# Appendix: Consultant Scope of Work

## Whole Building Life Cycle Assessment Consultant

The primary objective of the Whole Building Life Cycle Assessment (WBLCA) Consultant is to evaluate and quantify the environmental impacts (including embodied carbon) associated with the materials used throughout the entire lifecycle of the building.

### Abbreviations

- APEGA (Association of Professional Engineers and Geoscientists of Alberta)
- ASCE (American Society of Civil Engineers)
- ISO (International Organization for Standardization)
- LCIA (Life Cycle Impact Assessment)
- LEED (Leadership in Energy and Environmental Design)
- NRC (National Research Council)
- SBP (Sustainable Building Policy)
- TRACI (Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts)
- WBLCA (Whole Building Life Cycle Assessment)

### Qualifications

The WBLCA Consultant team lead must have at least three years of experience completing life cycle assessments for buildings of comparable scope and scale on at least three building projects. Professional credentials such as P.Eng., through APEGA, and AAA, through the Alberta Association of Architects are considered an asset but are not a requirement.

### Requirements

The Consultant shall conduct cradle-to-grave life-cycle assessments to quantify embodied carbon emissions and other lifecycle impacts, determine how the proposed design compares to a baseline, and identify low and no-cost opportunities to minimize these impacts through the building design and material selection process. Modelling shall follow the NRC National Guidelines for Whole Building Life Cycle Assessment.

The baseline and proposed buildings must be of comparable size, function, orientation, and operating energy performance. Guidance on the definition of the baseline building is available in the reference ASCE Whole Building Life Cycle Assessment: Reference Building Structure and Strategies.

The service life of the baseline and proposed buildings must be aligned with the project requirements and at least 60 years to fully account for maintenance and replacement. Baseline assumptions must be based on standard design and material selection for the project location and building type. Use the same life-cycle assessment software tools and data sets to evaluate both the baseline building and the proposed building and report all listed impact categories. Data sets must be compliant with ISO 14044 Environmental Management.

Projects pursuing green building certification shall leverage the whole building life cycle assessment to evaluate the following impact categories in addition to embodied carbon:

- depletion of the stratospheric ozone layer, in kg CFC-11e
- acidification of land and water sources, in moles H+ or kg SO2e
- eutrophication, in kg nitrogen eq or kg phosphate eq
- formation of tropospheric ozone, in kg NOx, kg O3 eq, or kg ethene
- depletion of nonrenewable energy resources, in MJ using CML / depletion of fossil fuels in TRACI

The LCIA method used in the life cycle assessment shall be TRACI v2.1 or newer.

## Deliverables

The Consultant must provide an embodied carbon or life cycle assessment report to be submitted to The City Project Manager and the SBP Steward. The report must use the Zero Carbon Building Standard v3 Embodied Carbon Reporting Template, meet the documentation requirements of the LEED Building Life-Cycle Impact Reduction, or follow another format approved in advance by the SBP Steward.

Project teams are required to submit a preliminary report at the completion of the Design Development stage with an updated report submitted at the Contract Documents stage.

## References


- Embodied Carbon Guidelines, City of Vancouver, 2023
- ISO 14044: 2006 Environmental Management, ISO, 2022
- LEED v4 Reference Guide, U.S. Green Building Council, 2017
- LEED v4.1 Reference Guide, U.S. Green Building Council, 2019
- National Guidelines for Whole Building Life Cycle Assessment, NRC, 2022
- Whole Building Life Cycle Assessment: Reference Building Structure and Strategies, ASCE, 2018
- Zero Carbon Building Standard, Canadian Green Building Council, 2023