The following document is the Introduction section of the *LEED Canada Reference Guide for Green Building Design and Construction 2009*. This excerpt has been made publically available to assist in the selection of an appropriate LEED rating system. The complete Reference Guide including strategies, calculations and additional resources to assist in meeting the requirements of each credit and prerequisite may be purchased from the CaGBC website, www.cagbc.org.

INTRODUCTION

I. WHY MAKE YOUR BUILDING GREEN?

The environmental impact of the building design, construction, and operations industry is enormous. Green building practices can substantially reduce or eliminate negative environmental impacts through high-performance, market-leading design, construction, and operations practices. As an added benefit, green operations and management reduce operating costs, enhance building marketability, increase workers' productivity, and reduce potential liability resulting from indoor air quality problems.

Throughout this reference guide, information is presented on the environmental impact buildings can have as well as practical solutions to limit negative impacts. As well, case studies of high performing buildings are shown as real world examples.

BENEFITS OF GREEN BUILDINGS

Green buildings are superior to their conventional counterparts; typically including features such as:

- Landscaping that requires little or no irrigation or application of synthetic chemicals, manages and treats stormwater and non-point-source pollution onsite, and replenishes groundwater supplies.
- Locations that support efficient travel options for building users.
- Durable, thermally efficient roofs, walls and windows that reduce heating and cooling and enhance thermal comfort.
- Building form, orientation and thermal mass optimized for solar gains, natural ventilation and daylighting for free heating, cooling, ventilation and lighting.
- Significantly smaller and more efficient HVAC and electrical lighting systems.
- Water efficient supply and waste fixtures.
- Adaptable interior designs, providing visual access to the outdoors and access to daylight.
- Interior finishes and installation methods having lower toxic emissions.

Throughout their lifecycle, green buildings use less energy and water, generate less greenhouse gases and other pollutants, use materials wisely, and produce less waste. They cost less to operate, are more adaptable to new uses and typically have longer economic lives. Occupants are more comfortable in green buildings with their excellent ventilation, thermal comfort, and abundant natural light. Green buildings are healthier for occupants and workers who process building materials, by minimizing use of materials made with harmful chemicals and indoor air pollutants, and reducing the risks of biological contamination. The satisfaction and lives of occupants are greatly enhanced by providing restorative views, plentiful outdoor air, and greater personal control of internal conditions. Providing healthy indoor environments reduce sick building syndrome as well as the risks of litigation. A growing body of research links the high quality indoor environments of green buildings to gains in productivity, decreased absenteeism and improved employee morale. Green design has environmental, economic, and social benefits for all stakeholders, including owners, occupants and the general public. Green buildings are essential to support sustainable patterns of living.

II. LEED® GREEN BUILDING RATING SYSTEM

BACKGROUND ON LEED

Growing awareness and concern with the environmental and health impacts of buildings in Canada has led to widespread demand for a common method of independently certifying the merits of a given building. In response to this demand, the Canada Green Building Council (CaGBC) has adapted several rigorous Canadian green rating systems based on the U.S. Green Building Council's (USGBC) LEED® system. The aim has been to create rating tools that both recognize high health, energy and environmental performance, while being practical and easy to apply by Canadian building projects.

The first LEED rating system adapted for Canada-wide use was the *LEED® Canada for New Construction and Major Renovations version 1.0*, launched in December 2004. This system was adapted from the USGBCs *LEED for New Construction and Major Renovations* version 2.1 (2002), tailored specifically for Canadian climates, construction practices and regulations. This first version also incorporated planned changes for the release of USGBC's *LEED for New Construction and Major Renovations* version 2.2 in 2005. In 2007, the CaGBC released an addendum to the *LEED Canada for New Construction and Major Renovations* version 1.0 Rating System and Reference Guide, introducing new compliance paths and adaptations from the release of USGBC's *LEED for New Construction and Major Renovations* version 2.2, as well as incorporating changes based on the experience of Canadian users.

The USGBC released *LEED for Core and Shell* version 2.0 in 2006 after a pilot. Due to its similarities to *LEED for New Construction and Major Renovations*, CaGBC released the new rating system as an adaptation to *LEED Canada for New Construction and Major Renovations* version 1.0 in 2008. This allowed an expedited release process and allowed building owners to switch between rating systems if tenant expectations change.

In 2009, the USGBC re-launched its suite of rating systems and aligned *LEED for New Construction and Major Renovations* (NC) and *LEED for Core and Shell Development* (CS) into one reference guide. The CaGBC is following suit and re-launching *LEED Canada NC 2009* and *LEED Canada CS 2009*, merged not only in one rating system document but also in this reference guide for ease of use.

LEED Canada for New Construction and Major Renovations 2009 and *LEED Canada for Core and Shell Development 2009* also incorporates CaGBC's application guides on the previous versions:

- Application Guide for Multi-Unit Residential Buildings in LEED Canada-NC (September 2005),
- Application Guide for Campuses and Multiple Building Projects in LEED Canada-NC (February 2008),
- Application Guide for Core and Shell Buildings and Leased Tenant Space in LEED Canada-NC (July 2008).

By incorporating these application guides into one package, it provides for a far more streamline approach for users.

The green design field is growing and changing daily. New technologies and products are coming into the marketplace, and innovative designs are proving their effectiveness. The rating systems and the reference guides are evolving as well. Teams wishing to certify their projects with LEED must use the version of the rating system that is current at the time of their registration. CaGBC highlights new developments on its website on a continual basis; see www.cagbc.org.

FEATURES OF LEED®

The LEED Green Building Rating Systems are voluntary, consensus-based, and market-driven. Based on existing and proven technology, they evaluate environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a green building in design, construction, and operation.

The LEED rating systems are designed for rating new and existing commercial, institutional, and residential buildings. They are based on accepted energy and environmental principles and strike a balance between known, established practices and emerging concepts. Each rating system is organized into 5 environmental categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality. An additional category, Innovation in Design (or Operations), addresses sustainable building expertise as well as measures not covered under the 5 environmental categories. Regional bonus points are another feature of LEED and acknowledge the importance of local conditions in determining best environmental design and construction practices.

THE LEED CREDIT WEIGHTINGS

In LEED 2009, the allocation of points between credits is based on the potential environmental impacts and human benefits of each credit with respect to a set of impact categories. The impacts are defined as the environmental or human effect of the design, construction, operation, and maintenance of the building, such as greenhouse gas emissions, fossil fuel use, toxins and carcinogens, air and water pollutants, and indoor environmental conditions. A combination of approaches, including energy modeling, life-cycle assessment, and transportation analysis, is used to quantify each type of impact. The resulting allocation of points among credits is called credit weighting.

LEED 2009 uses the U.S. Environmental Protection Agency's TRACI[1] environmental impact categories as the basis for weighting each credit. TRACI was developed to assist with impact evaluation for life-cycle assessment, industrial ecology, process design, and pollution prevention. LEED 2009 also takes into consideration the weightings developed by the National Institute of Standards and Technology (NIST); these compare impact categories with one another and assign a relative weight to each. Together, the 2 approaches provide a solid foundation for determining the point value of each credit in LEED 2009.

The LEED 2009 credit weightings process is based on the following parameters, which maintain consistency and usability across rating systems:

- All LEED credits are worth a minimum of 1 point.
- All LEED credits are positive, whole numbers; there are no fractions or negative values.
- All LEED credits receive a single, static weight in each rating system; there are no individualized scorecards based on project location.
- All LEED rating systems have 100 base points; Innovation in Design (or Operations) and Regional Priority credits provide opportunities for up to 10 bonus points.

[1] Tools for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). U.S. Environmental Protection Agency, Office of Research and Development. http://www.epa.gov/nrmrl/std/sab/traci/.

Given the above criteria, the LEED 2009 credit weightings process involves 3 steps:

A reference building is used to estimate the environmental impacts in 13 categories associated with a typical building pursuing LEED certification.

The relative importance of building impacts in each category are set to reflect values based on the NIST weightings.[2]

Data that quantify building impacts on environmental and human health are used to assign points to individual credits.

Each credit is allocated points based on the relative importance of the building-related impacts that it addresses. The result is a weighted average that combines building impacts and the relative value of the impact categories. Credits that most directly address the most important impacts are given the greatest weight, subject to the system design parameters described above. Credit weights also reflect a decision by LEED to recognize the market implications of point allocation. The result is a significant change in allocation of points compared with previous LEED rating systems. Overall, the changes increase the relative emphasis on the reduction of energy consumption and greenhouse gas emissions associated with building systems, transportation, the embodied energy of water, the embodied energy of materials, and where applicable, solid waste.

The details of the weightings process vary slightly among individual rating systems. For example, *LEED Canada for Existing Buildings: Operations & Maintenance* includes credits related to solid waste management but *LEED Canada for New Construction and Major Renovations* does not. This results in a difference in the portion of the environmental footprint addressed by each rating system and the relative allocation of points.

USGBC's weightings process for each rating system is fully documented in a weightings workbook. The credit weightings process will be re-evaluated over time to incorporate changes in values ascribed to different building impacts and building types, based on both market reality and evolving scientific knowledge related to buildings. A complete explanation of the LEED credit weightings system is available on the USGBC website, at www.usgbc.org.

[2] Relative impact category weights based on an exercise undertaken by NIST (National Institute of Standards and Technology) for the BEES program. http://www.bfrl.nist.gov/oae/software/bees/.

III. OVERVIEW AND PROCESS

The *LEED Canada New Construction and Major Renovations* Green Building Rating System and the *LEED Canada for Core and Shell Development* Green Building Rating System are a set of performance standards for certifying the design and construction of commercial or institutional buildings and high-rise residential buildings of all sizes, both public and private. The intent is to promote healthful, durable, affordable, and environmentally sound practices in building design and construction.

Prerequisites and credits in *LEED Canada for New Construction and Major Renovations 2009* and in *LEED Canada for Core and Shell Development 2009* address 7 topics:

- Sustainable Sites (SS)
- Water Efficiency (WE)
- Energy and Atmosphere (EA)
- Materials and Resources (MR)
- Indoor Environmental Quality (IEQ)
- Innovation in Design (ID)
- Regional Priority (RP)

LEED prerequisites and credits have identical structures; see Section XI of this introduction.

MINIMUM PROGRAM REQUIREMENTS

There are seven Minimum Program Requirements for projects certifying under *LEED Canada for New Construction and Major Renovations 2009* and under *LEED Canada for Core and Shell Development 2009*. These must be adhered to by all projects. See Section IV of this Introduction for more details.

WHEN TO USE LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS

LEED Canada for New Construction and Major Renovations was designed primarily for new commercial office buildings, but it has been applied to many other building types by LEED practitioners. All commercial buildings, as defined by standard building codes, are eligible for certification as *LEED Canada for New Construction and Major Renovations* buildings. Examples of commercial occupancies include offices, institutional buildings (libraries, museums, churches, schools, etc.), hotels, and multi-unit residential buildings (MURBs) other than those covered by Part 9 of the National Building Code. MURBs under Part 9 of the National Building Code and single-occupancy residential buildings wishing to obtain a LEED certification, should apply under *LEED Canada for Homes 2009*. However, Part 9 buildings that are a part of mixed-use projects in which the majority of the floor area is eligible for *LEED Canada for New Construction and Major Renovations certification* are allowed to be part of the latter project. Note that there is no separate LEED for Schools rating system in Canada. Instead schools wishing to obtain LEED certification for new buildings must apply under *LEED Canada for New Construction and Major Renovations*. Some special allowances for schools have been noted within the credits.

LEED Canada for New Construction and Major Renovations addresses design and construction activities for both new buildings and major renovations of existing buildings. For a major renovation of an existing building, *LEED Canada for New Construction and Major Renovations* is the appropriate rating system; refer to the "How to apply as a major renovation" section below for important details. If the project scope does not involve significant design and construction activities and focuses more on operations and maintenance activities, *LEED Canada for Existing Buildings: Operations &*

Maintenance is more appropriate because it addresses operational and maintenance issues of working buildings. If the project's scope is mostly limited to interior renovations, *LEED Canada for Commercial Interiors* is more appropriate. It is the responsibility of the applicant to ensure the project can achieve all prerequisites and sufficient credits for certification when selecting an appropriate rating system to use.

Some projects are designed and constructed to be partially occupied by the owner or developer, and partially occupied by other tenants. In such projects, the owner or developer has direct influence over the portion of the work that they occupy. For such a project to pursue *LEED Canada for New Construction and Major Renovations* certification, at least 50% of the building's floor area must be fit-up for the certification application. Projects in which 50% or less of the building's floor area is fit-up (and is not under the design and construction control of the owner or developer) should pursue *LEED Canada for Core and Shell Development* certification.

WHEN TO USE LEED CANADA FOR CORE AND SHELL DEVELOPMENT

The *LEED Canada for Core and Shell Development* Rating System is a market-specific application that recognizes the unique nature of core and shell development. The *LEED Canada for Core and Shell Development* Rating System acknowledges the limited level of influence a developer can exert in a speculatively developed building.

LEED Canada for Core and Shell Development was developed to serve the speculative development market, in which project teams do not control all scopes of a whole building's design and construction. Depending on how the project is structured, this scope can vary significantly from project to project. *The LEED Canada for Core and Shell* Rating System addresses a variety of project types and a broad project range.

LEED Canada for Core and Shell Development can be used for projects in which the developer controls the design and construction of the entire core and shell base building (e.g., mechanical, electrical, plumbing, and fire protection systems) but has no control over the design and construction of the tenant fit-up. Examples of this type of project can be a commercial office building, medical office building, retail center, warehouse, and lab facility.

If a project is designed and constructed to be partially occupied by the owner or developer, then the owner or developer has direct influence over that portion of the interior build-out work. For these projects to pursue *LEED Canada for Core and Shell Development* certification, the owner must occupy 50% or less of the building floor area. Projects in which more than 50% of the building floor area is occupied by an owner should pursue *LEED Canada for New Construction and Major Renovations* certification.

Note that the final project name must reflect the Core and Shell building rather than the tenant space, even if it is included in the common name of the building. The tenant space must not appear to be certified under LEED Canada if it in fact has not been. For example, a developer creates a small building which eventually houses a bank and a coffee shop. Since fit-up for the core and shell project did not include those tenant spaces, the LEED project title may not indicate the name of the bank and coffee shop.

HOW TO APPLY WITH LEASED TENANT SPACES UNDER LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS

Although *LEED Canada for Core and Shell Development* is designed specifically for projects with leased tenant space where the owner cannot control the fit-up (i.e., interior build-out work), projects with leased tenant space can still apply for *LEED Canada for New Construction and Major Renovations* certification as noted above. The following conditions have to be met for projects applying for *LEED Canada for New Construction and Major Renovations* certification:

- the base building and all interior areas to be occupied by the owner or developer must be fit-up to comply with the *LEED Canada for New Construction and Major Renovations* requirements;
- at least 50% of the building area must be fit-up to *LEED Canada for New Construction and Major Renovations* requirements before the project applies for certification; and,
- the remaining leased tenant space must have mandatory lease agreements that require the fit-up of tenant spaces to comply with the *LEED Canada for New Construction and Major Renovations* requirements. An exemption may be allowed for up to 10% of the building floor area, or 20% in the case of mixed-use projects.

The 10% fit-up exemption recognizes the difficulty in getting multiple tenants to comply with LEED requirements. However, this exemption is extended to 20% for mixed-use projects, recognizing the complexities and barriers that mixed-use projects face. Note that the exemption does not apply to base building elements and special directions are provided for specific credits where tenant use must be accounted for, such as WE Credit 3 (Water Use Reduction).

Tenant spaces are evaluated in their entirety on a tenant-by-tenant basis. That is, the 10% (or 20%) exemption must be applied to an entire tenant space(s) and cannot be made up of portions within tenant space(s). Furthermore, the tenant space(s) selected for demonstrating LEED compliance must be the same across all LEED credits.

For areas fit-up for the certification application (i.e., at least 50% of the building floor area), the submission demonstrates compliance through the submittal requirements as outlined in the LEED Letter Templates and as noted through the specific prerequisites and credits. However, for unfinished space, compliance must be demonstrated through Tenant Lease or Sales Agreements (i.e., mandatory lease agreements), along with a letter from the owner showing commitment to use those lease agreements. See the Interpretation sections of applicable prerequisites and credits for further guidance as well as the Leased Tenant Space Appendixes. Independent verification of construction documents or activities by a LEED Accredited Professional, although encouraged, is not required.

Projects with leased tenant space should review the Leased Tenant Space Appendixes, described briefly in Section X of this Introduction.

HOW TO APPLY WITH LEASED TENANT SPACES UNDER LEED CANADA FOR CORE AND SHELL DEVELOPMENT

For projects to pursue *LEED Canada for Core and Shell Development* certification, the owner must be unable to control the fit-up for 50% or more of the building floor area. However these two requirements must still be met:

- the base building and all interior areas to be occupied by the owner or developer must be fit-up to comply with the *LEED Canada for New Construction and Major Renovations* requirements; and,

- any materials installed as part of the base building contract in leased tenant spaces must comply with the *LEED Canada for Core and Shell Development* requirements. Otherwise the fit-up of leased tenant spaces are exempt from most LEED credit requirements (see the Leased Tenant Space Appendixes for further details on project scope as well as direction within the prerequisites and credits).

LEED Canada for Core and Shell Development project teams should review the Leased Tenant Space Appendixes, described briefly in Section X of this Introduction.

HOW TO APPLY AS A MAJOR RENOVATION UNDER LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS

A "major renovation" to an existing building includes extensive alteration work in addition to work on the exterior shell of the building and/or primary structural components and/or the core and peripheral MEP (mechanical – electrical – plumbing). Typically, the extent and nature of the work is such that the primary function space cannot be used for its intended purpose while the work is in progress and where a new certificate of occupancy is required before the work area can be reoccupied. If the project does not meet this definition, it may be more appropriate for the project to certify under *LEED Canada for Existing Buildings: Operations & Maintenance* or under *LEED Canada for Commercial Interiors*. It is the responsibility of the applicant to ensure the project can achieve all prerequisites and sufficient credits for certification when selecting an appropriate rating system to use. The overall project narrative in the submission for application should clearly outline how the project meets this definition of a major renovation.

HOW TO APPLY AS A LEED MULTIPLE BUILDING PROJECT

A LEED Multiple Building Project is a project made up of several buildings sharing a campus that wish to apply for LEED certification as if they are a single building. The overall project narrative in the submission for application should clearly outline how the project meets the conditions noted.

For Multiple Building Projects to be eligible to certify as a single building they must:

- Be designed by the same team (minor variations are permitted);
- Be constructed by the same team (minor variations are permitted);
- Be constructed concurrently or consecutively;
- Be part of a Campus-like site (i.e., share a single site);
- Share hard & soft landscape surfaces, open space and parking; and,
- Have LEED documentation completed as if they were a single building.

Note:

- When multiple buildings are treated as one project, the prerequisite or credit requirements need only be met at the project level, not at the individual building level (e.g., the energy cost of the individual buildings are added together to show compliance to EA Prerequisite 2 Minimum Energy Performance).
- Throughout this reference guide, the "LEED project" is often referenced as the "LEED building." For the case of a multiple building project, instances where "LEED building" is used may be interpreted as "LEED project."

HOW TO APPLY USING THE CAMPUS APPROACH

It is recognized that LEED projects may be part of a larger campus with shared amenities. *LEED Canada for New Construction and Major Renovations 2009* and *LEED Canada for Core and Shell Development 2009* provide special allowance pathways for these projects primarily through the Requirement sections of the Prerequisites and Credits.

The use of the term "campus" is not solely for university campus projects. For LEED Canada, projects may apply under campus allowances in settings such as corporate, military, institutional or private sites that are under single ownership or property management control. A campus may include existing buildings, new or major renovations of buildings pursuing LEED certification, and new or major renovations of buildings not pursuing LEED certification.

The campus boundaries that are being used for credit achievement may be defined by the applicant for the purposes of certification, and its boundaries need not include the entire portfolio of existing buildings owned or controlled by an organization, but rather may be part of a larger site of which a portion is being developed (e.g., LEED-certified buildings in a small precinct of a full university or office park). In addition, the campus site chosen for a credit need not be consistent with the campus application for a separate credit. For example, the campus site boundary used under SS Credit 1 (Site Selection) may be a much larger area then that used to achieve SS Credit 3 (Brownfield Redevelopment).

The campus allowances are intended to reduce environmental impact by encouraging owners and developers to take a broader approach to green infrastructure and project development. Green features developed on a district scale have, potentially, far greater environmental benefit over small-scale features on individual disconnected sites. In addition, the campus allowances can provide for improved efficiency for both applicants and LEED review teams with repetitive or shared LEED elements within a campus.

Many site related credits have campus-wide compliance paths which can be used to demonstrate that the entire defined campus achieves the credit. Projects can apply for a campus-wide precedent on the LEED Letter Templates when the first project of the campus is submitted for certification. If the credit is achieved for the campus, subsequent projects on that campus need only indicate the CaGBC project ID number of the initial project to achieve the credit and a declaration that the submission has not changed since that achievement. This simplifies the application for campus projects. An example of this situation is SS Credit 1 (Site Selection) where the entire campus can achieve the requirements campus-wide.

However, there are additional interpretations for campuses that pertain to sharing infrastructure or to handling specific campus elements, such as exclusion of primary roads in a campus for select credit achievement. For more information on these allowances, see the Interpretation section of the credits. Sharing of energy-related systems is handled separately in the *LEED Canada Interpretation Guide for District Energy Systems*.

REGISTRATION

Project teams interested in earning LEED Canada certification for their buildings must first register the project with the CaGBC. Projects can be registered on the CaGBC website (www.cagbc.org). Registering early in the development process ensures the maximum potential for achieving high building performance, and establishes contact with the CaGBC.

Registration of a *LEED Canada NC* or *LEED Canada CS* project provides online access to essential information, software tools and communications for LEED users, such as the LEED Canada NC / CS

Letter Templates and Scorecard spreadsheet, and allows the team to submit Credit Interpretation Requests (CIRs).

The CaGBC website (www.cagbc.org) contains additional registration details as well as the online form used to register projects.

CERTIFICATION SUBMITTAL DOCUMENTATION

Once a project is registered and design begins, teams should also begin to collect information and perform calculations to ensure that the project meets the requirements for the prerequisites and credits. Once submitted to the CaGBC, this documentation becomes the proof behind declarations made in the LEED certification application.

It is best to start and continue preparing LEED certification submittals from project onset, having reviewed this reference guide and the LEED Letter Templates spreadsheet for each prerequisite and credit, to understand the information required and the formats that will satisfy LEED Canada prerequisite and credit certification review. Note that additional documentation may be necessary to demonstrate credit achievement if applying an interpretation from this reference guide, if using a Credit Interpretation Request, or under any other special circumstance. Project teams must provide narratives to cover these special allowances, as well as any supporting documentation that would assist in demonstrating achievement.

It is helpful to have a LEED consultant (who has achieved a LEED Accredited Professional designation) assigned as the project contact and team member responsible for coordinating the certification process. Most project team members have submittals to prepare, and having an experienced LEED Accredited Professional designated to assist and coordinate efforts has proven to make the process much easier and more efficient.

LEED LETTER TEMPLATES

The LEED Letter Templates are the primary resource for managing the LEED Canada documentation process. The LEED Letter Templates provide a tool for project teams to manage project details; verify compliance with and complete documentation requirements for LEED credits and prerequisites; and provide professional declarations of achievement. The LEED Letter Templates are ultimately submitted with applications for LEED certification. All project teams pursuing LEED certification are required to use the LEED Letter Templates and the submittal documentation paths outlined within. LEED Letter Template submittals are instrumental in demonstrating credit compliance because they contain all the documentation requirements for any given LEED credit. Additionally, the LEED Letter Templates contain embedded calculators and tables to ensure that the submittal package delivered to CaGBC is complete and accurate.

The LEED Letter Templates must be signed by the individual responsible for the portion of the design or construction referred to by the credit or prerequisite. The signatory should be knowledgeable of the prerequisite or credit requirements and by signing certifies that the project meets those requirements. The intention is for the individual who performed the calculations to sign rather than the company signatory or overall LEED Consultant. The LEED Letter Templates default to the project team member who most regularly would meet these criteria. A single signatory for the entire LEED Letter Template package is not acceptable.

CREDIT INTERPRETATION REQUESTS AND RULINGS

In some cases, a LEED project team may encounter challenges when interpreting the requirements of a prerequisite or credit for their project, perhaps because the reference guide does not sufficiently address a specific issue or a conflict requires resolution. To address such issues, the CaGBC allows project teams to submit Credit Interpretation Requests (CIRs).

Each CIR must request guidance on a single credit or prerequisite (unless there is technical justification to do otherwise). CIRs should contain one concise question. Once a response to a CIR is posted, it is applicable to all projects submitting for certification thereafter, regardless of the project's registration date.

CIR rulings are intended to provide assistance to project teams by clarifying credit requirements and/or providing acceptable alternate compliance paths that meet the credit's intent. Project teams may implement CIR rulings at their discretion.

The credit interpretation process is as follows:

1. Before submitting a CIR:
    a. Review the intent of the credit or prerequisite in question and self-evaluate whether the project meets this intent.
    b. Consult this reference guide for more detailed explanation, instructions, calculations and guidance.
    c. Review the CIR database on the CaGBC website (www.cagbc.org) to see if the same inquiry has been answered previously, or if there are relevant CIRs that can help you deduce the answer. Many questions can be resolved by reviewing existing CIRs. Note:
        - CIR rulings for other rating systems, previous versions of rating systems and from the USGBC are not necessarily applicable.
        - This reference guide incorporated all appropriate CIR rulings from *LEED Canada NC version 1.0* posted by August 2009.
2. If a CIR is needed, submit a new credit interpretation request using the online form. Guidance for submitting a CIR can be found on the CaGBC website (www.cagbc.org).

Credit interpretation rulings do not guarantee credit award; the project applicant must still demonstrate and document achievement during the LEED Certification application process.

Credit language or achievement thresholds cannot be changed through the CIR process.

A project applying any CIR must note that CIR number on the LEED Letter Template in their submission declaration in order to ensure effective credit review. Include any supporting documentation necessary to support use of the CIR.

REVIEW AND CERTIFICATION

To earn LEED certification, the project must satisfy all the prerequisites and credits worth the minimum number of points to warrant the desired project rating under *LEED Canada for New Construction and Major Renovations* or *Core and Shell Development*. (Note: Projects must meet all prerequisites and achieve 40 points from other credits before they may earn any points from Regional Priority credits.) Project teams are subject to the Rating System and Reference Guide addenda requirements based on the project's registration date. Rating System and Reference Guide addenda can be found on CaGBC's website (www.cagbc.org).

Applications for certification (submittals) should follow the requirements noted on the CaGBC website and within the *LEED Canada for New Construction and Major Renovations* or *LEED Canada for Core and Shell Development* Rating System, this reference guide and LEED Letter Templates.

FEES

Information on certification fees can be found on the CaGBC website (www.cagbc.org). The CaGBC will acknowledge receipt of the application and proceed with application review when all project documentation and payments have been submitted. Registration fees, certification fees, and appeal review fees are not refundable.

APPEALS

Appeals may be filed after receipt of the final review report. Please see the CaGBC website (www.cagbc.org) for more information on appeals.

UPDATES AND ADDENDA

This is the first edition of the *LEED Canada Reference Guide for Green Building Design and Construction 2009*, dated June 2010. As building science and technology continue to improve and evolve, updates and addenda will be made available. The CaGBC cannot be held liable for any criteria set forth herein that may not be applicable to later versions of LEED rating systems. Updates and addenda will be accumulated between revisions and will be formally incorporated in major revisions. In the interim, between major revisions, the CaGBC may issue updates or addenda to clarify criteria.

The prerequisites, credits, amendments and addenda current at the time of project registration will continue to guide the project throughout its certification process.

USES OF SUBMITTAL DOCUMENTATION AND INTELLECTUAL PROPERTY PROTECTION

CaGBC is committed to the furtherance of green building research and program development. Currently and in the future, such efforts rely heavily on the collection and distribution of data collected from green buildings. In consideration of this pressing need, as a condition to participation in the LEED certification process, project teams must agree to provide CaGBC ownership of all data and underlying information that is submitted to CaGBC in accordance with the LEED project requirements. This requirement does not include any plans, drawings, schema or designs submitted to CaGBC. In accordance with these property rights, CaGBC may share such data with third parties to further research pertaining in general to green buildings and in particular LEED Certified projects.

Project Teams must also provide CaGBC with authorization to provide all submitted information to third parties for the purposes of carrying out certification reviews, project credit interpretation requests and appeals as required to carry-out the LEED certification process.

Projects may elect to have their information kept confidential at any time, through their online project profile. Information from such projects will only be used in anonymous fashion, except where required for the purposes of performing certification.

IV. MINIMUM PROGRAM REQUIREMENTS (MPRS)

There are seven minimum program requirements for projects certifying under *LEED Canada for New Construction and Major Renovations 2009* and *LEED Canada for Core and Shell Development 2009*. These must be adhered to by all projects. If it becomes known that a LEED project is or was in violation of these minimum program requirements, certification may be revoked, or the certification process may be halted. These situations will be handled on a case-by-case basis by the CaGBC.

The Minimum Program Requirements (MPRs) are:

1. MUST COMPLY WITH ENVIRONMENTAL LAWS.

The LEED project building or space, all other real property within the LEED project site boundary, and all project work must comply with applicable federal, provincial, and local building-related environmental laws and regulations in place where the project is located. This condition must be satisfied from the date of LEED project registration or the commencement of schematic design, whichever comes first, up to and until the date that the building receives a certificate of occupancy or similar official indication that it is fit and ready for use.

The project must comply with all building-related environmental laws that impact that project. A lapse in a project's compliance with a building-related environmental law or regulation that results from an unforeseen and unavoidable circumstance shall not necessarily result in non-compliance with this requirement. Such lapses shall be excused so long as they are remediated as soon as feasibly possible.

In no way will CaGBC act as law enforcement. With this minimum requirement, CaGBC is using established laws only to ascertain that the LEED project is meeting a minimum environmental standard.

Intent:

- The purpose of this requirement is to highlight the importance of environmental laws and regulations that apply to LEED projects. While all building projects ought to comply with all legal requirements, as the LEED rating systems are standards for excellence in green building, it is appropriate and logical to specifically require LEED certified buildings to comply with applicable environmental laws and regulations. Such legislation establishes a baseline standard for sustainability.

Exceptions:

- If the project is granted an exemption from a building-related environmental law from governmental authorities for any reason, then that project is exempt from this minimum requirement in regards to that particular law. In the event that this occurs, a description of the situation leading to the exemption and proof of the exemption (such as an official letter from the granting authority) must be provided with the certification submission.

2. MUST BE A COMPLETE, PERMANENT BUILDING OR SPACE.

All LEED projects must be designed for, constructed on, and operated on a permanent location on already existing land. LEED projects shall not consist of mobile structures, equipment, or vehicles. No building or space that is designed to move at any point in its lifetime may pursue LEED Certification.

LEED Projects must include the new, ground-up design and construction, or major renovation, of at least one commercial, institutional, or high-rise residential building in its entirety.

Intent:

- The LEED rating systems were designed to evaluate complete buildings and spaces in fixed locations. Partial buildings or spaces are unsuitable for LEED certification because, when analyzed under the requirements of LEED prerequisites and credits, they create results inconsistent with those of whole buildings or spaces. Also, partial certification can easily appear to encompass an entire building or space, sending a false message to users.

- Permanency is an important requirement because a significant percentage of LEED prerequisites and credits are dependent on location, making a mobile building or space unacceptable. The stipulation for already existing land responds to the fact that artificial land masses disrupt marine ecosystems. Buildings that generate the need to develop such land do not meet the overall intent of the LEED rating system. Anything less than a distinct, complete, and permanent project on existing land will not be able to accurately demonstrate compliance with LEED.

Exceptions:

- Prefabricated or modular structures and moveable building elements of any variation may be certified once installed and/or established as part of the LEED project building. If such a structure is moved, the LEED certification no longer applies.
- Certification of temporary structures is permissible. The amount of time that a building or space is intended to remain standing does not affect compliance with this requirement.
- Artificial land mass or support structures:
    - Buildings located on previously constructed docks, piers, jetties, infill, and other manufactured structures in or above water or other bodies are permissible, provided artificial land is previously developed, i.e., previously supported hardscape or another building before the development of the LEED project.
    - Buildings cantilevered over water, highways, or other bodies are acceptable.
    - Existing land to which soil or other material has been added is acceptable.
- Buildings vertically connected to, but physically distinct from public infrastructure such as a transportation hub, may be considered a building in its entirety and certified independently of the infrastructure.
- Horizontally and vertically attached buildings may be certified independently, provided the following conditions are met:
    - They are physically distinct; i.e.,
        - Exterior walls are party walls or are separated from adjoining buildings by air space;
        - Lighting, HVAC, plumbing, and other mechanical systems are separate from the systems of adjoining buildings. If the thermal energy serving the structure

is to be sub-metered, exceptions will be made for buildings served by a common chiller plant or hot water/steam heating system.

- They have unique addresses or names.

If these conditions are not met, the structure is considered a single building and must be certified as such.

- Additions to existing buildings (defined as buildings completed five years prior to the new addition) may certify as independent structures even if the additions do not meet the above requirements for attached buildings. This is to encourage owners as they move forward with new developments where existing structures limit design approaches.

Additional Clarifications

- Moveable buildings
  - Structures not compliant with this MPR include cars, motor homes, trains, boats, ships, planes, and transient exhibits of any kind.
  - If, for any reason, a LEED Canada NC (or CS) 2009 certified building is moved from the location cited at the time of LEED certification, it will no longer be in compliance with this MPR.
- No exceptions for projects with IEQ Prerequisite 2 conflicts
  - Some project buildings, such as casinos, typically have difficulty achieving LEED certification due to a smoking policy that conflicts with IEQ Prerequisite 2 (Environmental Tobacco Smoke Control). There will be no exceptions to this MPR to allow for partial building certification of such buildings. Project teams are encouraged to carefully review option 2 in IEQ Prerequisite 2 to explore opportunities to achieve LEED certification despite a smoking room located within a project.

3. THE PROJECT MUST USE A REASONABLE SITE BOUNDARY.

The LEED project site boundary must include all contiguous land that is associated with and supports normal building operations for the LEED project building, including all land that was or will be disturbed for the purpose of undertaking the LEED project.

The LEED project site boundary may not include land that is owned by a party other than that which owns the LEED project unless that land is associated with and supports normal building operations for the LEED project building.

LEED projects located on a campus must have project boundaries reasonable to that project (e.g., the construction boundaries of the project).

Gerrymandering of a LEED project boundary is prohibited: the boundary may not unreasonably exclude sections of land to create boundaries in unreasonable shapes for the sole purpose of complying with prerequisites or credits.

Intent:

- In order to ensure fair and consistent evaluation for all projects under the Sustainable Sites credit category, it is necessary to have guidelines for an acceptable LEED project boundary.

Exceptions:

- Non-contiguous parcels may be included in the LEED project site boundary if the following conditions are met:
    - The parcels are separated only by land that is owned and operated by an entity different than the owner of the land that the LEED project building sits on.
    - All parcels separate from the parcel that the LEED building sits on must directly support or be associated with normal building operations.
    - Non-contiguous parcels are no more than 0.40 kilometres (1/4 mile) walking distance apart.
    - There is a clear walking path between the parcels.
    - The site boundary is consistent for the application of all credits.
    - All land within the LEED project site boundary is governed by a common regulatory jurisdiction and is owned, leased, or managed by the same organizational entity.
    - A description is provided of the non-contiguous parcels of land within the LEED project site boundary, the land between them, and compliance with the above points.
- Land needed to demonstrate compliance with stormwater management need not be part of the LEED project site boundary but see SS Credit 6 for further details.
- Facilities needed to show compliance to a LEED credit but that exist offsite are individually handled within specific credits. However, the offsite facilities do not need to be within the LEED project site boundary.
- Land that the LEED project owner leases or has an easement on may be included within the LEED project site boundary.
- For projects with multiple phases of the same building, or buildings located on land that is part of an already certified LEED project, overlapping LEED project boundaries is inevitable and thus allowed. Note that the purpose of this exception is to protect the integrity of certified LEED projects while allowing the future projects to successfully pursue LEED certification. An example of protecting the integrity of an earlier LEED project is that the green space preserved under SS Credit 5 (Site Development) for the first project cannot be used for the second as it was already allocated to achieve this credit.
- Land which is covered by a city easement may be included in the LEED project site boundary.
- If a LEED project building shares use of a parking lot, parking garage, or other amenity with another building, then those amenities must be allocated according to the percentage of use for each building.
- Infrastructure supporting the LEED project building may be omitted from the LEED project boundary if it is not owned by the LEED project owner AND if it is not included in the scope of construction work for the LEED project. This omittance must be done consistently throughout the submission.

- Projects may exclude land used for construction staging areas that will not be used to support the LEED project building once operational. However, these areas must be included in the requirements for SS Prerequisite 1 (Construction Activity Pollution Prevention).
- Associated service buildings that do not meet the minimum project size noted in requirement #4 below do not need to be included in the LEED project site boundary.

4. THE LEED PROJECT MUST INCLUDE A MINIMUM OF 93 SQUARE METERS (1000 SQUARE FEET) OF BUILDING FLOOR AREA.

Intent:

- The thresholds and calculations that make up the system of evaluation in LEED begin to break down and lose meaning once the building or space being evaluated reaches relatively diminutive proportions. A building or space that is too small would compromise the integrity of the LEED certification system.

5. THE LEED PROJECT MUST COMPLY WITH MINIMUM OCCUPANCY RATES.

Full Time Equivalent Occupancy - The LEED project must serve 1 or more Full Time Equivalent (FTE) occupant(s), calculated as an annual average, in order to use LEED in its entirety. If the project serves less than 1 annualized FTE, optional credits from the Indoor Environmental Quality category may not be earned (the prerequisites must still be earned).

Intent:

- Many credits and prerequisites throughout the LEED rating systems evaluate the impact of the LEED project building on the building users, particularly those in the Indoor Environmental Quality credit category. CaGBC believes it is appropriate and necessary to require that a minimum number of people benefit from the strategies implemented in order to earn the credits.

Exceptions:

- This requirement does not apply to leased space not yet tenanted, but intended for occupancy.

6. MUST ALLOW CAGBC ACCESS TO WHOLE BUILDING ENERGY AND WATER USAGE DATA.

At this time, the CaGBC does not require projects to provide the CaGBC with access to actual whole building energy and water usage data. However, the CaGBC recognizes that the goal of decreased energy and water use consumption is a major component of LEED certification. Tracking actual building consumption and comparing it to the usage proposed in design cases, is essential to the individual success of each LEED certified building and the ongoing evaluation and development of the LEED program. The CaGBC encourages project teams to consider monitoring building performance through the use of industry benchmarking databases.

7. MUST COMPLY WITH A MINIMUM BUILDING AREA TO SITE AREA RATIO.

The building floor area of the LEED project building must be no less than 2% of the gross land area (site area including building footprint) within the LEED project boundary.

Intent:

- Because LEED is a rating system for buildings, it is appropriate to restrict the amount of land associated with a LEED certified project. While it is recognized that large sections of real estate may be affected by human activity generated by a building as well as an owner's general land use decisions, this stipulation has been put into place to ensure that an overabundance of land associated with a LEED certification does not occur and certain Sustainable Sites credits are awarded fairly.

Additional Clarifications:

- Calculation method for determining gross floor area to site area ratio

  [Building Floor Area (m^2) / Site Area (m^2)] x 100

V. LEED DOCUMENTATION REQUIREMENTS

All *LEED Canada for New Construction and Major Renovations*, and *Core and Shell Development*, certification applications must include the required LEED Letter Templates and all supporting documentation as noted on those templates.

GENERAL REQUIREMENTS

LEED certification application requires the submission of an overall project narrative with the completed LEED Letter Template documentation requirements. The project narrative describes the applicant's organization, project, site, and program, as well as key green features of the project. This narrative helps CaGBC staff and the LEED review team understand the major elements of the project and building performance.

The LEED Letter Templates workbook also includes additional submission requirements beyond the specific prerequisite and credits. This information includes the basic details pertaining to project site conditions, construction scope and timeline, occupant and usage data, and project team identification. Project teams must address all the elements in the general documentation requirements, providing details and clarifications where appropriate, and they may include any optional elements that are helpful in describing the project. Requirements for photos and drawings are also noted in the LEED Letter Templates, as well as confirmation that the Minimum Program Requirements are met. In addition, see the CaGBC website (www.cagbc.org) for further guidance.

Where a project team is applying for a prerequisite or credit with special circumstances (through a Credit Interpretation Request or an Interpretation of this reference guide) applications must provide additional documentation to demonstrate credit achievement. Project teams must provide narratives to cover these special allowances and any supporting documentation that would assist in demonstrating achievement.

LICENSED PROFESSIONAL EXEMPTION

The Licensed Professional Exemptions can be used by a project team's registered professional engineer or registered architect as a streamlined path for documenting certain credits, or bypassing otherwise-required submittals. License information and an Exemption Signature in the LEED Letter Templates are required to document each exemption the project team wishes to claim. Credits eligible for exemption are noted in the LEED Letter Templates.

CREDIT SUBSTITUTION

Projects registering under the LEED Canada 2009 rating systems are not allowed to substitute prerequisites or credits from another version. However, projects registered under previous *LEED Canada for New Construction and Major Renovations* or *Core and Shell Development* versions may be able to substitute LEED 2009 credits (generally where the whole credit change is adopted). Due to changes in the credit weighting, only select compliance paths may be substituted. See the allowance table on the CaGBC website (www.cagbc.org) for a list of acceptable substitutions. Note that this pathway is not encouraged due to the confusion added in maintaining multiple LEED versions of requirements and documentation. It is being allowed out of recognition of the improved requirements in LEED 2009 that previous project teams may be eager to use even though they are prevented from fully adopting LEED 2009 due to the project's current stage of development. However, if a project is able to, it can switch to the new version in its entirety.

VI. CERTIFICATION APPLICATION

LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS AND CORE AND SHELL DEVELOPMENT CERTIFICATION APPLICATION

To earn LEED certification, the applicant project must satisfy all the prerequisites and qualify for a minimum number of points to attain the established project ratings as listed below. Having satisfied the basic prerequisites of the program, applicant projects are then rated according to their degree of compliance within the rating system. (Note: Projects must meet all prerequisites and achieve 40 points from other credits before they may earn any points from Regional Priority credits.)

After registration, the project design team should begin to collect information and perform calculations to satisfy the prerequisite and credit documentation requirements. Because documentation should be gathered throughout design and construction, it is helpful to designate a LEED team leader (generally a LEED Consultant) who will be responsible for managing its compilation.

At the completion of construction, the project team submits all attempted credits for review. Upon receipt of the full certification application and fee, a screening review (completeness check) will be conducted to ensure the application is complete. Following the screening review, a first review is conducted by a contracted LEED review team, overseen by the CaGBC. A project team receives a formal first review response from the CaGBC; this review report designates prerequisites and credits as Prerequisite / Credit Achievement Anticipated, Prerequisite / Credit Pending, or Prerequisite / Credit Denied. The reviewer may ask clarifying questions of the applicant or request a Data Check of select items.

The concept of Data Check was implemented to streamline applications. For the majority of credits all required documentation is submitted with the initial submission. For several credits, however, the volume of documentation required makes this undesirable. For these credits, a Data Check may be performed to verify select items at the reviewer's discretion. The LEED Letter Templates indicate which credits are subject to a Data Check and the documentation that needs to be provided. Project teams must not claim credit performance for products and materials that cannot be verified in the supporting documentation reserved for a Data Check.

In the final (second) submission, the applicant provides responses to all prerequisites and credits pending additional information, either to respond to the reviewer's clarifying questions or to provide the requested Data Check materials. For credits denied in this first review, applicants are welcomed to respond to the denial with additional documentation. A final review is conducted

and sent from the CaGBC to the applicant. All credits will be designated as either awarded or denied. If any prerequisites are denied or if insufficient credits are awarded, the project fails the certification review and no LEED rating will be awarded.

Project teams have an opportunity to appeal denied prerequisites and credits at this stage. See the CaGBC website (www.cagbc.org) for additional details on the appeal process.

PREREQUISITES AND CREDITS

Prerequisites and credits are the core criteria of LEED rating systems, and define requirements that must be met to be eligible for certification:

- Prerequisites define the minimum requirements in a particular LEED category.
- Meeting the requirements of a prerequisite does not contribute points to a project's score.
- All prerequisite requirements must be met for a project to be eligible to receive LEED Canada certification.
- Credits are the fundamental LEED criteria that describe practices deemed to reduce the project's environmental, health and resource impacts. Each credit has a defined number of possible points that may be awarded upon successful review of submittal documents demonstrating the credits' requirements were followed. Documented achievement of the requirements in each credit is rewarded by a number of points that contribute to the overall rating for the project. Credits and available points in each credit are shown in section XIII below.
- A credit can consist of several "sub-credits," each of which adds further requirements that, with documented submittals, may be rewarded with additional points.
- Application of any particular credit to the defined LEED project is at the discretion of the project's design and construction team responding to the project's unique constraints and opportunities.
- Projects must meet all prerequisites and achieve 40 points from other credits before they may earn any points from Regional Priority credits.

Points are earned by implementing the requirements laid out in each credit, and documenting that implementation with that credit's defined submittals noted in the LEED Letter Templates. The total number of points awarded across all credits and categories determines the overall rating of Certified, Silver, Gold, or Platinum. The table below outlines the point thresholds for each LEED Certification rating. Project ratings are certified by the CaGBC based on the total point score, following an independent review of the documentation submitted by a design and construction team. With four possible levels of certification, LEED is flexible enough to accommodate a wide range of green building strategies that best fit the constraints and goals of particular projects.

LEED Canada for New Construction and Major Renovations and *Core and Shell Development* certifications are awarded according to the following scale:

LEED® Canada Certification Levels	Number of LEED® Canada Points Required
Certified	40 – 49 points
Silver	50 – 59 points
Gold	60 – 79 points
Platinum	80+ points

The CaGBC recognizes projects that achieve a specific rating level with a final review report, final scorecard, formal certificate of recognition and a LEED Canada plaque. Projects are further recognized on the CaGBC website (www.cagbc.org).

VII. CERTIFICATION STRATEGY

TIMELINE AND PROJECT DESIGN PHASES

Project teams should study the principles and objectives of LEED as early in the site selection and design process as possible. The project design phases mentioned throughout this reference guide correspond to the architectural design and planning steps commonly used in the construction industry:

1. **Predesign** entails gathering information, recognizing stakeholder needs, and establishing project goals.
2. **Schematic design** explores several design options and alternatives, with the intent to establish an agreed-upon project layout and scope of work.
3. **Design development** begins the process of spatial refinement and usually involves the first design of a project's energy systems.
4. **Construction documents** carry the design into the level of details for all spaces and systems and materials so that construction can take place.
5. **Construction**.
6. **Substantial completion** is a contractual benchmark that usually corresponds to the point at which a client could occupy a nearly completed space.
7. **Final completion.**
8. **Certificate of occupancy** is the official recognition by a local building department that a building conforms to applicable building and safety codes.

RELATED CREDITS

When pursuing LEED certification, it is important to consider how credits are interconnected and how their synergies and trade-offs will ultimately affect both the project and the other credits the team may consider pursuing. Consult the Related Credits section of each prerequisite and credit to help inform design and construction decisions leading to certification.

CONSISTENT DOCUMENTATION ACROSS CREDITS

Several kinds of project information are required for consistent LEED documentation across various credits. Pay special attention to overlapping project data; doing so will help the application and review process go smoothly. The most common inconsistency is with occupancy numbers. However, take note of where there are different methodologies for calculating occupancy. For example, peak transient users is employed in SS Credit 4.2 (Alternative Transportation: Bicycle Storage and Changing Rooms) but transients can be calculated in the same way as Full Time Equivalents under WE Prerequisite 1 (Water Use Reduction).

OPERATIONS AND MAINTENANCE IN *LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS AND CORE AND SHELL DEVELOPMENT* CERTIFIED BUILDINGS

The *LEED Canada Reference Guide for Green Building Design and Construction* contains information on operations and maintenance to help project teams streamline green O&M practices once the LEED design and construction project has been completed. Although not required as part of the LEED certification process, upfront planning for green operations and maintenance can help building owners, operators, and maintenance staff ensure that the building continues to operate in a sustainable manner.

VIII. EXEMPLARY PERFORMANCE STRATEGIES

Exemplary performance strategies result in performance that greatly exceeds the performance level or expands the scope required by an existing *LEED Canada for New Construction and Major Renovations* or *Core and Shell Development* credit. To earn exemplary performance credits, teams must meet the performance level defined by the next step in the threshold progression.

The credits for which exemplary performance points are available through expanded performance are noted throughout this reference guide.

IX. REGIONAL PRIORITY CREDITS

To provide incentive to address geographically specific environmental issues, CaGBC is providing an opportunity for LEED Canada project teams to propose existing credits as Regional Priority credits. For a list of eligible credits and guidance regarding Regional Priority, refer to the CaGBC website (www.cagbc.org).

X. LEASED TENANT SPACE APPENDIXES

Appendix 1

Default Occupancy Counts: presents default occupancy counts for Core and Shell projects. Because of the nature of core and shell development, the project team may not know the tenant makeup and occupancy during the building's design phase. For some credits, the team will need to refer to the default occupancy count table to determine credit compliance. The occupancy counts must be consistent across all credits. *LEED Canada for New Construction and Major Renovations* projects with leased tenant space may also find this information useful for determining occupancy.

Appendix 2

Leased Tenant Space Energy Modelling Guidelines: gives guidelines for energy modelling for projects with leased tenant space. These guidelines are intended to ensure that projects in different markets approach the energy modelling requirements in a similar manner and to establish a minimum benchmark for energy optimization. Consult this appendix when modelling both the designed core and shell spaces and the tenant spaces that are not part of the project design and construction scope.

Appendix 3

Core and Shell Project Scope Checklist: contains a checklist for tenant interiors to help Core

and Shell teams define the owner-tenant division in the project design and certification review process. *LEED Canada for New Construction and Major Renovations* projects with leased tenant space may also find this information useful for determining scope.

Appendix 4

Tenant Lease or Sales Agreement: offers a way for projects with leased tenant space to earn points by making prerequisite / credit requirements part of a binding sales agreement or tenant lease (e.g., mandatory lease agreement). This expands the area of project owner and design team "control" from design and construction to tenant sales and lease agreement negotiation, and is designed to give projects with a limited scope of work the ability to achieve credits that would otherwise be beyond their control, by committing the tenant(s) to green building practices in the tenant's scope of work.

XI. TOOLS FOR REGISTERED PROJECTS

LEED offers additional resources for LEED project teams on the CaGBC website, at www.cagbc.org. The CaGBC website provides resources for starting the project, including a LEED project checklist, the LEED Letter Templates, Credit Interpretation Request rulings, certification methodology and rating system errata and addenda.

XII. HOW TO USE THIS REFERENCE GUIDE

The *LEED Canada for Green Building Design and Construction Reference Guide* is a supporting document to the *LEED Canada for New Construction and Major Renovations* and *Core and Shell Development* rating systems. The guide helps project teams understand the criteria, the reasons behind them, strategies for implementation, and general documentation requirements (the LEED Letter Templates contain the full documentation requirements). It includes examples of strategies that can be used in each category, case studies of buildings that have implemented these strategies successfully, and additional resources. It does not provide an exhaustive list of strategies for meeting the criteria or all the information that a project team needs to determine the applicability of a credit to the project.

RATING SYSTEM PAGES

The rating system, published in its entirety on the CaGBC website, is imbedded in this reference guide. Each prerequisite and credit discussion begins with a page that mirrors the rating system's Intent and Requirements. This reference guide addresses the Intents and Requirements for the following Rating Systems: *LEED Canada for New Construction and Major Renovations 2009* and *LEED Canada for Core and Shell Development 2009*. These rating systems were also released in a combined rating system document.

In instances where a particular rating system has a unique intent and/or requirements, the rating system pages will highlight the requirements, noting if the requirement is solely for *New Construction and Major Renovations (NC)* projects or for *Core and Shell Development (CS)*.

PREREQUISITE AND CREDIT FORMAT

Each prerequisite or credit is organized in a standardized format for simplicity and quick reference. The first section summarizes the main points regarding the green measure and includes the intent, requirements, required submittals for certification, and a summary of any referenced industry

standard. Subsequent sections provide supporting information to help interpret the measure and offer links to resources and examples. The sections for each credit are described in the following paragraphs.

Intent identifies the main sustainability goal or benefit of the prerequisite or credit.

Requirements specifies the criteria that satisfy the prerequisite or credit and the number of points available. The prerequisites must be achieved; the credits are optional, but each contributes to the overall project score. Some credits have 2 or more paths from which the project team must choose. For example, Energy & Atmosphere Credit 1, Optimize Energy Efficiency Performance, has 3 options, but a project can apply for only 1, depending on the type of building.

Interpretations are unique to LEED Canada. Interpretations incorporate previous *LEED Canada for New Construction and Major Renovations version 1.0* Credit Interpretation Requests which were deemed useful to users of this new version. Interpretations also include pathways from previous LEED Canada application guides developed through market experience generally unique to Canada. Interpretations also highlight key technical issues that needed further clarification from the requirements.

Benefits and Issues to Consider addresses the environmental benefits of the activity encouraged by the prerequisite or credit, and economic considerations related to first costs, life-cycle costs, and estimated savings.

Related Credits acknowledges the trade-offs and synergies within the LEED rating system credit categories. Achieving a particular credit may make it worthwhile and comparatively easy to pursue related credits; the converse is also possible.

The **Summary of Referenced Standards**, where applicable, introduces the required standards used to measure achievement of the credit intent. Teams are strongly encouraged to review the full standard and not rely on the summary.

Implementation discusses specific methods or assemblies that facilitate achievement of the requirements.

Timeline and Team guides the project team by identifying who should lead an effort and when the tasks should begin.

Calculations offers sample formulas or computations that determine achievement of a particular prerequisite or credit. Most calculations are facilitated in the LEED Letter Templates.

The **Documentation Guidance** section provides the first steps in preparing to complete the LEED Letter Templates documentation requirements.

Examples illustrates strategies for credit achievement.

Exemplary Performance, if applicable, details the level of performance needed for the award of points in addition to those for credit achievement.

Regional Variations outlines concerns specific to the geographic location of the building.

Resources offers suggestions for further research and provides examples or illustrations, detailed technical information, or other information relevant to the prerequisite or credit. The resources include websites, online materials, and printed books and articles that can be obtained directly from the organizations listed.

Definitions clarifies the meaning of certain terms relevant to the prerequisite or credit. These may be general terms or terms specific to *LEED Canada for New Construction and Major Renovations* and *Core and Shell Development.* A complete glossary is found at the end of this reference guide.

Case Studies are only available for select credits. They provide information on how past certified projects achieved the credit under a previous rating system (generally *LEED Canada NC, version 1.0* with or without addendum).

Throughout these sections, the rating system specific information is called out; the relevant rating systems are identified by NC (New Construction and Major Renovations), or CS (Core and Shell Development). This method provides clarity to the credit discussions and provides the relevant information needed for different project types where necessary. Finally, certain credits are specific to each rating system and are identified by the point-weighting table on the first page of each credit.

XIII. REFERENCE TABLES

LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS 2009 PROJECT CHECKLIST

SUSTAINABLE SITES		26 POSSIBLE POINTS
❒ Prereq 1	Construction Activity Pollution Prevention	Required
❒ Credit 1	Site Selection	1
❒ Credit 2	Development Density and Community Connectivity	3, 5
❒ Credit 3	Brownfield Redevelopment	1
❒ Credit 4.1	Alternative Transportation: Public Transportation Access	3, 6
❒ Credit 4.2	Alternative Transportation: Bicycle Storage and Changing Rooms	1
❒ Credit 4.3	Alternative Transportation: Low-Emitting and Fuel-Efficient Vehicles	3
❒ Credit 4.4	Alternative Transportation: Parking Capacity	2
❒ Credit 5.1	Site Development: Protect and Restore Habitat	1
❒ Credit 5.2	Site Development: Maximize Open Space	1
❒ Credit 6.1	Stormwater Design: Quantity Control	1
❒ Credit 6.2	Stormwater Design: Quality Control	1
❒ Credit 7.1	Heat Island Effect: Non-Roof	1
❒ Credit 7.2	Heat Island Effect: Roof	1
❒ Credit 8	Light Pollution Reduction	1

WATER EFFICIENCY		10 POSSIBLE POINTS
❒ Prereq 1	Water Use Reduction	Required
❒ Credit 1	Water Efficient Landscaping	2, 4
❒ Credit 2	Innovative Wastewater Technologies	2
❒ Credit 3	Water Use Reduction	2-4

ENERGY AND ATMOSPHERE		35 POSSIBLE POINTS
❒ Prereq 1	Fundamental Commissioning of Building Energy Systems	Required
❒ Prereq 2	Minimum Energy Performance	Required
❒ Prereq 3	Fundamental Refrigerant Management	Required
❒ Credit 1	Optimize Energy Performance	1-19
❒ Credit 2	On-Site Renewable Energy	1-7
❒ Credit 3	Enhanced Commissioning	2
❒ Credit 4	Enhanced Refrigerant Management	2
❒ Credit 5	Measurement and Verification	3
❒ Credit 6	Green Power	2

MATERIALS AND RESOURCES		14 POSSIBLE POINTS
❒ Prereq 1	Storage and Collection of Recyclables	Required
❒ Credit 1.1	Building Reuse: Maintain Existing Walls, Floors, and Roof	1-3
❒ Credit 1.2	Building Reuse: Maintain Interior Non-Structural Elements	1
❒ Credit 2	Construction Waste Management	1-2
❒ Credit 3	Materials Reuse	1-2
❒ Credit 4	Recycled Content	1-2
❒ Credit 5	Regional Materials	1-2
❒ Credit 6	Rapidly Renewable Materials	1
❒ Credit 7	Certified Wood	1

INDOOR ENVIRONMENTAL QUALITY		15 POSSIBLE POINTS
❒ Prereq 1	Minimum Indoor Air Quality Performance	Required
❒ Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
❒ Credit 1	Outdoor Air Delivery Monitoring	1
❒ Credit 2	Increased Ventilation	1
❒ Credit 3.1	Construction Indoor Air Quality Management Plan: During Construction	1
❒ Credit 3.2	Construction Indoor Air Quality Management Plan: Before Occupancy	1
❒ Credit 4.1	Low-Emitting Materials: Adhesives and Sealants	1
❒ Credit 4.2	Low-Emitting Materials: Paints and Coatings	1
❒ Credit 4.3	Low-Emitting Materials: Flooring Systems	1
❒ Credit 4.4	Low-Emitting Materials: Composite Wood and Agrifibre Products	1
❒ Credit 5	Indoor Chemical and Pollutant Source Control	1
❒ Credit 6.1	Controllability of System: Lighting	1
❒ Credit 6.2	Controllability of System: Thermal Comfort	1
❒ Credit 7.1	Thermal Comfort: Design	1
❒ Credit 7.2	Thermal Comfort: Verification	1
❒ Credit 8.1	Daylight and Views: Daylight	1
❒ Credit 8.2	Daylight and Views: Views	1

INNOVATION IN DESIGN		6 POSSIBLE POINTS
❒ Credit 1	Innovation in Design	1-5
❒ Credit 2	LEED® Accredited Professional	1

REGIONAL PRIORITY		4 POSSIBLE POINTS
❒ Credit 1	Durable Building	1
❒ Credit 2	Regional Priority Credit	1-3

LEED CANADA FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS 2009

100 base points, plus 6 possible Innovation in Design points and 4 possible Regional Priority points

Certified	40–49 points
Silver	50–59 points
Gold	60–79 points
Platinum	80 points and above

Note that projects must meet all prerequisites and achieve 40 points from other credits before they may earn any points from Regional Priority credits.

LEED CANADA FOR CORE AND SHELL DEVELOPMENT 2009 PROJECT CHECKLIST

SUSTAINABLE SITES — 28 POSSIBLE POINTS

❒	Prereq 1	Construction Activity Pollution Prevention	Required
❒	Credit 1	Site Selection	1
❒	Credit 2	Development Density and Community Connectivity	3, 5
❒	Credit 3	Brownfield Redevelopment	1
❒	Credit 4.1	Alternative Transportation: Public Transportation Access	3, 6
❒	Credit 4.2	Alternative Transportation: Bicycle Storage and Changing Rooms	2
❒	Credit 4.3	Alternative Transportation: Low-Emitting and Fuel-Efficient Vehicles	3
❒	Credit 4.4	Alternative Transportation: Parking Capacity	2
❒	Credit 5.1	Site Development: Protect and Restore Habitat	1
❒	Credit 5.2	Site Development: Maximize Open Space	1
❒	Credit 6.1	Stormwater Design: Quantity Control	1
❒	Credit 6.2	Stormwater Design: Quality Control	1
❒	Credit 7.1	Heat Island Effect: Non-Roof	1
❒	Credit 7.2	Heat Island Effect: Roof	1
❒	Credit 8	Light Pollution Reduction	1
❒	Credit 9	Tenant Design and Construction Guidelines	1

WATER EFFICIENCY — 10 POSSIBLE POINTS

❒	Prereq 1	Water Use Reduction	Required
❒	Credit 1	Water Efficient Landscaping	2, 4
❒	Credit 2	Innovative Wastewater Technologies	2
❒	Credit 3	Water Use Reduction	2-4

ENERGY & ATMOSPHERE — 37 POSSIBLE POINTS

❒	Prereq 1	Fundamental Commissioning of Building Energy Systems	Required
❒	Prereq 2	Minimum Energy Performance	Required
❒	Prereq 3	Fundamental Refrigerant Management	Required
❒	Credit 1	Optimize Energy Performance	3-21
❒	Credit 2	On-Site Renewable Energy	2, 4
❒	Credit 3	Enhanced Commissioning	2
❒	Credit 4	Enhanced Refrigerant Management	2
❒	Credit 5.1	Measurement and Verification: Base Building	3
❒	Credit 5.2	Measurement and Verification: Tenant Submetering	3
❒	Credit 6	Green Power	2

MATERIALS AND RESOURCES — 13 POSSIBLE POINTS

❒	Prereq 1	Storage and Collection of Recyclables	Required
❒	Credit 1	Building Reuse: Maintain Existing Walls, Floors, and Roof	1-5
❒	Credit 2	Construction Waste Management	1-2
❒	Credit 3	Materials Reuse	1
❒	Credit 4	Recycled Content	1-2
❒	Credit 5	Regional Materials	1-2
❒	Credit 6	Certified Wood	1

INDOOR ENVIRONMENTAL QUALITY		12 POSSIBLE POINTS
❒ Prereq 1	Minimum Indoor Air Quality Performance	Required
❒ Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
❒ Credit 1	Outdoor Air Delivery Monitoring	1
❒ Credit 2	Increased Ventilation	1
❒ Credit 3	Construction Indoor Air Quality Management Plan: During Construction	1
❒ Credit 4.1	Low-Emitting Materials: Adhesives and Sealants	1
❒ Credit 4.2	Low-Emitting Materials: Paints and Coatings	1
❒ Credit 4.3	Low-Emitting Materials: Flooring Systems	1
❒ Credit 4.4	Low-Emitting Materials: Composite Wood and Agrifibre Products	1
❒ Credit 5	Indoor Chemical and Pollutant Source Control	1
❒ Credit 6	Controllability of System: Thermal Comfort	1
❒ Credit 7	Thermal Comfort: Design	1
❒ Credit 8.1	Daylight and Views: Daylight	1
❒ Credit 8.2	Daylight and Views: Views	1

INNOVATION IN DESIGN		6 POSSIBLE POINTS
❒ Credit 1	Innovation in Design	1-5
❒ Credit 2	LEED® Accredited Professional	1

REGIONAL PRIORITY		4 POSSIBLE POINTS
❒ Credit 1	Durable Building	1
❒ Credit 2	Regional Priority Credit	1-3

LEED CANADA FOR CORE AND SHELL DEVELOPMENT 2009

100 base points, plus 6 possible Innovation in Design points and 4 possible Regional Priority points

Certified	40–49 points
Silver	50–59 points
Gold	60–79 points
Platinum	80 points and above

Note that projects must meet all prerequisites and achieve 40 points from other credits before they may earn any points from Regional Priority credits.