Conservation and Carbon: The Campus Context
Amy Montgomery

Higher education campuses are a unique sub-set of building owners: they own large portfolios of buildings that vary in size, age, and program, and very often including buildings of historic significance; they pay to operate and maintain their buildings and therefore have a vested interest in both energy efficiency and long-term durability. Many campuses across North America are also modeling leadership in environmental stewardship and climate mitigation, committing to drastic reductions in carbon emissions. One key part of many campus decarbonization strategies is to convert the existing district energy systems from natural gas to low-carbon electricity. This often means converting the existing hot water/steam system (180F/80C) supplied by natural gas boilers to a lower temperature heating water system (100-120F/40-50C) supplied by electric heat pumps. And as the lower temperature water distribution is most effectively implemented when it is matched to a reasonable heating demand, this change in heating system triggers the need for building envelope thermal performance upgrades.This conversion of heating system fuel source from natural gas to electricity coupled with building envelope thermal performance upgrades is a typical deep energy retrofit strategy. Deep energy retrofits are retrofits of existing buildings where efficiency measures are implemented to achieve a reduction in energy consumption of 50% or more (compared to the pre-retrofit performance). Deep energy retrofits are also characterized by efficiency measures that are integrated and interdependent, going "deeper" than typical no-cost/low-cost measures such as upgrading to energy-efficient lighting or seeking marginal improvements in efficiencies at the time of equipment replacement. Deep energy retrofits can be challenging for buildings with historic significance because, for the reasons described above, they nearly always necessitate interventions involving the building enclosure. While the building enclosure may have previously been "off limits" for energy efficiency measures in some buildings due to concerns about the risk of damaging the heritage fabric, the choice not to improve the performance - unless clearly justified - is increasingly recognized as contributing to a different type of risk: a climate risk. In this context, conservation practitioners must work closely with energy analysts, building scientists, and other project team members to holistically weigh the risks and benefits of proposed efficiency measures for deep energy retrofits of historic buildings. This presentation highlights short case studies from several deep energy retrofit projects of buildings of heritage significance on university and college campuses across North America, including the Red River College (Winnipeg), University of Toronto, University of Windsor, McGill University, Yale University, and Harvard University. Projects are in various stages of completion; some are recently completed while others are still in progress.

Session 2: Bridging agricultural buildings into non-agricultural uses; adapting the extant barns to modern assembly spaces
Arlin Otto

Extant barns— or barns without their original use or context— pepper the landscapes of Ontario and Quebec, as well as much of Canada. The Pennsylvanian German Slit Barn and the quintessential Ontario Bank barn were designed to harness animal heat, facilitate hay drying, animal containment, and a threshing floor. With the industrialization of farming, the design of these barns has changed to keep up with the needs and desired features of 21st century North American farming operations. As urbanization through the expansion of cities into former farmland continues, these agricultural buildings are often considered as commercial opportunities. In pursuing these projects, they spark an important need to bridge “remembering the agricultural past” and “adapting for the future”.Most historic barns were designed and built using empirical design. Even those built more recently, the National Farm Building Code of Canada (NFBCC 1995) addresses the needs of farm buildings with low human occupancy, and hence contained reduced requirements on matters affecting human health, fire safety and structural sufficiency. This is inherently different than the Ontario Building Code (OBC 2012), in which Part 10 ('Change of Use’) and Part 11 ('Renovation’) provide requirements for existing buildings that address occupant safety and property protection more stringently. During a typical change of use project, a building would likely need to be reverse engineered to certain degrees to assess its sufficiency in meeting the OBC’s modern code requirements for the new use. In addition to structural requirements, there could also be a need to consider other life safety measures, human health, zoning, mechanical and electrical systems, accessibility, energy efficiency, conservation, or architectural upgrades. From a structural standpoint, shifting from a low human occupancy farm building to a major occupancy of normal importance could require a 30% increase in safety factors coupled with a 30-50% increase to both snow and wind loads. This could represent a 40-75% net increase in loads. Adaptive reuse projects requiring a change of use application offer the ultimate test of assessing an existing building’s sufficiency to meet modern code requirements. It relies on specialized knowledge of materials to be able to quantify existing capacity and demonstrate compliance. Added complexity comes from the impact of as-built or as-altered conditions on the structural capacity and barns built by legacy or empirical design.Through this presentation, we’ll explore the feasibility of historic barn adaptive reuse projects through two case studies, considering the schematic planning stage to wide-scale structural analysis to support change of use to an assembly occupancy. This includes the exploration of alternative measures, the use of innovative solutions and interdisciplinary collaboration required to get these adaptations to “yes”. Let’s start building the bridge between the NFBCC and OBC, to beyond.

Session 3: La réhabilitation sismique des bâtiments patrimoniaux
Jérôme Bédard

La réhabilitation sismique des bâtiments existants nécessite une adaptation aux normes en vigueur, ce qui présente plusieurs défis techniques pour les professionnels en contexte patrimonial. Les thèmes abordés lors de la présentation seront supportés par des exemples concrets de projets à l’étude et réalisés. Au Québec, c’est le Code de construction du Québec (CCQ) qui prescrit les exigences pour les bâtiments existants subissant une transformation, des travaux d’entretien ou de réparation. Différents critères incitatifs à une réhabilitation sismique sont énoncés dans le CCQ, notamment une diminution de la capacité sismique du bâtiment, une modification au système de résistance aux charges latérales, un agrandissement solidaire à la structure existante ou une augmentation de la masse sismique. Le Code national du Bâtiment (CNB) donne également des indications sur l’évaluation de la résistance structurale et la mise à niveau des bâtiments existants afin que leur performance soit conforme à l’objectif. L’augmentation majeure des charges sismiques en lien avec l’application du CNB 2020 amplifie l’importance des stratégies de réhabilitation sismique qui doivent appliquées afin de rehausser le bâtiment au seuil visé par le cadre réglementaire.L’identification des systèmes de résistance aux charges latérales existants est primordiale afin d’évaluer l’impact des transformations sur le bâtiment. La nature des fondations (pieux caissons, murs de moellons), le mode de construction (murs de remplissage, murs massifs) et les caractéristiques géométriques (confinement des murs de remplissage, ouvertures, portées) doivent être considérés pour déterminer les composantes qui participent à la reprise des efforts sismiques. Une fois ces composantes définies, des essais in situ sont réalisées sur les matériaux existants, principalement la maçonnerie, afin de caractériser les résistances réelles. Ces essais, combinés à des relevés et des percées exploratoires pour observer l’état des matériaux et des assemblages entre les composantes structurales existantes, ont comme objectif d’établir précisément la capacité du bâtiment existant à résister aux charges sismiques. Pour la maçonnerie par exemple, différents modes de rupture sont analysés selon le mode de construction identifié. Suivant nos analyses, il est très commun d’obtenir que la résistance aux charges latérales des bâtiments existants soit bien en deçà des niveaux requis par les exigences réglementaires et qu’un rehaussement sismique soit requis. Les méthodes de rehaussement sismique à préconiser pour les bâtiments patrimoniaux doivent avant tout privilégier la conservation des composantes. Les renforts sismiques qui sont ajoutés au bâtiment doivent être compatibles avec la rigidité attendue pour un bâtiment en maçonnerie tout en intégrant les objectifs du calcul parasismique moderne, notamment la ductilité. Des méthodes innovantes, variées et adaptées aux caractéristiques du bâtiment sont proposées.

Session 4: Facadism: Heritage at Face Value
Janet Li

Facadism is the practice of retaining only the outward layer of a building while everything else is demolished to make way for new construction. It is becoming a standard practice that the development industry has been habituated to. This presentation will provide an account of the current environment as seen in Toronto, analyzing aspects such as heritage compromise, acceptability by conservationists, economic realities, adherence to Standards and Guidelines, and the value of old buildings. This presentation will review a taxonomy of projects in the Toronto area - Face, Podium, Shell, Sticker, Building-in-building, and take a closer look at a case study. Facadism exposes shortcomings in the existing heritage system, particularly in the statement of significance. Statements of significance reduce and codify cultural values to a few sentences or jotted notes. This is problematic in minimizing the significance of other values beyond the few that are prioritized. Often, the material is overemphasized. Current practice focuses on normative, art-historical, and archeological notions and cannot encompass all aspects of heritage in its organic form. The focus on aesthetics and fabric leads to superficial preservation, reducing heritage to a mere image. However, heritage is more than aesthetic, it is a sociocultural activity, not simply a technical practice. Thus, this can be reflected in a loss of identity, and the erasure of certain types of histories and narratives, especially minorities. The presentation will explore the case study of Mirvish Village in Toronto. Known for its eclectic group of artists and small businesses, the area kick-started many local businesses and young careers. Now part of a large redevelopment of the site to intensify the area, representative examples of several early 20th century styles will be preserved skin deep. Although historical and contextual associations mention the significant community contribution of the artist's enclave, it's overshadowed by the material significance. The niche community, some of whom spent their whole lives in this community, were evicted and not invited back. There is concern about the affordability of the units, gentrification, and the pushing out of the existing (largely marginalized) community. Facadism often results from the limits established according to new construction; heritage is not considered a priority. The mainstream thinking is in terms of blank slates rather than considering what is existing. The compulsion to demolish should be thoroughly evaluated to consider not just what is seen but unseen. Heritage should be understood as responsible development, not just image preservation.