Part 1  LEED® Certifications and McGill Mandatory Credits

1.1  Summary

.1  McGill requires projects to achieve prescriptive levels of environmental performance according to project size and scope. New construction and major renovations are required to register and achieve certification using the Leadership in Energy and Environmental Design (LEED®) green building certification rating system. All projects are encouraged to pursue aggressive levels of energy efficiency and sustainable design using recognized performance standards as design minimums. Minimum performance standards for McGill will be as follow:

.1  New Construction and Major Renovations

All new buildings or building-wide, full-gut renovation projects (more than 50% of the building spaces) must achieve at least a LEED® v4 Silver certification. All projects will produce an assessment of the maximum number of LEED® credits achievable and the costs to the project for achieving these objectives.

.2  Fit-Outs

All fit-outs and partial building interior fit-outs of more than 500 m² and of at least one building storey and multiple building systems must achieve at least a LEED® v4 Silver equivalence. All projects will include a LEED® Silver certification feasibility section in the initial design submission.

Part 2  Integrative Process

2.1  Summary

.1  In order to assist project teams in the vetting of sustainable goals and objectives, McGill has identified two levels of integrated design requirements for projects based on their scope of work. Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems. The first meetings of all projects should clarify the design objectives with respect to sustainable design, in conjunction with McGill’s Project Manager.

2.2  New Construction and Major Renovations

For all new building or building-wide, full-gut renovation projects (more than 50% of the building spaces), or for all fit-outs and partial building interior fit-outs of more than 500 m² and of at least one building storey and multiple building systems:

.1  Perform at least three integrated design charrettes, the first of which should happen at the time of the project kickoff. These charrettes must include identification and tracking of project goals and analysis of the Total Cost of Ownership impacts of potential design options. Charrettes should include representation of major stakeholders including occupants and operations staff. Use the analyses described below to inform the owner’s project requirements (OPR), basis of design (BOD), design documents, and construction documents:
.1 Preliminary Energy Analysis

Before design of the building form begins, a building massing ("simple box") energy analysis can be used to evaluate potential energy and load reduction strategies.

.1 Site conditions. Consider the site’s surroundings, integration of landscape components and strategies to minimize lighting needs.

.2 Massing and orientation. Consider footprint, shape, height and orientation.

.3 Building envelope performance. Consider options for the following aspects, and their effects on energy loads:

.1 Solar heat gain coefficients and overall U-value of glazing systems
.2 R-value of walls, roofs, and conditioned below-grade structures
.3 Orientation
.4 Percentage of exterior glazing (e.g., 30%, 50%, and 70%)

.4 Lighting levels. Consider at least two options for reasonable reductions in lighting power density, including one aimed at a significant reduction from ASHRAE standards.

.5 Thermal comfort ranges. Consider options for expanding the thermal comfort range.

.6 Plug and process load needs. Consider at least two options for reasonable reductions in plug load density, including one aimed at a significant reduction from ASHRAE standards.

.7 Programmatic and operational parameters. Consider options aimed at reducing building size, hours of occupancy, and/or number of occupants.

.2 Water-Related Systems

.1 Perform a preliminary water budget analysis before the completion of schematic design that explores how to reduce potable water loads. Assess and estimate the project’s potential non-potable water supply sources and water demand volumes, including the following:

.1 Indoor water demand.
.2 Outdoor water demand.
.3 Process, services, and equipment water demand, as applicable
.4 Alternative supply sources for non-potable water.

.2 Implementation

.1 Document how the above analysis informed building and site design decisions.
2.3 Minor Renovations and Improvements

For all system upgrades with a change of more than 50% of a system, and for all other projects with no or limited energy impact:

.1 Perform at least two integrated design charrettes, the first of which should happen at the starting point of the project. These charrettes must specifically address goal setting and tracking that sets expectations and evaluates project success. These meetings should include representation of major stakeholders including occupants and operations staff.

Part 3 Life Cycle Cost Analysis

3.1 Summary

.1 In order to assist project teams assess the total cost of ownership impacts that decisions have throughout the course of design, McGill has identified various levels of Life Cycle Cost Analysis for projects depending on their scope of work. Responsible Life Cycle Cost Analysis includes an analysis of utility rebated, grants, stimulus funding, or other alternative funding sources. It is best practice to include building operations staff in all LCCA and value engineering review.

3.2 New Construction and Extensive Renovations

For all new building or building-wide, full-gut renovation projects (more than 50% of the building spaces), and for all fit-outs and partial building interior fit-outs of more than 500 m² and of at least one building storey and multiple building systems:

.1 Perform Life Cycle Cost Analysis to quantify the 20-year impacts on GHG, energy costs, maintenance costs, etc. The scope of LCCA will vary depending on project, but will typically include envelope, HVAC, electrical, and many other building systems. Requirements include:

.1 Planning/conceptual design: initial LCCA templates with supporting narratives for optional design elements with major budget implications;

.2 Schematic design: LCCA templates presenting options for major energy-consuming systems;
.3 Value engineering (any phase): LCCA templates presenting impacts beyond initial capital outlay.

3.3 Minor Renovations and Improvements

For all system upgrades with a change of more than 50% of a system, and for all other projects with no or limited energy impact:

.1 Perform Life Cycle Cost Analysis to compare design options based on 20-year impacts on GHG, energy cost, maintenance costs, etc. The scope of LCCA will vary depending on project, but will typically include envelope, HVAC, electrical, and many other building systems. Requirements include:

.1 Design: LCCA template for design options with 20-year impacts on GHG, energy costs, maintenance costs, etc.
### 3.4 Table of process phases for LCCA led by the Project Manager

<table>
<thead>
<tr>
<th>Process Phase</th>
<th>LCCA Goals</th>
<th>Type of System</th>
<th>Internal Consultants</th>
<th>External Consultants</th>
</tr>
</thead>
</table>
| Scoping       | - Develop a benchmark budget with design and construction cost estimates based upon data from previous projects  
- Develop an operations and maintenance (O&M) benchmark budget based on existing campus buildings | Energy Systems | Utilities & Energy Management: Energy Manager  
Building Operations: Maintenance Mechanical Engineer | Mechanical Engineer |
|               |            | Water Systems  | Utilities & Energy Management: Utility & Energy Maintenance Officer  
Building Operations: Maintenance Mechanical Engineer | Mechanical Engineer |
|               |            | Lighting Systems | Building Operations: Maintenance Electrical Engineer | Architect |
|               |            | Maintenance    | Buildings & Grounds: Building Services Officer  
Design Department: Senior Manager Architecture | Mechanical Engineer |
| Architectural Design | Design Department: Senior Manager Architecture | Architect |
| Finishes      |            | Buildings & Grounds: Building Services Officer  
Design Department: Senior Manager Architecture | Architect |
### Feasibility & Programming

Develop LCCA Options for the following possible categories:

- **Energy Systems:**
  - Central vs. stand-alone
  - Alternative energy systems
- **Mechanical Systems:**
  - Air distribution systems

| Energy Systems | Utilities & Energy Management: Energy Manager | Electrical Engineer
| Building Operations: Maintenance Mechanical Engineer | Mechanical Engineer |

| Water Systems | Utilities & Energy Management: Utility & Energy Maintenance Officer | Mechanical Engineer |
| Building Operations: Maintenance Mechanical Engineer | |

| Mechanical Systems: Water distribution systems | Lighting Systems | Architect |
| Building Operations: Maintenance Electrical Engineer |

| Electrical systems: Indoor lighting sources and controls Outdoor lighting sources and controls Distribution | Architectural Design | Architect |
| Building Operations: Maintenance Electrical Engineer |

| Siting/Massing: Orientation and massing Landscape, irrigation, and hardscape | |
| Structural Systems: Systems and material selection | |
| Building Envelope: Skin and insulation options Roofing Glazing | |

### Schematic Design

- Conduct studies to review LCCA options;
  Prioritize studies based on the simplicity of the analysis and the level of cost impact:

  1. Simple analysis with high cost impact
  2. Simple analysis with low cost impact
  3. Complex analysis with high cost impact
  4. Complex analysis with low cost impact

- Select cost-effective alternatives based on the studies conducted considering cost, user preferences, recommendations, and payback findings

| Energy Systems | Utilities & Energy Management: Energy Manager | Electrical Engineer |
| Building Operations: Maintenance Mechanical Engineer | Mechanical Engineer |

| Water Systems | Utilities & Energy Management: Utility & Energy Maintenance Officer | Mechanical Engineer |
| Building Operations: Maintenance Mechanical Engineer | |

| Lighting Systems | Building Operations: | Architect |
| Building Operations: | | |
### Part 4  Design for Flexibility

#### 4.1 Summary

1. Wherever possible, install accessible systems (floor or ceiling) for at least 50% of the project floor area to allow for flexible use of space and access to systems not entangled with other building systems.

2. At least 50% of interior non-structural walls, ceilings, and floors shall be designed to be movable or demountable.

3. At least 50% of non-structural materials shall be reusable or recyclable, as defined by the Federal Trade Commission Guide for Use of Environmental Marketing Claims, 260.12.

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**END OF SECTION**