Building Standards Guide

Promoting construction of safe, healthy, habitable buildings

Implementation of Energy Codes

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Saskatchewan

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- Saskatoon and Region Homebuilders Association
- Saskatchewan Building Officials Association
- Saskatchewan Association of Architects
- Association of Consulting Engineering Companies - Saskatchewan
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PART I

Introduction

For years, Saskatchewan *building owners* have proven themselves highly capable of constructing and renovating *buildings* which are efficient, safe and compliant with *building codes*. As these *building codes* are updated and modernized, *building owners* have implemented these new standards, recognizing the long-term value of owning *buildings* that are efficient and which have an overall lower lifecycle cost than *buildings* constructed in previous years.

The adoption of the National Building Code (NBC) 2015 included a provision which delayed the enforcement of the NBC of Division B, Section 9.36. Energy Efficiency (NBC Section 9.36.) and the National Energy Code of Canada for Buildings (NECB) 2017 until January 1, 2019. All building permits, for new construction or additions to existing buildings, which are issued on or after this date are required to comply with either NBC Section 9.36. or NECB 2017, depending on which *Code* applies to that *building*.

Recent improvements to adopted *building codes* are intended to provide a reduction both in lifecycle costs of *building* ownership and in greenhouse gas emissions. These improvements align with the Government of Saskatchewan's plan for climate change, titled "Prairie Resilience", which establishes a number of strategies that are applicable to *buildings* in the province. These strategies include:

- adopting NBC 2015, effective January 1, 2018, with provisions that improve energy efficiency standards for *houses* and small *buildings* effective January 1, 2019;
- adopting NECB 2017, applicable to large *buildings*, effective January 1, 2019;
- facilitating provisions in NBC 2015 that provide for increased use of wood in *building* construction in order to extend carbon storage;
- exploring options to label *buildings* for energy performance;
- encouraging industry to further develop innovative solutions to meet energy performance requirements;
- increasing the number of government *buildings* with sustainability certification;
- requiring new and renovated government *buildings* to exceed the energy performance requirements of NECB 2015 by 10 per cent; and,
- working in collaboration with other provincial and territorial governments and the National Research Council (NRC) to improve standards for climate resilience in *building* design.

This guide is intended to assist *code users* in understanding their roles and responsibilities in ensuring *buildings* in Saskatchewan are constructed in compliance with the relevant energy code applicable to that *building*.

This guide also contains appendices which provide information for *code users* that may be used in applying energy efficiency requirements in specific situations. Appendix A includes the Saskatchewan Climate Information that illustrates the heating degree day boundaries for selected locations in Saskatchewan. Appendix B Frost Depth contains information to assist *code users* in determining the necessary depth for foundation structural design and energy efficiency. The remaining appendices include information and sample documentation, outlining how *code* compliance may be demonstrated to a *local authority*.

Building owners and *designers* should discuss with their *local authority* all requirements for permits, plans, documentation and compliance prior to any construction taking place.

Abbreviations and Acronyms

(Note: Where a year follows an abbreviation, that reference denotes the edition of the document that is in effect.)

BASA Regulations – *The Building and Accessibility Standards Administration Regulations*

ERS – EnerGuide Rating System

NBC – National Building Code

NECB – National Energy Code of Canada for Buildings

NRC – National Research Council

NRCan – Natural Resources Canada

UBAS Act – *The Uniform Building and Accessibility Standards Act*

UBAS Regulations – *The Uniform Building and Accessibility Standards Regulations*

Definitions

The UBAS Act, the UBAS Regulations and the BASA Regulations contain certain definitions establishing specific meanings. In addition, both the NBC and NECB contain a number of definitions which are specific to their respective *codes*. The definitions in the UBAS Act, the UBAS Regulations, or the BASA Regulations shall apply in the event of a conflict between these definitions and those in either the NBC or NECB. Italicized words, other than titles of acts and regulations, are defined in the following legislations, regulations, NBC, NECB and standards.

In addition, the section entitled Other Terms and Definitions has been included to clarify the meaning of certain words for the purposes of this document. These words are also italicized to ensure understanding of their use in this specific document. In all other situations, if there is no definition in the documents noted above, the meaning commonly assigned to them in the context in which they are used, taking into account the specialized use of terms within the various trades and professions, will be used.

Users are strongly encouraged to ensure they are using the correct definition when using this guide or referencing either the NBC or NECB.

The Uniform Building and Accessibility Standards Act

Alteration means a change or extension to any matter, thing, or *occupancy* that is regulated by the UBAS Act.

Architect means a registered *architect* within the meaning of *The Architects Act*.

Appropriate local authority means the *local authority* that has jurisdiction over the geographical area in which a *building* is or is to be situated.

Building means a structure used or intended for supporting or sheltering any use or *occupancy*, and includes an *addition* built to an existing structure and, where applicable, the land adjoining a structure.

Constructor means a person who contracts with an *owner* or his authorized agent to undertake a*building* construction project, and includes an *owner* who:
(i) contracts with more than one person for the *work* on a *building* construction project; or
(ii) undertakes the *work* on a *building* construction project or any part of such a project;

Engineer means a professional *engineer,* as defined in *The Engineering and Geoscience Professions Act*, and includes the holder of a certificate of authorization granted pursuant to section 22 of that Act.

Farm building means a *building* associated with a farming operation and includes a residence consisting of not more than two dwelling units, but does not include *buildings* associated with commercial operations, multiple-occupancy residences, or assembly *buildings*. This definition is expanded upon in the UBAS Regulations. (See page 5)

Local authority means:

- a municipality;
- a regional park authority within the meaning of *The Regional Parks Act, 2013*; or,
- with respect to park land within the meaning of *The Parks Act*, the minister responsible for the administration of that Act.

Occupancy means the use or intended use of all or part of a *building* for the shelter or support of persons, animals, or property.

Owner means any person, firm, or corporation which controls the property under consideration.

Renovation means a renewal of a *building* or a portion of a *building*.

The Uniform Building and Accessibility Standards Regulations

Farm building means a *farm building* as defined in the UBAS Act (See page 4) and these Regulations. Any *building* which is classified for assessment purposes as commercial and industrial, elevator, railway right of way and pipeline, or is used for the production, processing, wholesaling or distribution of cannabis cannot be classified as a *farm building* with regards to the application of *building* standards, including energy efficiency.

Work means any construction, erection, placement *alteration*, repair, *renovation*, demolition, relocation, removal, use, *occupancy,* or change of *occupancy* of a *building.*

National Building Code Section 9.36.

Annual energy consumption means the annual sum of service water heating and space-conditioning energy consumption of the *proposed house* design, as calculated in accordance with Subsection 9.36.5.

Common space means all spaces required to be *conditioned spaces* in accordance with the requirements of the NBC that are not within a suite but does not include crawl spaces and vertical service spaces. Note: The walls that enclose a *common space* are excluded from the calculation of *floor area* of that *common space*. For design purposes, unheated garages, crawl spaces, vertical service shafts and elevator shafts are not considered *common spaces*.

Conditioned space means any space within a *building* the temperature of which is controlled to limit variation in response to the exterior ambient temperature by the provision, either directly or indirectly, of heating or cooling over substantial proportions of the year.

Designer means the person responsible for the design. Note: For the NBC Section 9.36., a *designer* means a *competent person* as identified in Other Terms. (See page 7). Note: For the NECB, a *designer* means an *architect* or professional *engineer*, as defined in the UBAS Act, registered in the province of Saskatchewan with the appropriate scope of practice for the *work* undertaken.

Effective thermal resistance (RSI value in metric) means the inverse of the *overall thermal transmittance* of an assembly.

This includes the effects of thermal bridging for:

- closely spaced repetitive structural members;
- major structural elements that penetrate the *building envelope*;
- junctions between the following *building envelope* materials:
  - glazing assemblies;
  - spandrels;
  - parapets;
  - roof-to-wall junctions;
  - corners; and
  - edges of walls or floors; and,
  - secondary structural members.

Fenestration means all *building* envelope assemblies including their frames that transfer visible light, such as windows clerestories, skylights, translucent wall panels, glass block assemblies, transoms, sidelights, sliding, overhead, or swinging glass doors and glazed inserts in doors, etc.

Floor area means the space on any storey of a *building* between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits, vertical service spaces, and their enclosing assemblies.

Frost action means the phenomenon that occurs when water in soil is subjected to freezing which, because of the water/ice phase change or ice lens growth. Results in a total volume increase or the build-up of expansive forces under confined conditions or both, and the subsequent thawing that leads to loss of soil strength and increased compressibility.

House means a detached house, a semi-detached house, a duplex, a triplex, a townhouse, a row house, or a boarding house.

Overall thermal transmittance (U-value) means the rate, in W/(m^2▪K), at which heat is transferred through a *building* assembly that is subject to a temperature differences. Note: if using NECB for design use the definition on page 6.

Reference house means a hypothetical replica of the *proposed house* design using the same energy sources for the same functions and having the same environmental requirements, *occupancy*, climatic data, and operating schedules, but made to comply with all applicable prescriptive requirements of the NBC Subsections 9.36.2. to 9.36.4.

National Energy Code of Canada for Buildings

Addition means any *conditioned space* that is added to an *existing building* and that increases the *building's* floor surface area by more than 10 m^2.

Building envelope means the collection of components that separate *conditioned space* from unconditioned space, the exterior air or the ground, or that separate *conditioned spaces* intended to be conditioned to temperatures differing by more than 10°C at design conditions.

Designer means an *architect* or professional *engineer*, as defined in the UBAS Act, registered in the province of Saskatchewan with the appropriate scope of practice for the *work* undertaken.

Overall thermal transmittance (U-value) means the rate, in W/(m^2▪K), at which heat is transferred through a *building* assembly that is subject to a temperature difference. It represents the amount of heat transferred through a unit area in a unit of time induced under steady-state conditions by a unit temperature difference between the environments on its two faces. The U-value reflects the capacity of all elements to transfer heat through the thickness of the assembly, as well as, for instance, through air films on both faces of above-ground components. Where heat is not transferred homogeneously across the area being considered, the *overall thermal transmittance* shall be determined.

Other Terms and Definitions

These definitions were created specifically for this guide and represent the meaning as intended for the content of this document.

Addition means, for the purpose of applying NBC Section 9.36., any *conditioned space* that is added to an *existing building* and that increases the *building's* floor surface area.

Code means the National Building Code or the National Energy Code of Canada for Buildings, as applicable in the context where the term is used.

Code users means *building owners*, industry (including *designers, constructors,* contractors, etc.), *local authorities*, building officials, and others who use either the NBC or the NECB as is applicable in the context where the term is used.

Competent person means a person, firm, or corporation, acceptable to the *local authority*, who is knowledgeable and experienced in the application of the NBC Section 9.36. for the design of *buildings* and/or *building* systems.

Existing building means, in the context of applying energy efficiency standards, a *building* on which construction was completed or on which a *building* permit was issued prior to January 1, 2019.

Factory-constructed building means a *building* that is constructed in a factory, or a ready-to-move *building*.

Freezing degree-days means the sum total over the period of a year of the number of degrees Celsius a given day's mean temperature is below 0°C. The values used in application of either the NBC or the NECB should then be based on an average value for a minimum ten-year period. (See Appendix B)

Frost depth means the maximum depth within the soil, where groundwater is expected to freeze. (See Appendix B)

Note: The *frost depth* is measured in open-field conditions in undisturbed soil.

Ground-oriented dwelling units means:

- traditional individual detached *houses* with or without a secondary suite;
- semi-detached *houses* or duplexes (doubles) where each *house* may contain a secondary suite;
- row *houses* without secondary suites; or
- row *houses* with secondary suites where firewalls are constructed in accordance with Sentence 9.10.11.2.(1) of the National Building Code 2015.

Note: This term does not apply to stacked dwelling units or multiple unit residential *buildings* other than those specifically mentioned above.

Heating degree-days means the sum total over the period of a year of the number of degrees Celsius a given day's mean temperature is below 18°C. The values used in application of either the NBC or the NECB should then be based on an average value for a minimum ten-year period. (See Appendix A)

Note: For the NECB the target temperature for *heating degree-days* when considering a semi-heated *building* is 15°C.

Major alteration means:

- everything requiring a permit that doesn't fall under the scope of a *minor alteration*; and,
- other systems that need to be considered. These systems might be indirectly linked to the *alteration* project as the original project did not intend to change these systems but their operation or compliance may be affected by other changes involved in the *alteration*. (e.g., heating system and ventilation systems after an extensive *building envelope* upgrade).

Minor alteration means a standalone project for which a permit is required;

- often isolated or small in scope;
- does not involve structural elements;
- does not impact systems in other areas of the *building*;
- does not affect the operation of fire alarm or sprinkler system; and,
- does not make the means of egress non-compliant with either the NBC or the NECB, as is applicable in the context where the term is used.

New building means, in the context of energy efficiency standards, a *building* whose *building* permit was issued on or after January 1, 2019.

Other project types means any project not related to *ground-oriented dwelling units*.

> Note: This includes the entire base *building* and any interior construction completed for first *occupancy* (*owner* or tenant improvements).

Proposed house means the *house* as designed for the *owner* and submitted for *building* permit approval and construction.

Seasonally-occupied building means a *building* with no space heating appliance.

> Note: The appliances referred to in this situation are fixed in the *building* and may include items such as furnaces or permanent baseboard heating. The appliances referred to in this context, do not include portable heaters.

Thermal resistance or *nominal thermal resistance* (RSI value) means the resistance to heat transfer and typically measured in the centre of a batt of insulation.

Legislative and Regulatory Framework

The Uniform Building and Accessibility Standards Act

The UBAS Act and associated Regulations provide the framework for *buildings* in Saskatchewan and establishes the following:

- *Building owners* are responsible for compliance.
- *Local authorities* are responsible for administration and enforcement of the UBAS Act in their jurisdiction.
- The Government of Saskatchewan is responsible for the province's legislative, regulatory and policy framework.
- Building officials work for the *local authorities*.
- Professional *designers* and *constructors* work for *building owners*.

No person who is required to comply with the UBAS Act and the Regulations shall fail to comply with the *Codes*.

The Uniform Building and Accessibility Standards Regulations

The UBAS Regulations provide for the adoption of both the NBC and the NECB. The edition of the NBC and NECB applicable to a *building* is the edition of the NBC or NECB which is in effect on the day the permit for construction is issued. The UBAS Regulations also contain any amendments to the NBC or NECB which are specific to *buildings* in Saskatchewan.

The Building and Accessibility Standards Administration Regulations

The BASA Regulations provide the framework for the licensing of building officials, including the licence classifications of building officials and the different types of *buildings* each classification is authorized to inspect.

Roles and Responsibilities

The UBAS Act provides a framework for ensuring *buildings* in Saskatchewan are constructed in a safe, healthy, habitable and energy-efficient manner. An overview of the roles and responsibilities of each party to the construction process are described here.

Owner

As the *owner* controls the property and is responsible for employing *constructors* and design professionals, the *owner* is responsible for compliance with the requirements adopted under the UBAS Act, including accessibility, energy efficiency and minimum standards of construction.

A *building owner* is not relieved from the obligation to comply with *building*, accessibility, or energy standards as a result of work done or not done by a *local authority* in:

- the granting of a permit;
- the review of drawings or specifications;
- the making of inspections; or,
- the absence or omission of any of these actions.

Local Authority

Local authorities are responsible for enforcing the UBAS Act, associated Regulations and all provisions of the NBC and NECB which may be applicable to a *building* within their jurisdiction. *Local authorities* often use bylaws to administer *building* standards but the lack of a *building* bylaw does not absolve a *local authority* from its responsibility to enforce the UBAS Act.

Government of Saskatchewan

The Government of Saskatchewan is responsible for establishing the legislative framework, high-level policy, the licensing of building officials and providing support to stakeholders. The Ministry of Government Relations is assigned responsibility for administering the UBAS Act and associated Regulations. The ministry provides support to *owners*, industry, *local authorities*, building officials, the fire service and other *code users* on the application of the NBC, NECB and accessibility standards.

The Government of Saskatchewan is also responsible for supporting the Saskatchewan Building and Accessibility Standards Appeal Board, which hears appeals of a building official order and requests for exemptions from accessibility standards.

Building Official

Building officials are appointed by and work for *local authorities* to provide plan review, inspection and enforcement services of the minimum standards required by the UBAS Act. Building officials must be licensed by the Government of Saskatchewan prior to providing building official services.

Building officials have the following powers under the UBAS Act:

- entering a *building* at a reasonable hour;
- ordering the production of documents, tests, certificates, etc. related to a *building*;
- taking material samples;
- issuing notices to *owners* that order actions within a prescribed time;
- stopping construction including the use or *occupancy* of a *building*;
- eliminating unsafe conditions;
- taking action where imminent danger exists; and,
- conducting enforcement measures to ensure compliance.

Design Professional

Design professionals (a licensed *architect* or professional *engineer*) are required to provide the design or design review of large *buildings* or a specific *building* component and are knowledgeable and experienced in the NBC and/or the NECB as it pertains to their scope of *work*. Design professionals provide services either directly or indirectly to *building owners*.

Smaller *buildings* (i.e., three storeys or less in *building* height and less than 600 m^2 in *building* area) may be designed by a *competent person* acceptable to the *local authority* who is knowledgeable in the requirements found in Part 9 of the NBC and is experienced in *building* design.

Constructor

Building constructors, including contractors and sub-trades, are employed by *building owners* to complete construction and *renovations* of *buildings*. All *work* must be completed in compliance with the design, the UBAS Act and Regulations, the NBC and, as applicable, NECB.

Adoption of Energy Codes in Saskatchewan

Local authorities have the responsibility to administer and enforce the minimum energy efficiency standards. The energy efficiency standards established by the UBAS Regulations are NBC 2015 Section 9.36. and NECB 2017. These standards are applicable to any *building* permit issued on or after January 1, 2019, for construction of a new building or an addition to an existing building. There are no Saskatchewan amendments to either the NBC Section 9.36. or the NECB.

NBC Section 9.36. is applicable to some Division B, Part 9 *buildings* which typically include housing and small *buildings*. The NECB may also be applied to these small Division B, Part 9 *buildings* instead of NBC Section 9.36. However, the NECB is primarily intended for application to Division B, Part 3 *buildings*. *Buildings* containing non-residential occupancies whose combined total *floor area* is > 300 m^2 or *buildings* which are a medium-hazard industrial occupancy, cannot be designed in accordance with NBC Section 9.36. and must comply with the NECB.

While Saskatchewan has adopted the NBC Section 9.36. and NECB as the minimum energy standards, a *local authority* may choose, through bylaw, to adopt standards that exceed the minimum standards established by the province under the UBAS Act. A local authority cannot opt out of the responsibility to administer and enforce the minimum energy standards of the province. It is recommended that *building owners* and *designers* consult with the *local authority* to see if any additional energy efficiency standards have been adopted by the *local authority* where a *building* is to be located.

See Part II of this guide for information on NBC Section 9.36. and Part III of this guide for information on the NECB.

Exemptions from the Application of Energy Codes

The UBAS Act exempts *farm buildings* from the application of *building* and accessibility standards.

Also *buildings* 10 m^2 or less in *building* area are exempt from *building* and accessibility standards as found in the Administrative Requirements for Use with the National Building Code 1985 and referenced in NBC 2015 Division C, Article 2.2.1.1. The NECB does not consider any added space that is less than 10 m^2 in area to be an *addition*.

Some *building* components may be exempt from energy standards as specified in the NBC Section 9.36. or NECB. Any assembly in an exempted portion of a *building* that is adjacent to a *conditioned space* must still meet the requirements of the applicable *Code*. The NECB also includes energy efficiency provisions for semi-heated *buildings*.

Existing Buildings

The energy efficiency standards do not apply to *minor* or major *alterations* to *buildings*. Subsection 7(1) of the UBAS Act requires the current NBC requirements apply where practical. However, the Regulations do not require NBC Section 9.36. or the NEBC to apply to alterations to existing buildings. The UBAS Act overrides the application statements of the NBC Section 9.36. and the NECB.

A local authority may, through a building bylaw require buildings to comply with higher energy standards and/or require alterations to existing buildings to comply where practicable.

It is recommended that *owners* contact the *appropriate local authority* to ensure any proposed *renovations* or *alterations* to an *existing building* comply with NBC Section 9.36. or NECB as applicable within that local authority's jurisdiction.

Existing buildings that are not being renovated or changing *occupancy* will not be required to conform to the NBC Section 9.36. or the NECB.

Appeal Mechanism

The UBAS Act provides powers to an appointed building official including the ability to write orders when *building*, accessibility, and energy-efficient standards have been contravened. There is an appeal mechanism available to *building owners* who are aggrieved by the order of a building official, as permitted by section 18 of the UBAS Act. *Building owners* should contact Building Standards and Licensing Branch if they wish to appeal a building official's order.

PART II

National Building Code Section 9.36.

Implementation of Energy Codes in Saskatchewan

The UBAS Act adopts the NBC, as amended by Saskatchewan, and establishes the minimum standard for *building*, accessibility and energy efficiency. NBC Section 9.36. came into force January 1, 2019, without amendment. All permits for construction which are issued on or after this date are subject to the application of NBC Section 9.36. In Saskatchewan, subsequent editions of the NBC (including NBC Section 9.36.) will be automatically adopted one year after the date of publication.

There are four possible paths for complying with NBC Section 9.36. with each path having some limitations on its use, as identified in the wording of the NBC Section 9.36. NBC Section 9.36. can be applied using one of the following approaches:

- a prescriptive path;
- a prescriptive path with trade-off provisions;
- a performance path; or,
- the NECB.

Local authorities may also accept either certification programs as being deemed compliant or an alternative solution for the purpose of compliance.

A *building's owner*, in consultation with the *appropriate local authority*, can decide which of the four compliance paths to use, taking into account the size of the *building* and its intended use. A *competent person* may also submit an alternative solution demonstrating that the performance of the *building* satisfies the objective and function statements attributed to NBC Section 9.36. as a means of compliance. *Local authorities* have the discretion to accept or reject an alternative solution.

The general scope of the NBC Section 9.36. applies to:

- *building envelope*;
- HVAC equipment; and
- service water heating equipment.

Application of Energy Codes

New Buildings

The following table from the NBC Section 9.36. summarizes the choices *building owners* have available for compliance with NBC Section 9.36. based on a *building* type and size.

Figure 1: NBC Table A-9.36.1.3. – Energy Efficiency Compliance Options for Part 9 Buildings

Building Types and Sizes	Energy Efficiency Compliance Options		
	NBC 9.36.2. to 9.36.4. (Prescriptive)*	NBC 9.36.5. (Performance)	NECB*
• houses with or without a secondary suite • buildings containing only dwelling units with common spaces ≤ 20% of buildings total floor area	✓	✓	✓
• Group C occupancies • buildings containing Group D, E or F3 occupancies whose combined floor area ≤ 300 m^2 (excluding parking garages that serve residential occupancies) • buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portions combined total floor area ≤ 300 m^2 (excluding parking garages that serve residential occupancies)	✓	✗	✓
• buildings containing Group D, E or F3 occupancies whose combined floor area > 300 m^2 • buildings containing Group F2 occupancies of any size	✗	✗	✓
• NOTE: Asterisk (*) denotes that Trade-off Compliance Path may be used in conjunction for meeting either Section 9.36 of the NBC or the NECB			

Source: National Building Code 2015 Table A-9.36.1.3.

Factory-Constructed Buildings

Factory-constructed *buildings* must be constructed in compliance with the NBC as adopted by Saskatchewan. There are two options that may be used by *owners* to show compliance of components or assemblies:

- CSA A277 “Procedure for Factory Certification of Buildings”; or,
- *building* inspection reports by a Saskatchewan building official.

CSA A277 "Procedure for Factory Certification of Buildings" states the following for compliance:

> "Factory-built buildings shall be designed and built to comply with the following:
>
> a) the National Building Code or the applicable provincial, territorial, or municipal building code;
> b) the CSA Z240 MH Series "Manufactured Homes";
> c) the Canadian Electrical Code, Part I, for the installation of electrical systems;
> d) the National Plumbing Code of Canada, for factory-installed plumbing and fixtures; or,
> e) other applicable codes standards, and requirements."

For the purpose of demonstrating compliance with energy efficiency standards, factory-constructed *buildings* must be certified to show compliance with NBC Section 9.36. throughout the construction process. If this certification is not available to the *local authority*, building permits complete with inspection reports throughout the construction of the factory-constructed *building* may be used to show compliance with the NBC Section 9.36.

The *building owner* or manufacturer is responsible for demonstrating completion before January 1, 2019, or compliance with the NBC Section 9.36. to the *appropriate local authority* for any of the following scenarios:

- *building* permit issued and construction completed prior to January 1, 2019, NBC Section 9.36. does not apply,
- *building* permit issued prior to January 1, 2019, but construction completed after January 1, 2019, NBC Section 9.36. does not apply,
- *building* permit issued prior to January 1, 2019, but construction started after January 1, 2019, NBC Section 9.36. does not apply, or
- *building* permit issued and construction started after January 1, 2019, NBC Section 9.36. does apply.

Compliance Paths

Prescriptive Path

The NBC Section 9.36. prescriptive path is available for:

- *houses*;
- *houses* with secondary suites;
- *buildings* containing only dwelling units with *common spaces* whose total *common space floor area* does not exceed 20 per cent of the total *floor area* of the *building*; and,
- other residential *buildings* (Group C), *buildings* containing business and personal services (Group D), mercantile (Group E), or low-hazard industrial *buildings* (Group F3), as well as to *buildings* containing a mix of these *occupancies*, to a maximum limit of $\leq$ 300 m^2 of *floor area*.

(See Figure 1: Energy Efficiency Compliance Options for Part 9 Buildings, page 14)

The prescriptive path dictates specific requirements which must be included in a *building*'s construction. These include:

- minimum thermal characteristics for *building* components; and,
- energy efficiency measures for *building* systems and equipment.

In order to demonstrate compliance with the NBC Section 9.36. prescriptive path, key pieces of information must be used to determine compliance with the prescribed requirements in the NBC, including:

- *Heating degree-days* zone (See Appendix A) for the *building* location; and,
- the applicable calculation(s) for the *building* assembly or element with the prescribed value specified.

Prescriptive with Trade-off Path

The prescriptive with trade-off path can be used for any *building* to which the prescriptive path can be used. The NBC Section 9.36. limits where the trade-offs are available for specific *building* components.

The trade-off path provides some degree of flexibility in the application of certain prescriptive requirements and only applies to above ground assemblies. In specific situations, the design can provide lesser performance on particular *building* components if other components within the same *building* system provide greater performance. The trade-off calculations must be documented to demonstrate compliance.

The prescriptive path with trade-offs for NBC Section 9.36. is limited to specific components and is only applicable for a single *building.* Items which can be used for trade-off include:

- *thermal resistance* for one or more above ground opaque *building* envelope assemblies;
- *thermal resistance* for windows; or,
- insulation requirements for floor or ceiling insulation for *buildings* that are one storey in height.

Trade-off Options

The trade-off path allows the following:

- The **opaque-to-opaque** approach allows the *designer* to reduce the *effective thermal resistance* or RSI value of one wall, floor or ceiling area by increasing the *effective thermal resistance* or RSI value of another wall, floor or ceiling to achieve the same energy loss through the combined total areas. The reduction in *effective thermal resistance* or RSI value is subject to limitations.
- The **transparent-to-transparent** approach applies where a *designer* may wish to increase the U-value of one or more windows while reducing the U-value of another window to achieve the same energy loss through the combined total area of both windows. This method is limited to the trading of windows that face the same directional orientation.
- The **opaque-to-transparent** approach allows for a reduction in attic insulation by improvements in the window performance. Typically, it would only be applied to single section factory-constructed *buildings* that are subject to transportation height limitations. This method is also limited to *houses* with a *fenestration* and door-to-wall ratio of less than 15 per cent, which lose less energy due to having fewer windows than typical *houses*.

Other limitations applicable to the trade-off path include the following:

- the wall and attic RSI-value cannot be reduced below 55 per cent of the required RSI-value;
- the RSI-values of other opaque assemblies cannot be reduced below 60 per cent of their required RSI-value;
- the trade-off path cannot be applied to heated assemblies such as embedded heating cables, pipes, or membranes; and
- the trade-off path cannot be applied to components and assemblies that already benefit from other relaxations or exemptions.

Performance Path

The performance path is only applicable to:

- *houses* with or without a secondary suite; and,
- *buildings* containing only dwelling units with *common spaces* whose total *common space floor area* does not exceed 20 per cent of the total *floor area* of the *building.*

A hypothetical annual energy consumption target for a reference *building* is established using computer modelling. This target is based on using the NBC Section 9.36. prescriptive requirements for all components, systems and assemblies of the proposed *building* to create a computer simulated reference *building*. The modelling will then assess the specifications for the actual *proposed house* to generate a hypothetical energy consumption estimate and compare this with the energy consumption target of the *reference house*. The *annual energy consumption* for the *proposed house* should not exceed the *reference house* in order to meet the requirements of the performance compliance path.

This path allows the *designer* the greatest degree of flexibility as they are allowed to make trade-offs between different *building* systems. The NBC Section 9.36. requires this path be applied to the whole *building*, not just selected *building* systems.

Because the performance path cannot be used to calculate the energy performance of non-residential *buildings*, mixed-use *buildings* or large residential *buildings*, *designers* and modellers must choose between either the prescriptive path of the NBC Section 9.36. or the NECB. (See Performance Path Assessment Tools, Appendix D)

National Energy Code of Canada for Buildings Path

All *buildings* that are permitted to be designed in accordance with NBC Section 9.36. can be designed using the NECB.

A professional *designer* is required for the design of energy efficiency requirements of a *building* if the *owner* chooses to apply the NECB for *building* performance. A *competent person* may design a *building* that is still within NBC Part 9 but *owners* would have to employ a professional *designer* to verify compliance with the NECB.

Please see Part III of this guide for NECB requirements for *buildings*.

Alternative Solutions

Compliance with the NBC Section 9.36. may also be achieved through an alternative solution. The alternative solution must show that it either meets or exceeds the function and objective statements of NBC Section 9.36. requirements applicable to the *building* in question. An alternative solution must be developed using acceptable methods detailed in NBC Division C, Part 2.

A *local authority* has the power to evaluate and accept or reject the alternative solution for *code* compliance at its discretion. Therefore, consultation with the *appropriate local authority* is important before construction begins when an alternative solution is going to be proposed.

Deemed Compliance

In some circumstances, energy performance certification programs may be accepted as equivalent to NBC Section 9.36. (See page 16). These programs must be reviewed by the *appropriate local authority* to be deemed compliant with NBC Section 9.36. and would need to be accepted as an approved solution by the *appropriate local authority*.

It is important to contact the *appropriate local authority* before applying for the *building* permit or as part of the *building* permit application, to ensure the *appropriate local authority* will accept a proposed *building* certification program as demonstrating compliance with NBC Section 9.36.

Several energy performance standards and *building* certification programs have been developed for one of two categories of *buildings*:

- residential; or,
- non-residential.

It is important to ensure that any standard or program used is appropriate for the *building* being designed.

For residential projects, it is important to ensure the measures taken to attain these certifications focus on *building* performance and not on other sustainability features that may be included in the program. Additional information on these standards and certification programs is readily available online and include but are not limited to:

- **The Net Zero Home** certification;
- **Net Zero Ready Home** certification;
- **Built Green** certification,
- **EnergyStar for Homes** qualified;
- **Canadian Passive House** certification;
- **R2000** certification; or,
- **LEED-H** certification.

Some non-residential *building* certification programs focus on sustainability issues beyond the energy efficiency of the *building* itself. It is necessary for the *designers* of these *buildings* to demonstrate to the *appropriate local authority* that the minimum requirements of the *Codes* are met. Additional information on these certification programs is readily available online and include but are not limited to:

- **ANSI/ASHRAE/IES Standard 90.1** "Energy Standard for Buildings Except Low-Rise Residential Buildings";
- **Green Globes** certification;
- **BOMA BEST** certification;
- **Building Energy Quotient**; or,
- **LEED** certification.

PART III

National Energy Code of Canada for Buildings

Implementation of Energy Codes in Saskatchewan

The UBAS Regulations adopts the NECB without amendment, effective January 1, 2019. Unlike the NBC Section 9.36., where subsequent editions are automatically adopted one year after the date of publication, each subsequent edition of the NECB will be reviewed for possible amendment before adoption of new editions.

All permits for construction which are issued on or after January 1, 2019, are subject to the application of the NECB for *buildings* to which it applies. The NECB applies in conjunction with the minimum requirements of the NBC.

The NECB applies to the design and construction of:

- new Part 3 *buildings* as described in the NBC;
- *additions* to existing NBC Part 3 *buildings*;
- new Part 9 *buildings* that do not fall within the scope of NBC Section 9.36.;
- *additions* to existing Part 9 *buildings* that do not fall within the scope of NBC Section 9.36.; and
- *new buildings* or *additions* that fall within the application of NBC Section 9.36. where this compliance path is chosen.

There are three possible paths for complying with the NECB and each path may have some limitations on its use which are identified in the wording of the NECB. The NECB can be applied using the following approaches:

- a prescriptive path;
- a prescriptive path with trade-off provisions; or,
- a performance path.

Local authorities may also accept an alternative solution for the purpose of compliance.

The design of *buildings* within the scope of the NECB must be undertaken by a professional *designer* regardless of the compliance path chosen. A *building's owner*, in consultation with the *appropriate local authority*, can decide which compliance path to use, taking into account the size of the *building* and its intended use.

The general scope of the NECB applies to:

- *building envelope*;
- HVAC equipment;
- service water heating equipment;
- lighting; and,
- electrical power systems and motors, excluding process loads.

Application of Energy Codes

New Buildings

The following table summarizes the choices *building owners* have available for compliance with the NECB based on the *building* system under consideration.

Figure 2: Compliance Path Options in Application of the NECB 2017

NECB 2017	Prescriptive Path	Prescriptive with Trade-off Path	Performance Path (NECB Part 8)
Part 3 Building envelope	√	√ (except additions)	√
Part 4 Lighting	√	√	√
Part 5 Heating, Ventilating and Air-conditioning Systems	√	√	√
Part 6 Service Water Systems	√	√	√
Part 7 Electrical Power Systems and Motors	√	X	√
Note: When using the Performance Path it must apply to the whole building (NECB 2017 Division B Article 1.1.2.1.)			
Note: Part 8 Performance Compliance Path cannot be used and the prescriptive path shall be used where insufficient information is known about the building's components, materials, and assemblies.			

Factory-Constructed Buildings

Factory-constructed *buildings* must be constructed in compliance of the NECB as adopted by Saskatchewan. There are two options that may be used by *owners* to show compliance of components or assemblies:

- CSA A277 "Procedure for Factory Certification of Buildings"; or,
- *building* inspection reports by a licensed building official.

CSA A277 "Procedure for Factory Certification of Buildings" states the following for compliance:

> "Factory-constructed buildings shall be designed and built to comply with the following:
>
> a) the National Building Code or the applicable provincial, territorial, or municipal building code;
> b) the CSA Z240 MH Series;
> c) the Canadian Electrical Code, Part I, for the installation of electrical systems;
> d) the National Plumbing Code of Canada, for factory-installed plumbing and fixtures; or,
> e) other applicable codes standards, and requirements."

For the purpose of demonstrating compliance with energy efficiency standards, factory-constructed *buildings* must be certified to show compliance with NECB throughout the construction process. If this certification is not available to the *appropriate local authority*, building permits complete with inspection reports throughout the construction of the factory-constructed *building* may be used to show compliance with the NECB.

The *building owner* or manufacturer is responsible for demonstrating completion before January 1, 2019, or compliance with the NECB to the *appropriate local authority* for any of the scenarios:

- permit issued and construction completed prior to January 1, 2019, NECB does not apply;
- permit issued prior to January 1, 2019, but construction completed after January 1, 2019, NECB does not apply;
- permit issued prior to January 1, 2019, but construction started after January 1, 2019, NECB does not apply; or
- permit issued and construction started after January 1, 2019, NECB does apply.

Compliance Paths

Prescriptive Path

The NECB prescriptive compliance path is available for all *buildings*. A checklist has been developed by NRCan that *code users* may find helpful in reviewing compliance with the NECB (See Appendix E).

The prescriptive path dictates specific requirements which must be included in a *building's* construction. These include:

- minimum thermal characteristics for *building* components; and,
- energy efficiency measures for *building* systems and equipment.

In order to demonstrate compliance with the NECB prescriptive path, key pieces of information must be used to determine compliance with the prescribed requirements in the NECB, including:

- *Heating degree-days* zone (See Appendix A) for the *building* location; and,
- the applicable calculation(s) for the *building* assembly or element with the prescribed value specified.

Prescriptive with Trade-off Path

The prescriptive with trade-off path can be used for any *building* to which the prescriptive path can be used. The NECB limits where the trade-offs are available for specific *building* components.

The trade-off path provides some degree of flexibility in the application of certain prescriptive requirements and only applies to above ground assemblies. In specific situations, the design can provide lesser performance on particular *building* components if other components within the same *building* system provide greater performance.

The trade-off calculations must be documented to demonstrate compliance. The trade-off path requires specific calculations to demonstrate the trade-off component or assembly complies with the NECB requirements. For most parts of the NECB, there are specific guidelines which must be followed before using a trade-off path(s). Some trade-offs are referred to as 'simple trade-off' with specific application and limitations. Other parts of the NECB require a more complex set of calculations that must be completed prior to the trade-off being allowed. For NECB Part 3 the trade-off path is not available for *building additions*. For NECB Parts 4 and 5, trade-off calculation tools are available from NRCan to assist with calculations (See Appendix E).

Performance Path

The performance path is available to all *buildings* to which the NECB applies and the following information is known:

- the *occupancy* of the *building*; and,
- the components, materials, and assemblies that are covered.

A hypothetical annual energy consumption target for a reference *building* is established using computer modelling. This target is based on using the NECB prescriptive requirements for all components, systems, and assemblies of the proposed *building* to create a computer simulated reference *building*. The modelling will then assess the specifications for the actual proposed *building* to generate a hypothetical energy consumption estimate and compare this with the energy consumption target of the reference *building*. The *annual energy consumption* for the proposed *building* should not exceed the reference *building* in order to meet the requirements of the performance path.

This path allows the *designer* the greatest degree of flexibility as they are allowed to make trade-offs between different *building* systems. The NECB requires this path be applied to the whole *building*, not just selected *building* systems.

Additions with the performance path shall be assessed in one of the following two ways:

- the *addition* is considered by itself; or,
- the *addition* is considered together with the *existing building*.

If an *addition* is considered with the *existing building*, all of the characteristics of the *existing building* must be known for the performance energy modeling.

Alternative Solutions

Compliance with the NECB may also be achieved through an alternative solution. The alternative solution must show that it either meets or exceeds the function and objective statements of the NECB requirements applicable to the *building* in question. An alternative solution must be developed using acceptable methods detailed in NECB Division C, Part 2.

A *local authority* has the power to evaluate and accept or reject the alternative solution for *code* compliance at its discretion. Therefore, consultations with the *appropriate local authority* is important before construction begins when an alternative solution is going to be proposed.

Several energy-based standards and building certification programs have been developed for one of two categories of *buildings*:

- residential; or,
- non-residential.

It is important to ensure that any standard or program selected for use is appropriate for the *building* being designed.

When larger *buildings* and high-rise residential *buildings* are designed, professional *designers* need to select a standard or program which is suitable for that *building* type. These standards or programs may be able to provide energy efficiency comparable or better than the NECB. However, it is important to ensure that the measures taken to attain these certifications focus on *building* performance. These programs may include other sustainability features. It is necessary to demonstrate to the *appropriate local authority* through an alternative solution that the minimum requirements of the NECB are met. Additional information on these certification programs is readily available and include but are not limited to:

- **ANSI/ASHRAE/IES** "Standard 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings";
- **EnergyStar for Mid to High-Rise Residential** qualified; or,
- **LEED** certification.

Non-residential *building* certification programs are available to *building owners* who wish to obtain a specific *building* certification. Some of these certification programs focus on sustainability issues beyond the energy efficiency of the *building* itself. It is necessary for the *designers* of these *buildings* to demonstrate to the *appropriate local authority* through an alternative solution that the minimum requirements of the NECB are met. Additional information on these certification programs is readily available and include but are not limited to:

- **ANSI/ASHRAE/IES** "Standard 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings";
- **Green Globes** certification;
- **BOMA BEST** certification;
- **Building Energy Quotient**; or,
- **LEED** certification.

PART IV

Questions and Answers

1. **Q. Who is responsible for compliance with the energy efficiency standards?**

   Compliance with standards is a shared responsibility:
   - *Building owners* are responsible for compliance.
   - *Local authorities* are responsible for administration and enforcement of the UBAS Act in their jurisdiction.
   - The Government of Saskatchewan is responsible for the legislative, regulatory, and policy framework.
   - Building officials work for the *local authority*.
   - Professional *designers* and *constructors* work for the *building owners*.

   In summary, no person who is required to comply with the Act and the Regulations, shall fail to comply with the *Codes*. A failure of a *local authority* or building official to enforce the requirements of the UBAS Act or the issuance of a permit in violation of the UBAS Act does not relieve a *building owner* from their obligation to comply with the requirements of the UBAS Act.

2. **Q. What standards apply?**

   NBC Section 9.36. applies to *houses* and small *buildings*. The NECB applies to all other *buildings*.

3. **Q. When do the standards come into effect?**

   Both NBC Section 9.36. and the NECB are in effect for every *building* permit issued on or after January 1, 2019.

4. **Q. How do the standards apply to a *building* that was under construction but will not be completed until after January 1, 2019?**

   Buildings that have commenced construction or have a permit issued by the *local authority* prior to January 1, 2019, are exempt from the application of energy efficiency standards.

5. Q. What *buildings* are exempt from the standards?

Farm buildings and accessory *buildings* less than 10 m^2 in *building* area are exempt from both NBC Section 9.36. and NECB requirements. Unheated *buildings* and semi-heated *buildings* are exempt from some energy efficiency requirements, however, some requirements still apply.

6. Q. Do the energy efficiency standards apply to *additions*?

Yes - The UBAS Regulations do require energy efficiency standards to apply to *additions*. Subsection 7(1) of the UBAS Act includes *buildings* which are constructed, altered, repaired or renovated as needing to comply with the *Code*. As such, the energy efficiency standards do apply to *additions* to *buildings.*

7. Q. Do the energy efficiency standards apply to *existing buildings*?

No - Energy standards do not apply to the alteration, repair, renovation or relocation of a building to which building standards apply and for which construction began before January 1, 2019.

8. Q. Do the energy efficiency standards apply to *seasonally-occupied buildings* (e.g., cottages, cabins, etc.)?

Subsection 7(1) of the UBAS Act includes *buildings* which are occupied as needing to comply with the *Codes* but does not make a distinction between *seasonally-occupied buildings* and continuously occupied *buildings*. The answer regarding energy efficiency standards is dependent on if the *building* contains a heating appliance. The appliances referred to in this situation are fixed in the *building* and may include items such as furnaces or permanent baseboard heating. The appliances referred to here do not include portable heaters.

Yes - The NBC and NECB do not provide separate requirements for *seasonally-occupied buildings* or intermittently-occupied *buildings*. The *Codes* are not based on how much time a *building* is occupied. Any *building* containing a heating appliance/system or with provisions made to install one in the future must comply with *code* requirements including those for energy efficiency.

No - Any *building* that does not contain a heating appliance/system and without provision to install one in the future does not have to comply with energy efficiency requirements but must comply with all other requirements of the NBC.

9. Q. A purchase is made for an RTM in existing inventory from a builder. A permit has been obtained for construction of the foundation, what do I have to do for compliance?

The following items must be shown for compliance:

- the foundation shall be compliant with NBC, including Section 9.36. and
- the RTM house may be exempt from NBC Section 9.36. if it is verified that the *building* was started or completed prior to January 1, 2019, with certification or inspection reports by a licensed building official or other authorized inspection authority approved under an applicable standard.

10. Q. A factory-constructed *building* obtained a permit prior to January 1, 2019. Does it have to comply to the NBC Section 9.36. or the NECB?

For any building permits that were obtained prior to January 1, 2019, the proposed *building* would be exempt from both NBC Section 9.36. and NECB requirements.

11. Q. A purchase was made for a factory-constructed *building* that will have final assembly on site. The *building* permit was obtained prior to January 1, 2019, for the foundation, but the *building* will not show up on site until April 2019. What is required to show compliance?

Any factory-constructed components started and completed before January 1, 2019, would not require NBC Section 9.36. or NECB compliance. This must be verified with certification or inspection reports from a building official or other authorized inspection authority approved under an applicable standard
. Conversely, any factory-constructed components started and completed after January 1, 2019, would require NBC Section 9.36. or NECB compliance.

The foundation and related components would be exempt from both NBC Section 9.36. and NECB compliance based on the date the foundation permit was issued.

Consultation by the owner with the *appropriate local authority* regarding expectations for *building* compliance is recommended to clarify the compliance requirements of the *local authority*.

The *building owner* or manufacturer is responsible for demonstrating completion before January 1, 2019, or compliance with the NBC Section 9.36. or NECB to the *appropriate local authority* for any of the scenarios:

- permit issued and construction completed prior to January 1, 2019, the applicable *Code* does not apply,
- permit issued prior to January 1, 2019, but construction completed after January 1, 2019, the applicable *Code* does not apply,
- permit issued prior to January 1, 2019, but construction started after January 1, 2019, the applicable *Code* does not apply, or
- permit issued and construction started after January 1, 2019, the applicable *Code* does apply.

Appendices

Appendix A – Saskatchewan Climate Information
Appendix B – Frost Depth
Appendix C – National Building Code Section 9.36. Energy Compliance Sample Documents
Appendix D – National Building Code Section 9.36. Performance Assessment Tools
Appendix E – National Energy Code of Canada for Buildings Energy Compliance Sample Documents
Appendix F – National Energy Code of Canada for Buildings Checklists and National Resources Canada Trade-off Tools
Appendix H – Authority Having Jurisdiction Inspection Information

Appendix A – Saskatchewan Climate Information

Heating degree days are a measurement designed to quantify the demand for energy needed to heat a *building* and is derived from measurements of outside air temperature. The heating requirements for a given *building* at a specific location are considered to be directly proportional to the number of *heating degree days* at that location.

The Saskatchewan Climate Zone Map (See Figure A1 below) has been developed for illustration purposes only.

The climate zones discussed in this appendix are based on *heating degree-days*. All boundary lines for Heating Degree-Day zones are charted using data from the following sources:

- NBC 2015 Division B, Appendix C 'Climatic Data'; and,
- NRCan Climate Charts data 2001-2010 for locations on record.

If a *building's* location is listed in the NBC 2015 Division B, Appendix C Climatic and Seismic Information for Building Design in Canada, the data provided should be used (See Figure A2). Where a *building's* location is not listed in the NBC and the *building* is located well within a climate zone identified on the map, the zone referenced by the map may be used or site specific data can be used. If a *building* location is in close proximity to a climate zone boundary line, determination of the appropriate zone must be done by examining the following:

a) NBC 2015 'Climatic Data' from Division B, Appendix C (See Figure A2); or
b) Data collected over a 10-year period from the weather station nearest to the region in which the proposed *building* is to be located.

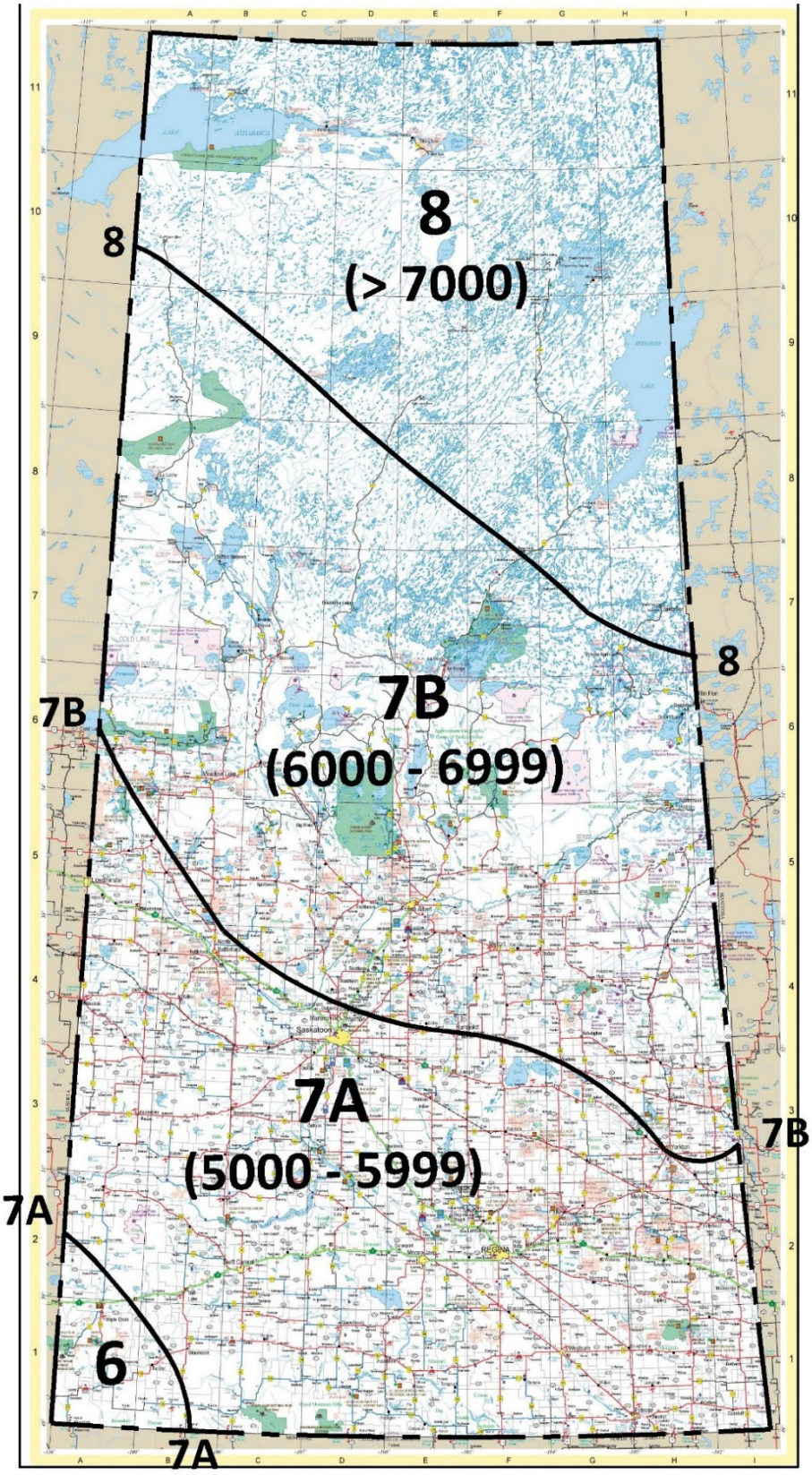
Climatic values for municipalities not listed in Appendix C may be obtained by contacting the Meteorological Service of Canada, Environment Canada, 4905 Dufferin Street, Toronto, Ontario M3H 5T4; www.climate.weather.gc.ca.

Also, collected data can be accessed through the NRCan website under historical data through the following link: http://climate.weather.gc.ca/historical_data/search_historic_data_e.html.

Refer to NBC 2015, Division B, Article 9.36.5.5. – Climatic Data for clarification
This information will provide the heating degree days and information needed to complete the necessary calculations for both prescriptive and performance paths of Section 9.36. and the NECB.

The base map used in creation of the Saskatchewan Climate Zone Map is credited to Tourism Saskatchewan as the Official Road Map 2018.

Figure A1: Saskatchewan Climate Zone Map



Note: Map must be used with commentary of Appendix A page 1.

Figure A2: Heating Degree-Days for Selected Saskatchewan Locations

Heating Degree Days	
Province/ Location	**Degree-Days Below 18°C**
Assiniboia	5180
Battrum	5080
Biggar	5720
Broadview	5760
Dafoe	5860
Dundurn	5600
Estevan	5340
Hudson Bay	6280
Humboldt	6000
Island Falls	7100
Kamsack	6040
Kindersley	5550
Lloydminster	5880
Maple Creek	4780
Meadow Lake	6280
Melfort	6050
Melville	5880
Moose Jaw	5270
Nipawin	6300
North Battleford	5900
Prince Albert	6100
Qu'Appelle	5620
Regina	5600
Rosetown	5620
Saskatoon	5700
Scott	5960
Strasbourg	5600
Swift Current	5150
Uranium City	7500
Weyburn	5400
Yorkton	6000

Source: National Building Code of Canada 2015, 'Climatic Data' Division B Appendix C for Heating Degree Days.

Appendix B – Frost Depth

When completing the design of a foundation structure in compliance with energy efficiency requirements, *frost depth* is a factor. Even small movements resulting from *frost action* can affect the functioning of the *building* and the serviceability for the occupants. This Appendix provides information to assist *Code users* with understanding *frost depth*, its relationship to foundations and energy efficiency requirements for NBC Part 9 *buildings*.

The severity of *frost action* depends on:

- the type of soil;
- the soil drainage characteristics;
- the availability of moisture near the foundation;
- the prevailing weather and climate conditions; and
- whether the foundation is provided heat from the *building* or is not provided heat.

Frost depth may fluctuate from year to year depending on the severity of the weather and the amount of snow cover. In general, where winter temperatures are colder and/or snow cover is more limited, the *frost depth* will be greater.

There are a variety of ways to determine *frost depth* theoretically but many of these ways require detailed information about the soils at a specific site. *Frost depth* can be determined using one of three approaches:

- Site Specific Analysis Method (subsurface investigation and geotechnical analysis);
- Area Specific Approach (local knowledge); or
- Simplified Theoretical Method (freezing index versus *frost depth* chart).

The *local authority* will determine which approach is acceptable. If a *local authority* has selected a standard approach, a *building owner* or designer may use another approach if they demonstrate to the *local authority* the alternative approach is suitable for the size of the *building* and the type of foundation being proposed.

Site Specific Analysis Method

Site specific analysis can involve field monitoring over a period of several years and subsurface investigation, which provides the most accurate information, but is not readily available for most sites. Subsurface investigation should involve:

- the appraisal of the general subsurface conditions at a *building* site by analysis of information gained by such methods as geological surveys;
- onsite testing, sampling, visual inspection;
- laboratory testing of samples of the subsurface materials; and
- groundwater observations and measurements.

The analysis for site specific information and subsurface investigations must be undertaken by a professional *engineer* or geoscientist specializing in geotechnical work. The site specific analysis method results in a foundation designed to perform appropriately for the conditions on a particular site without being over-built.

Area Specific Approach

Frost depth for a particular *building* can be determined using local knowledge, accumulated by local authorities, and based on information from previous experience within a jurisdiction, gathered from:

- *building* permits;
- subdivision development;
- underground infrastructure work; and,
- excavation projects.

Small *buildings* are less liable to be damaged by soil movement. As a result, knowledge specific to an area rather than a particular site may provide sufficient information for the foundation design of a smaller *building*.

As an alternative to the local knowledge approach, a *local authority* could establish *frost depth* for *buildings* in their jurisdiction using one of the following methods:

- obtain a *frost depth* estimate from a design professional for areas within their jurisdiction;
- require developers/builders to establish a *frost depth* for subdivision/site based on evidence that satisfies the *local authority* (subsurface investigation and professional analysis);
- require all foundations impacted by *frost depth* to be professionally designed (as opposed to designed by a competent person);
- use the simplified theoretical method (see below).

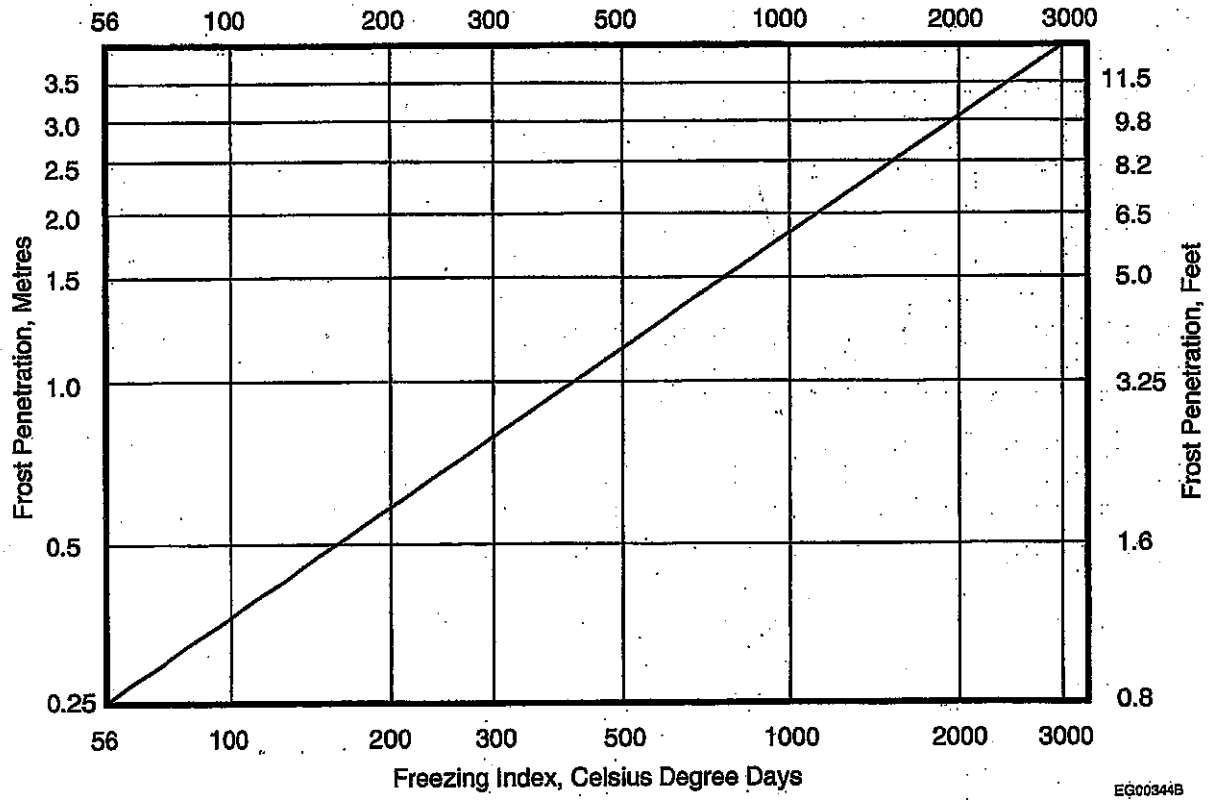
Simplified Theoretical Method

The simplified theoretical method estimates *frost depth*, using the relationship between *frost depth* and the freezing index to provide a quick estimate (See Figure B-1 below). This method is outlined in the "Illustrated User's Guide – NBC 2015 Part 9 of Division B Housing and Small Buildings". A more rigorous approach, the Modified Berggren Method, is included in the "Canadian Foundation Engineering Manual". The simplified theoretical method provides a more conservative *frost depth* estimate.

The freezing index is determined for the site by using climatic data sets. The freezing index is selected on the bottom axis of the chart and a straight line is extended vertically from that point to the relationship line. The value identified on the vertical axis where the relationship line intersects the freezing index provides the estimated *frost depth*.

Designers using this method should obtain data applicable to the *building* directly from climate data sets, based on an average of at least 10 years of *freezing degree-days* for a specific site. If information is not available for a specific site, information from nearby sites can be interpolated to provide an estimate for a *building* location. *Freezing degree-days* based on data for 1976-2005 are available from www.climateatlas.ca or data for 1981-2010 from www.climate.weather.gc.ca.

Figure B-1: Freezing Index versus Frost Depth



Source: NBC 2015 Part 9 of Division B Housing and Small Buildings Figure 9.12.-3

National Building Code of Canada Requirements Associated with Frost Depth

Basements should fulfill several functions including:

- providing structural support for the *building*;
- providing resistance to earth pressure; and,
- controlling heat loss.

In good soil conditions, the NBC minimum foundation depth requirements can perform well but when minimum requirements are used in poor soil conditions, failure of the foundations/basement system can occur. When soil conditions or construction materials go beyond these limits, the designer and builder need to take additional measures so that the foundation/basement meets minimum performance and functional requirements.

Key elements in foundation/basement system design and performance include:

- surface soil type and structure;
- subsurface soil type and structure;
- soil moisture conditions;
- soil moisture management;
- climate moisture and heat conditions;

whether the foundation contains heated or unheated space; and
foundation insulation effectiveness.

Foundations require *frost depth* to be determined when:

- a foundation contains no heated space and is located in:
  - coarse grained soil with poor soil drainage;
  - silt soil with good soil drainage;
  - silt soil with poor soil drainage;
  - clay soil with good soil drainage; or,
  - clay soil with poor soil drainage; or,
- a foundation contains heated space but is insulated in a manner that will reduce heat flow to the soil beneath the footings and foundation is not specifically designed for freezing.

A *local authority* may allow a foundation depth to be reduced from the minimum depth identified, based on:

- local knowledge;
- the soil type and drainage has no minimum depth requirement in the NBC; or,
- where the foundation is specifically designed to provide appropriate support to the *building* despite any soil movement resulting from freezing.

Foundation depth requirements may change if a foundation is insulated, depending on the design, soil type, and conditions at the site. Foundations in soils susceptible to *frost action* (i.e., silt or clays) must be treated as if the enclosed space is unheated for the purpose of minimum foundation depth. Foundation insulation requirements vary based on:

- depth;
- whether heated or unheated; and
- if heated, the heat is located in the wall or floor assembly.

Energy efficiency standards require:

- continuous insulation to minimize heat loss;
- uniformity over the entire area; and,
- conformance with requirements for air leakage and condensation control.

The requirement for insulation for assemblies in contact with the ground means that foundation floors and walls require minimum amounts of insulation. As a result, for most foundations, the junction between the bottom of the foundation wall, and the edge of the foundation floor require insulation. This limits the amount of heat flowing toward the ground beneath the footing and *frost depth* to the footing becomes significant where soils are susceptible to *frost action* (NBC Article 9.36.2.5.).

There are some provisions in the NBC exempting the foundation of a *building* from the requirements for continuous insulation under certain circumstances. These include the following:

- insulation around concrete slabs-on-ground (NBC Subsection 9.25.2.);
- continuity of insulation and *effective thermal resistance* of the overall assembly do not apply where interrupted:
  - between the insulation in the foundation wall and that of the floor slab; or,
  - by an integral perimeter footing of a slab-on-grade (NBC Article 9.36.2.5.);
- unheated floors-on-ground not required under the entire floor (NBC Article 9.36.2.8.); or
- slabs-on-ground with integral perimeter footing shall not be insulated under the integral footing (NBC Article 9.36.2.8.).

An important requirement for floors-on-ground with embedded heating is the requirement for insulation under their full bottom surface including their edges. This essentially eliminates any heat flow through the assembly to the ground below the footings. As a result, the foundation will need to be designed to extend below *frost depth* or to accommodate the results of frost action (NBC Article 9.36.2.8.).

Questions and Answers

1. Q. Is *frost depth* the same as frost action?

Frost depth and *frost action* are not the same. *Frost depth* is the distance, measured vertically, from the ground surface to the deepest point where the temperature in the soil drops below 0°C. *Frost action* is the effects on the soils and moisture when the soil temperature drops below 0°C.

2. Q. Is the *frost depth* established for a foundation the same as the *frost depth* used for placement of utility infrastructure (water, sewer or other pipes)?

The foundation depth established for a *building* foundation is not necessarily the same as the depth acceptable for placement of water filled pipes. Different factors may need to be considered in the determination of the two minimum depths.

3. Q. How is a foundation related to a basement?

A foundation provides structural support for the *building* and enables the loads applied to the *building* to be transferred to the ground. A foundation may also accommodate a basement. A basement encloses space to be used by the occupants of the *building*. A foundation/basement can be designed to accommodate both functions.

4. Q. What issues are encountered by foundation/basements?

When a foundation also accommodates a basement, successful performance of either can be a challenge as a basement and the foundation are generally located below ground. The basement and the foundation are in contact with soil that may be wet, dry, warm or frozen, in addition to being fine, coarse grained, stable or expansive. As a result, both basements and foundations are subjected to greater structural, water and moisture loads than the above grade portions of a small *building* or a *house*.

5. Q. How do the energy efficiency standards affect a foundation?

If the basement is a foundation, energy efficiency standards will require a heated basement to be insulated to reduce heat loss into the soil. Basements that are insulated must then be treated as unheated spaces with respect to *Code* requirements and this can change the minimum foundation depth and design.

6. Q. Does a basement need to be as deep as the *frost depth*?

The *frost depth* is used to determine the minimum depth of the foundation. The foundation is not necessarily the same as the basement and could have a different depth.

The minimum foundation depth (NBC Article 9.12.2.2.) is permitted to be decreased where:

- local experience with soil conditions shows that lesser depths are satisfactory, or
- where the foundation is designed for lesser depth.

7. Q. Are there ways to comply with foundation requirements other than making your foundation extend below *frost depth*?

Yes. *Frost depth* can be modified at the foundation location through the installation of insulation above and around the exterior of the footing or the foundation can be designed to resist the effects of *frost action*. These alternate solutions will require professional design.

8. Q. How does snow cover affect *frost depth*?

A continuous period of freezing before snow cover accumulates will result in a deeper *frost depth* than if snow accumulates before the extended period of cold. It is likely that over the period of the winter, these *frost depth*s will become similar if the site is located where there are areas without snow accumulation or that are cleared of snow. As a result, snow cover should not be relied upon to reduce the *frost depth* used to determine the minimum depth of a foundation.

9. Q. Does frost penetrate deeper in dense, fine-grained soil than in granular soil?

Frost depth is affected by a number of factors of which particle size is one. *Frost depth* does tend to be greater in granular soils, but fine-grained soils are more susceptible to *frost action* regardless of depth as a result of the ability to retain more moisture.

10. Q. Why is outdated information used in determining *frost depth*?

Updated data for freezing index is available for periods as recent as 1981 to 2010. Older data is more conservative and as a result a foundation will withstand more extreme conditions. The methodology for a quick estimate of *frost depth* has not been updated; however, detailed analysis methods have been updated and can be used if the foundation is professionally designed.

11. Q. Do energy efficiency requirements require the foundation/basement be deeper in order to avoid insulation?

No. The purpose of energy efficiency requirements is to reduce the consumption of energy for a *building*. These requirements establish the need for foundation insulation but do not require a foundation to be built deeper. Foundation depth can be reduced from the specified minimum through design decisions.

12. Q. Is there any Saskatchewan-based data that indicates *frost depth* around insulated foundations?

Yes. Saskatchewan was the location of research conducted by the National Research Council of Canada documented in reports NRCC 29118 'Measured soil conductivities and modified design curves for prediction of frost penetration adjacent to insulated foundations' and NRCC 24364 'The effect of basement insulation on the depth of frost penetration adjacent to insulated foundations'. The reports concluded that highly insulated foundations need to be treated as if they we unheated spaces for the purposes of minimum foundation depth.

13. Q. Why and what are the differences between the requirements of NBC Section 9.12. and NBC Section 9.36.?

The objectives of NBC Section 9.12. relate to the structural sufficiency of the *building* to ensure the *building* can withstand the loads applied to it, transfer those loads to the ground and function as designed without occupants risking injury or the *owner* experiencing structural loss.

The objectives of NBC Section 9.36. are to limit the probability of harm to the environment due to excessive use of energy as a result of the design and construction of *building*s.

14. Q. How does in-wall or in-floor heating change foundation/basement insulation requirements?

In-wall or in-floor heating requires insulation under the entire slab to reduce heat loss if using the prescriptive path for energy efficiency compliance. The performance path for energy efficiency compliance allows flexibility in how overall energy performance is achieved and may allow for elimination of this insulation by improving the energy performance of other *building* components.

15. Q. What soils are most susceptible to *frost action*?

Silt and fine sand are the soils most susceptible to *frost action*. This is because the void spaces between soil particles in these soils is small enough to prevent good drainage, yet large enough to allow relatively free movement of water. This creates the perfect conditions for the formation of "ice lenses" within the soil that are typically the cause of the most severe cases of *frost action*. Clay soils usually restrict the movement of water to the point where ice lenses cannot easily develop and are therefore considered slightly less susceptible to *frost action*. Well-draining granular soils are considered the least susceptible to *frost action*. *Frost action* can occur in any type of soil under the right conditions.

16. Q. How does moisture affect *frost depth* and *frost action*?

Frost depth will generally decrease as moisture increases, since the ice in the upper layers will insulate the layers below. The higher the moisture content of the soil, the more expansion will occur as the moisture freezes.

17. Q. What is the relative depth of frost line around a foundation that is heated versus a foundation that is unheated?

The frost line around an unheated or highly insulated foundation is deeper than it is around a heated foundation.

Appendix C – National Building Code Section 9.36. Energy Compliance Sample Documents

LOGO	BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION FRAMEWORK GUIDE ENERGY EFFICIENCY PROVISIONS FOR BUILDINGS

BUILDING PERMIT, DEVELOPMENT PERMIT, AND CONSTRUCTION REQUIREMENTS FOR ENERGY REQUIREMENTS IN BUILDINGS

BUILDING PERMIT SUBMISSION REQUIREMENTS

PRESCRIPTIVE		TRADE-OFF		PERFORMANCE	
NBC SECTION 9.36.	**NECB**	**NBC SECTION 9.36.**	**NECB**	**NBC SECTION 9.36.**	**NECB**
• 9.36. ENERGY COMPLIANCE FORM • PRESCRIPTIVE CALCULATIONS	• PROJECT SUMMARY FORM • PRESCRIPTIVE REPORT • LETTER OF COMMITMENT FOR FIELD REVIEW (PARTS 3-7)	• 9.36. ENERGY COMPLIANCE FORM • TRADE-OFF CALCULATIONS	• PROJECT SUMMARY FORM • PRESCRIPTIVE REPORT (FOR APPLICABLE PARTS) • TRADE-OFF REPORT • SEALED TRADE-OFF CALCULATIONS • LETTER OF COMMITMENT FOR FIELD REVIEW (PARTS 3-7)	• 9.36. ENERGY COMPLIANCE FORM • ENERGY MODEL SUMMARY REPORT	• PROJECT SUMMARY FORM • PERFORMANCE REPORT • DESIGNER SEALED ENERGY MODEL REPORT • LETTER OF COMMITMENT FOR FIELD REVIEW (PARTS 3-7 AND PART 8) ENERGY MODE REPORT
HARD COPY DRAWINGS SETS — SEE DRAWING REQUIREMENTS FOR ALL PROJECT TYPES					

CONSTRUCTION AND INSPECTION REQUIREMENTS

PRESCRIPTIVE		TRADE-OFF		PERFORMANCE	
NBC SECTION 9.36.	**NECB**	**NBC SECTION 9.36.**	**NECB**	**NBC SECTION 9.36.**	**NECB**
• REVIEW OF CONSTRUCTION UNDER THE AHJ INSPECTION SATES: MAY INCLUDE FOOTING, FOUNDATION, PRE-BACKFILL, FRAMING & FINAL	• REVIEW OF CONSTRUCTION UNDER CURRENT INSPECTION PROGRAM • LETTER OF ASSURANCE OF FILED REVIEW (PARTS 3-7)	• REVIEW OF CONSTRUCTION UNDER THE AHJ INSPECTION STAGES: MAY INCLUDE FOOTING, FOUNDATION, PRE-BACKFILL, FRAMING & FINAL	• REVIEW OF CONSTRUCTION UNDER CURRENT INSPECTION PROGRAM • LETTER OF ASSURANCE OF FILED REVIEW (PARTS 3-7)	• REVIEW OF CONSTRUCTION UNDER THE AHJ INSPECTION STAGES: MAY INCLUDE FOOTING, FOUNDATION, PRE-BACKFILL, FRAMING & FINAL	• REVIEW OF CONSTRUCTION UNDER CURRENT INSPECTION PROGRAM • LETTER OF ASSURANCE OF FILED REVIEW (PARTS 3-7 AND PART 8)

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36.
ENERGY EFFICIENCY COMPLIANCE FORM

Application

The National Building Code 2015 Section 9.36., as per Article 9.36.1.3., applies to the design and construction of all new buildings and additions including:

- buildings of residential occupancy to which Part 9 applies;
- buildings containing business and personal services, mercantile or low hazard industrial occupancies to which Part 9 applies to whose combined floor area does not exceed 300 m^2, excluding parking garages serving residential occupancies; and,
- buildings containing any mixture of the above two.

Energy Performance compliance applies only to:

- houses with or without a secondary suite; and,
- buildings containing only dwelling units and common spaces whose floor area does not exceed 20% of the floor area of the building.

Notes

Section 9.36. of the NBC does not apply to major alterations unless required by a local authority. This form provides the requirements for new buildings and additions. In addition, for buildings or additions built after January 1, 2019, that are designed and constructed to comply with NBC Section 9.36. the owner must mention compliance for all future alterations. Contact the authority having jurisdiction to determine if requirements will apply for a specific major alteration project.

Definitions

Competent person means a person, firm, or corporation, acceptable to the local authority, who is knowledgeable and experienced in the application of the National Building Code Section 9.36. for the design of buildings and/or building systems.

Ground oriented dwelling units includes:

- traditional individual detached houses with or without a secondary suite;
- semi-detached houses or duplexes (doubles) where each house may contain a secondary suite;
- row houses without secondary suites; and,
- row houses with secondary suites where firewalls are constructed in accordance with NBC Sentence 9.10.11.2.(1).

This means construction and footprint of the base building. The term does not apply to stacked dwelling units or multiple unit residential buildings other than those specifically mentioned above.

Other project types means any project not related to ground-oriented dwelling units.
This includes the entire base building and any interior construction completed for occupancy (owned or tenant improvements).

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36.
ENERGY EFFICIENCY COMPLIANCE FORM

This form clarifies the design direction chosen for new buildings and additions to comply with NBC Section 9.36.

All calculations are required to be completed by a competent person (or design professional if NECB used for design) and attached to this form to be accepted for review.

Section A: Prescriptive

Project Information	
_____ Project Address	_____ BPA Number (Office use only)

Occupancy Class: _____ **Floor Area (m^2):** _____ **Climate Zone:** _____

Design Option: (select one)

☐ Prescriptive (See Section A) ☐ Trade-Off (See Section B) ☐ Performance (See Section C)

Floor area means the space on any storey of a building between the exterior walls and required fire walls, including the space occupied by interior walls and partitions, but not including exits. Vertical service spaces, and their enclosing assemblies.

HRV / ERV: Yes ☐ No ☐

Conversions:	
R = 5.678 x RSI	**U = 1 / RSI**

Effective Thermal Resistance of Above Ground Opaque Building Assemblies (RSI)				
Assembly	**w/ HRV**	**w/o HRV**	**Proposed**	**Office Use**
Ceilings below attics				
Cathedral / Flat roofs				
Walls & Rim joists				
Floors over unheated spaces				
Floors over garage				
Thermal Characteristics of Fenestration, Doors and Skylights (U)				
Assembly	**Efficiency**		**Proposed**	**Office Use**
Windows & Doors	Maximum U-Value = or Minimum Energy Rating ≥			
One door exception	Maximum U-Value =			
Attic hatch	Minimum RSI =			
Skylights	Maximum U-Value =			
Effective Thermal Resistance of Below-Grade or In-Contact-With-Ground Opaque Buildings Assemblies (RSI)				
Assembly	**w/ HRV**	**w/o HRV**	**Proposed**	**Office Use**
Foundation Walls				
Slab On Grade With Integral Footing				
Unheated floors:				
Below Frost Line	uninsulated	uninsulated		
Above Frost Line				
Heated Floors				

Calculations of RSI_{eff} for the above assemblies are required to be submitted.

HVAC Equipment Performance Requirements					
Equipment	**Capacity KW**	**Standard**	**Min. Efficiency**	**Proposed**	**Office Use**
Gas Fired Furnace w or w/o A/C	≤ 65.9	CSA P.2	AFUE ≥ 92%		
	> 65.9 & ≤ 117.23	CAN/CSA-P.8	E_t ≥ 78.5%		
Electric Boiler	≤ 88	(1)			
Gas Fired Boiler	≤ 88	CSA P.2	AFUE ≥ 90%		
	> 88 & ≤ 117.23	AHRI BTS	E_t ≥ 83%		
Other					
Heat Loss / Gain Calculations	Calculations were prepared in conformance with CSA F280 No			Yes / No BTU:	
Nomenclature	**AFUE**= annual fuel utilization efficiency, **E_t** = thermal efficiency				

Water Heaters Performance Requirements					
Equipment	**Capacity KW**	**Standard**	**Min. Efficiency**	**Proposed**	**Office Use**
Tank Storage Electric	≤ 12 kW (50 L to 270 L capacity)	CAN/CSA-C191	SL ≤ 35 + 0.20V (top inlet)		
			SL ≤ 40 + 0.20V (bottom inlet)		
	≤ 12 kW (> 270 L and ≤ 454 L capacity)		SL ≤ (0.472V) - 38.5 (top inlet)		
			SL ≤ (0.472V) - 33.5 (bottom inlet)		
	> 12 kW (> 75 L capacity)	ANSI Z21.10.3/CSA 4.3 & DOE 10 CFR, Part 431, Subpart G	$S = 0.30 + 27 / V_m$		
Tank Storage Gas Fired	< 22 kW	CAN/CSA-P.3	EF ≥ 0.67 — 0.0005V		
	≥ 22 kW	ANSI Z21.10.3/CSA 4.3	E_t ≥ 80% and standby loss≤rated Input/(800 + 16.57)(√V)		
Tankless Gas Fired	≤ 73.2 kW	CAN/CSA-P.7	EF ≥ 0.8		
	> 73.2 kW	ANSI Z21.10.3/CSA 4.3 and DOE 10 CFR, Part 43l, Subpart G	E_t ≥ 80%		
Tankless Electric	No standard addresses the performance efficiency; however, their efficiency typically approaches 100%				
Other					
Nomenclature	**EF** = energy factor in %/h, **E_t** = thermal efficiency **S** = standby loss in %h, **SL** = standby loss in W, **V**= volume **V_m** = measured storage volume in US gallons				

(1) Must be equipped with automatic water temperature control. No standard addresses the performance efficiency; however, their efficiency typically approaches 100%.

Section B: Trade Off

To be completed and submitted for review by a competent person

□ Opaque to opaque – One or more above-ground opaque building envelope assemblies are permitted to be less than required, provided one or more above-ground opaque building envelope assemblies are increased to more than required.

- Walls and joist type roofs must maintain minimum 55% of the required RSI_{eff}
- All other assemblies must be minimum 60% of the required RSI_{eff}
- The sum of the areas of all traded assemblies divided by their RSI_{eff} must be less than or equal to what it would have been if all assemblies had met 9.36.2.6.

□ Transparent to transparent – One or more windows are permitted to be less than required, provided one or more windows are increased to be more than required.

- The traded windows must have the same orientation.
- The sum of the areas of all traded windows divided by their RSI_{eff} must be less than or equal to what it would have been if all windows had met 9.36.2.7.

□ Opaque to transparent – This option is meant to allow reduced insulation for factory-constructed buildings with a low floor to ceiling height and a fenestration and door area to gross wall area ratio of 15% or less.

All calculations are required to be attached to this form to be considered complete and be accepted for review. The location and extent of assemblies used in the calculation shall be clearly identified on the drawings by hatch.

Section C: Performance

This option is available only to houses with or without secondary suites, and buildings that contain only dwelling units with common spaces that are less than 20% of the building's total floor area.

To be completed and submitted for review by a competent person*

Input parameters		**Reference Model**	**Proposed Model**
Airtightness (air exchanges per hour @ 50 Pa)			
Thermal mass (MJ/m^2 ^oC)			
Ventilation rate (l/s)			
HRV Efficiency			
Fenestration and door to wall ratio (FDWR) – reference (%)			
Direction of front elevation (clearly circle one)			N NE E SE S SW W NW
Area of windows and doors	Front elevation (m^2)		
	Rear elevation (m^2)		
	Left elevation (m^2)		
	Right elevation (m^2)		
	Total area of windows (m^2)		
	Total area of opaque doors (m^2)		
Energy use (GJ)			
Software title		**Version**	
Is software Hot 2000 v15 or ANSI/ASHRAE 140 compliant?		Yes / No	

Declaration
I hereby certify that the calculations submitted were prepared in full accordance with NBC 2015 Subsection 9.36.5. or EnerGuide Rating System and the operation procedures of the software**.**
_____ Print Name
_____ _____ Business Name Address
_____ _____ Email Phone Number
_____ _____ Signature Date

The full modelling report generated by Hot 2000 v15 or an ANSI/ASHRAE 140 compliant software package is required to be submitted.

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BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36.
ENERGY EFFICIENCY COMPLIANCE INFORMATION

Application

The National Building Code 2015 Section 9.36., as per Article 9.36.1.3., applies to the design and construction of all new buildings and additions including:

- buildings of residential occupancy to which Part 9 applies;
- buildings containing business and personal services, mercantile or low hazard industrial occupancies to which Part 9 applies to whose combined floor area does not exceed 300 m^2, excluding parking garages serving residential occupancies; and,
- buildings containing any mixture of the above two.

Energy Performance compliance applies only to:

- houses with or without a secondary suite; and,
- buildings containing only dwelling units and common spaces whose floor area does not exceed 20% of the floor area of the building.

Notes

Section 9.36. of the NBC does not apply to major alterations unless required by a local authority. This form provides the requirements for new buildings and additions. In addition, for buildings or additions built after January 1, 2019, that are designed and constructed to comply with NBC Section 9.36. the owner must mention compliance for all future alterations. Contact the authority having jurisdiction to determine if requirements will apply for a specific major alteration project.

Definitions

Competent person means a person, firm, or corporation, acceptable to the local authority, who is knowledgeable and experienced in the application of the National Building Code Section 9.36. for the design of buildings and/or building systems.

Ground oriented dwelling units includes:

- traditional individual detached houses with or without a secondary suite;
- semi-detached houses or duplexes (doubles) where each house may contain a secondary suite;
- row houses without secondary suites; and,
- row houses with secondary suites where firewalls are constructed in accordance with NBC Sentence 9.10.11.2.(1).

This means construction and footprint of the base building. The term does not apply to stacked dwelling units or multiple unit residential buildings other than those specifically mentioned above.

Other project types means any project not related to ground-oriented dwelling units.
This includes the entire base building and any interior construction completed for occupancy (owned or tenant improvements).

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36. ENERGY EFFICIENCY COMPLIANCE FORM
PRESCRIPTIVE PATH

This form clarifies the design direction chosen for new buildings and additions to comply with NBC Section 9.36.

All calculations are required to be completed by a competent person (or design professional if NECB used for design) and attached to this form to be accepted for review.

Section A: Prescriptive

Project Information	
_____ Project Address	_____ BPA Number (Office use only)

Occupancy Class: _____ **Floor Area (m^2):** _____ **Climate Zone:** _____

Design Option: (select one)

☐ Prescriptive (See Section A) ☐ Trade-Off (See Section B) ☐ Performance (See Section C)

Floor area means the space on any storey of a building between the exterior walls and required fire walls, including the space occupied by
interior walls and partitions, but not including exits. Vertical service spaces, and their enclosing assemblies.

HRV / ERV: Yes ☐ No ☐

Conversions:	
R = 5.678 x RSI	**U = 1 / RSI**

Effective Thermal Resistance of Above Ground Opaque Building Assemblies (RSI)				
Assembly	**w/ HRV**	**w/o HRV**	**Proposed**	**Office Use**
Ceilings below attics				
Cathedral / Flat roofs				
Walls & Rim joists				
Floors over unheated spaces				
Floors over garage				
Thermal Characteristics of Fenestration, Doors and Skylights (U)				
Assembly	**Efficiency**		**Proposed**	**Office Use**
Windows & Doors	Maximum U-Value = or Minimum Energy Rating ≥			
One door exception	Maximum U-Value =			
Attic hatch	Minimum RSI =			
Skylights	Maximum U-Value =			
Effective Thermal Resistance of Below-Grade or In-Contact-With-Ground Opaque Buildings Assemblies (RSI)				
Assembly	**w/ HRV**	**w/o HRV**	**Proposed**	**Office Use**
Foundation Walls				
Slab On Grade With Integral Footing				
Unheated floors:				
Below Frost Line	uninsulated	uninsulated		
Above Frost Line				
Heated Floors				

Calculations of RSI_{eff} for the above assemblies are required to be submitted.

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36. ENERGY EFFICIENCY COMPLIANCE FORM
PRESCRIPTIVE PATH

HVAC Equipment Performance Requirements					
Equipment	**Capacity KW**	**Standard**	**Min. Efficiency**	**Proposed**	**Office Use**
Gas Fired Furnace w or w/o A/C	≤ 65.9	CSA P.2	AFUE ≥ 92%		
	> 65.9 & ≤ 117.23	CAN/CSA-P.8	E_t ≥ 78.5%		
Electric Boiler	≤ 88	(1)			
Gas Fired Boiler	≤ 88	CSA P.2	AFUE ≥ 90%		
	> 88 & ≤ 117.23	AHRI BTS	E_t ≥ 83%		
Other					
Heat Loss / Gain Calculations	Calculations were prepared in conformance with CSA F280			Yes / No BTU:	
Nomenclature	**AFUE**= annual fuel utilization efficiency, **E_t** = thermal efficiency				

Water Heaters Performance Requirements					
Equipment	**Capacity KW**	**Standard**	**Min. Efficiency**	**Proposed**	**Office Use**
Tank Storage Electric	≤ 12 kW (50 L to 270 L capacity)	CAN/CSA-C191	SL ≤ 35 + 0.20V (top inlet)		
			SL ≤ 40 + 0.20V (bottom inlet)		
	≤ 12 kW (> 270 L and ≤ 454 L capacity)		SL ≤ (0.472V) - 38.5 (top inlet)		
			SL ≤ (0.472V) - 33.5 (bottom inlet)		
	> 12 kW (> 75 L capacity)	ANSI Z21.10.3/CSA 4.3 & DOE 10 CFR, Part 431, Subpart G	S = 0.30 + 27 / V_m		
Tank Storage Gas Fired	< 22 kW	CAN/CSA-P.3	EF ≥ 0.67 — 0.0005V		
	≥ 22 kW	ANSI Z21.10.3/CSA 4.3	E_t ≥ 80% and standby loss≤rated Input/(800 + 16.57)(√V)		
Tankless Gas Fired	≤ 73.2 kW	CAN/CSA-P.7	EF ≥ 0.8		
	> 73.2 kW	ANSI Z21.10.3/CSA 4.3 and DOE 10 CFR, Part 43l, Subpart G	E_t ≥ 80%		
Tankless Electric	No standard addresses the performance efficiency; however, their efficiency typically approaches 100%				
Other					
Nomenclature	**EF** = energy factor in %/h, **E_t** = thermal efficiency **S** = standby loss in %h, **SL** = standby loss in W, **V**= volume **V_m** = measured storage volume in US gallons				

(1) Must be equipped with automatic water temperature control. No standard addresses the performance efficiency; however, their efficiency typically approaches 100%.

Declaration

I hereby certify that the calculations submitted were prepared in full accordance with Section 9.36.

_____
Print Name

_____ _____
Signature Date

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36. ENERGY EFFICIENCY COMPLIANCE FORM
TRADE-OFF PATH

Project Information

Address: _____ _____ BPA Number (Office use only)

Occupancy Class: _____ Floor Area (m^2): _____ Climate Zone: 7A

Note: In addition to the submission of trade-off calculations, the prescriptive form shall be completed and submitted.

Applies to the design and construction of all *buildings* and *additions* including:

- *Buildings* of *residential occupancy* to which Part 9 applies;
- *Buildings* containing *business and personal services, mercantile or low hazard industrial* occupancies to which Part 9 applies to whose combined floor area does not exceed 300 m^2, excluding parking garages serving residential occupancies.;
- *Buildings* containing any mixture of the above two; and
- *Additions* where the total gross floor area of the proposed addition(s) is more than 10m^2.

Form to be completed by a *competent person*
Competent person is defined as a person who is familiar and fluent with building design under Section 9.36. of the NBC and acceptable to the Authority Having Jurisdiction.

Trade Off

Please check off all that apply.

☐ Opaque to opaque – One or more above-ground opaque building envelope assemblies are permitted to be less than required, provided one or more above-ground opaque building envelope assemblies are increased to more than required.
- Walls and joist type roofs must maintain minimum 55% of the required RSI_{eff}
- All other assemblies must be minimum 60% of the required RSI_{eff}
- The sum of the areas of all traded assemblies divided by their RSI_{eff} must be less than or equal to what it would have been if all assemblies had met 9.36.2.6

☐ Transparent to transparent – One or more windows are permitted to be less than required, provided one or more windows are increased to be more than required.
- The traded windows must have the same orientation.
- The sum of the areas of all traded windows divided by their RSI_{eff} must be less than or equal to what it would have been if all windows had met 9.36.2.7

☐ Opaque to transparent – This option is meant to allow reduced insulation for factory-constructed buildings with a low floor to ceiling height and a fenestration and door area to gross wall area ratio of 15% or less.

All calculations are required to be attached to this form to be considered complete and be accepted for review. The location and extent of assemblies used in the calculation shall be clearly identified on the drawings by hatch.

Declaration

I hereby certify that the calculations submitted were prepared in full accordance with Section 9.36.

_____
Print Name

_____ _____
Signature Date

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36. ENERGY EFFICIENCY COMPLIANCE FORM
PERFORMANCE PATH

Project Information

Address: _____ _____ BPA Number (Office use only)

Occupancy Class: _____ Floor Area (m^2): _____ Climate Zone: _____

Energy performance compliance applies only to:

- Houses with or without a secondary suite;
- Buildings containing only dwelling units and common spaces whose floor area does not exceed 20% of the floor area of the building; and
- Additions where the total gross floor area of the proposed addition(s) is less than $10m^2$

Form to be completed by a *competent person*

Competent person means a person, firm, or corporation, acceptable to the *local authority*, who is knowledgeable and experienced in the application of the National Building Code Section 9.36. for the design of *buildings* and/or *building* systems.

*****The full modelling report generated by an ANSI/ASHRAE 140 compliant software package or Hot 2000 software is required to be submitted.**

Input parameters		Reference Model	Proposed Model
Airtightness (air exchanges per hour @ 50 Pa)			
Thermal mass ($MJ/m^2 \bullet °C$)			
Ventilation rate (l/s)			
HRV Efficiency			
Gross wall area of above grade walls			
Fenestration and door to wall ratio (FDWR) – reference (%)			
Direction of front elevation (clearly indicate one)		☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW	
Area of windows and doors	Front elevation (m^2)		
	Rear elevation (m^2)		
	Left elevation (m^2)		
	Right elevation (m^2)		
	Total area of windows (m^2)		
	Total area of opaque doors (m^2)		
Energy use (GJ)			

Software Information

Software title		**Version**	
Is software Hot2000 or ANSI/ASHRAE 140 compliant?	☐ Yes	☐ No	
Is the Hot2000 program in general mode or ERS mode?	☐ General	☐ ERS	☐ N/A
Confirm that the proposed house is at least 5% more efficient than the reference house when ERS mode is used in Hot2000 software	☐ Yes	☐ No	☐ N/A

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36. ENERGY EFFICIENCY COMPLIANCE FORM
PERFORMANCE PATH

Declaration

*I hereby certify that the calculations submitted were prepared in full accordance with Subsection 9.36.5. of the 2015 NBC or the EnerGuide Rating System and the operation procedures of the software***.**

_____

Print Name

_____ _____

Business Name Address

_____ _____

Email Phone Number

_____ _____

Signature Date

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36.
ENERGY EFFICIENCY INSPECTION CHECKLIST

Project Information

_____ _____
Project Address **Permit No.**

Path: ☐ Prescriptive ☐ Trade-off ☐ Performance

NC = NOT COMPLETE / NA = NOT APPLICABLE / D/A = DEFICIENCY / ACTION REQ'D

	ITEM	OK	NC	NA	D/A	NOTES
FRAMING	Wall Assembly	☐	☐	☐	☐	☐ 2x6 ☐ Staggered studs ☐ Double wall ☐ Exterior Insulation ☐ Other: ☐ As per Design
	Windows & Doors	☐	☐	☐	☐	☐ Labels observed ☐ Specs on hand ☐ As per Design

	ITEM	OK	NC	NA	D/A	NOTES
INSULATION	Batt Insulation	☐	☐	☐	☐	☐ R_____ ☐ Stamp / Label observed ☐ As per Design
	Spray Foam	☐	☐	☐	☐	☐ Thickness checks ☐ Tech Data Form on hand ☐ Tech Label observed ☐ As per Design
	Exterior Foam	☐	☐	☐	☐	☐ Thickness checks ☐ Tech Data on hand ☐ As per Design
	* Attic Space Insulation	☐	☐	☐	☐	☐ None (at time of inspection) ☐ Cottage / corner batts ☐ Batts @ non-blow-in locations
	* NOTE: Attic space insulation is observation only; full inspection may not be provided.					
	Attic Insulation Stops	☐	☐	☐	☐	
	** Below-slab Insulation	☐	☐	☐	☐	☐ None (at time of inspection) ☐ Rigid insulation observed
	** NOTE: Below-slab insulation is observation only and may not be seen; full inspection not provided.					

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BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NBC SECTION 9.36.
ENERGY EFFICIENCY INSPECTION CHECKLIST

FINAL

NOTE – the Final Inspection will not be conducted if the following items have not been completed / submitted:

☐ Ventilation verification label / form
☐ Performance modelling report (if required)
☐ Spray foam data
☐ Program labelling (if required)
☐ Letter of Assurance
☐ Other required documentation

ITEM	OK	NC	NA	D/A	NOTES
Ventilation System	☐	☐	☐	☐	☐ HRV ☐ In-line fans ☐ Other ☐ As per Design
Controls	☐	☐	☐	☐	☐ Central Control interconnected with supply-air ☐ Controls in bathrooms / kitchen ☐ As per Design
Intakes	☐	☐	☐	☐	☐ Bathrooms ☐ Kitchen ☐ As per Design
Make-up Air	☐	☐	☐	☐	☐ Connected to Return-air ☐ Direct fresh-air ☐ As per Design

Appendix D – National Building Code Section 9.36. Performance Assessment Tools

Good engineering practice relies upon *competent persons* or design professionals, using analytical tools, to assess the energy efficiency performance of components of the *building* and to ensure compliance with minimum standards. These analytical tools frequently include computer software for detailed analysis of the performance of specific components of a *building.*

Documentation from the analysis needs to be made available to the *appropriate local authority* and an assurance that the design meets the requirements of the applicable energy *code* for that *building.* While the *appropriate local authority* and its building official may question the extent of the analysis, the choice of software to perform an analysis is considered part of the design. A *local authority* may discuss design choices with the *designer* to ensure compliance but the *local authority* shall not get involved in the actual design as stated in the UBAS Regulations
subsection 9(1).

A *designer* is responsible for selecting tools that are appropriate for the project type and location, often using software to undertake the energy performance analysis. A *competent person* can be used to perform the analysis of the *building* component or the whole *building's* energy performance in comparison to the requirements of the National Building Code Section
9.36. (NBC Section 9.36.) and to provide assurance that the proposed design meets or exceeds the requirements.

Energy Rating Systems

Energy rating systems assess the performance of a *building* against a predetermined set of criteria, including software tools that have been developed based on Canadian energy efficiency standards. In general terms, the assessment process compares the minimum *code* requirements/performance against the performance of design specifications of the proposed *building*. The result is a report providing the performance comparison of the minimum criteria against the proposed *building*.

Natural Resources Canada has developed the EnerGuide Rating System (ERS) for assessing energy efficiency requirements of low-rise housing. This energy modeling simulation and design tool is known as HOT2000 Version 15.1. which allows the user to select a modelling option of either NBC Section 9.36. or the ERS. This system provides home *owners* and builders with information on the energy performance of their home and could be used to demonstrate to the *appropriate local authority* as deemed compliant or as an alternative solution. The *appropriate local authority* would still be required to inspect the home for compliance with the design.

Although the occupant loads for NBC Section 9.36. differ slightly from the ERS, extensive use of the ERS has demonstrated that the results are within approximately 5 per cent of the prescriptive *code* requirements. A *local authority* can accept the ERS v.15.1 is as deemed compliant subject to the following conditions:

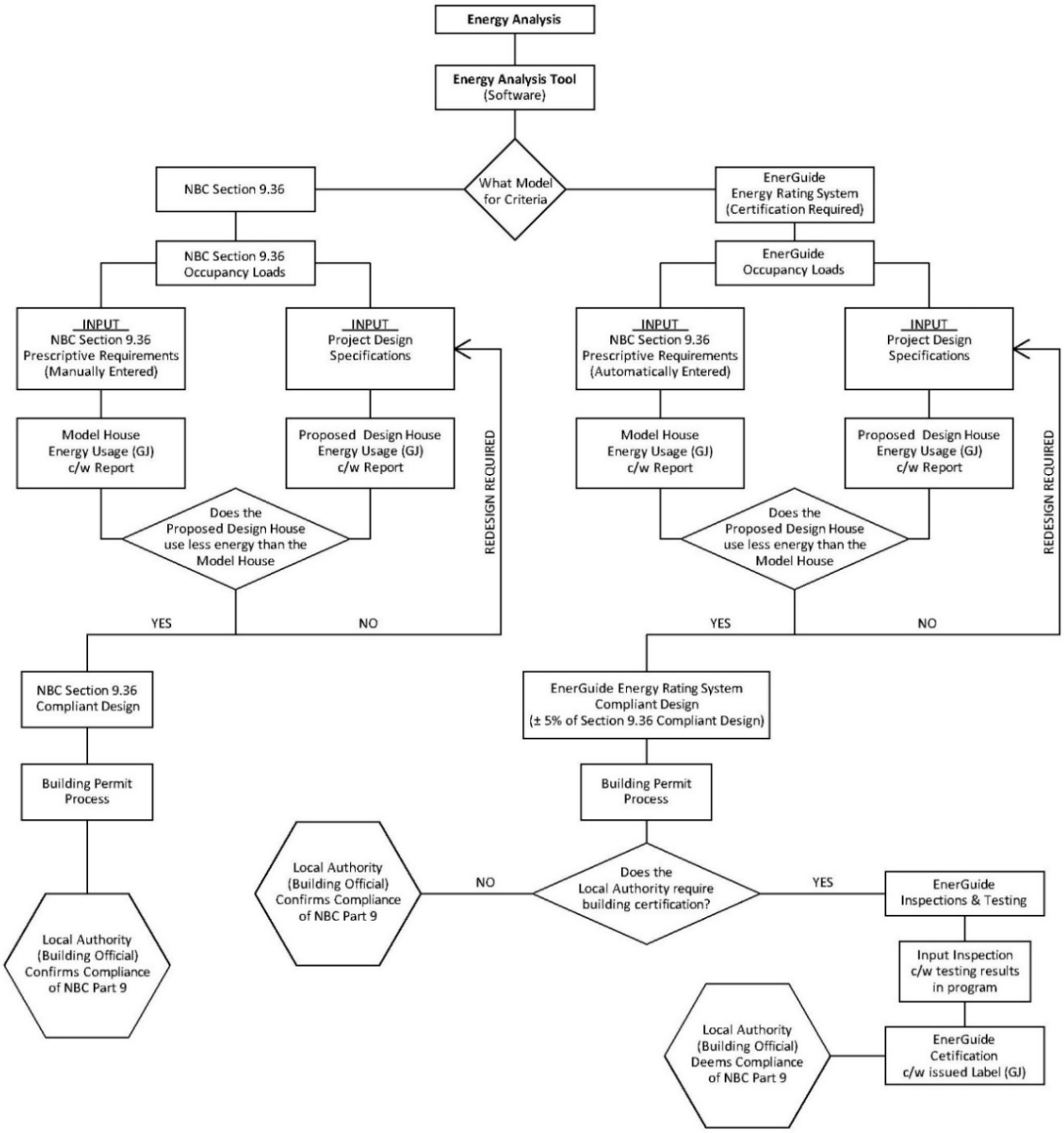
1. Annual energy savings of ≥ 5 per cent over the ERS v.15.1 reference case as indicated by the ERS analysis report (Homeowner Information Sheet).
2. Applies only to single detached *houses*, semi-detached *houses*, row *houses*, and *houses* with secondary suites (Does not apply to stacked units or joined units by a *common space*).
3. Annual energy saving calculations are based on Rated Annual Energy Consumption and excludes any on-site renewable energy contribution.
4. Reduction in process/plug loads is not permitted in modeling.

All associated documentation from ERS modelling should become part of the *appropriate local authority's building* permit file for the home.

If chosen by an owner, the ERS process of evaluating a home could extend into a certification of the home through the certification program process, which can be utilized by a *local authority* as a deemed compliance path. If the certification program includes inspections to verify the energy efficiency components of the *building* a *local authority* could accept the inspections instead of conducting their own.

The graphic on the following page (See Figure D1) provides a summary of the steps in the performance assessment process if the ERS or similar tool are used for a home.

Figure D1: Performance Assessment Process



Appendix E – National Energy Code for Building Energy Sample Documents

LOGO	BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION FRAMEWORK GUIDE ENERGY EFFICIENCY PROVISIONS FOR BUILDINGS

BUILDING PERMIT, DEVELOPMENT PERMIT, AND CONSTRUCTION REQUIREMENTS FOR ENERGY REQUIREMENTS IN BUILDINGS

BUILDING PERMIT SUBMISSION REQUIREMENTS

PRESCRIPTIVE		TRADE-OFF		PERFORMANCE	
NBC SECTION 9.36.	**NECB**	**NBC SECTION 9.36.**	**NECB**	**NBC SECTION 9.36.**	**NECB**
• 9.36. ENERGY COMPLIANCE FORM • PRESCRIPTIVE CALCULATIONS	• PROJECT SUMMARY FORM • PRESCRIPTIVE REPORT • LETTER OF COMMITMENT FOR FIELD REVIEW (PARTS 3-7)	• 9.36. ENERGY COMPLIANCE FORM • TRADE-OFF CALCULATIONS	• PROJECT SUMMARY FORM • PRESCRIPTIVE REPORT (FOR APPLICABLE PARTS) • TRADE-OFF REPORT • SEALED TRADE-OFF CALCULATIONS • LETTER OF COMMITMENT FOR FIELD REVIEW (PARTS 3-7)	• 9.36. ENERGY COMPLIANCE FORM • ENERGY MODEL SUMMARY REPORT	• PROJECT SUMMARY FORM • PERFORMANCE REPORT • DESIGNER SEALED ENERGY MODEL REPORT • LETTER OF COMMITMENT FOR FIELD REVIEW (PARTS 3-7 AND PART 8) ENERGY MODE REPORT
HARD COPY DRAWINGS SETS — SEE DRAWING REQUIREMENTS FOR ALL PROJECT TYPES					

CONSTRUCTION AND INSPECTION REQUIREMENTS

PRESCRIPTIVE		TRADE-OFF		PERFORMANCE	
NBC SECTION 9.36.	**NECB**	**NBC SECTION 9.36.**	**NECB**	**NBC SECTION 9.36.**	**NECB**
• REVIEW OF CONSTRUCTION UNDER THE AHJ INSPECTION SATES: MAY INCLUDE FOOTING, FOUNDATION, PRE-BACKFILL, FRAMING & FINAL	• REVIEW OF CONSTRUCTION UNDER CURRENT INSPECTION PROGRAM • LETTER OF ASSURANCE OF FILED REVIEW (PARTS 3-7)	• REVIEW OF CONSTRUCTION UNDER THE AHJ INSPECTION STAGES: MAY INCLUDE FOOTING, FOUNDATION, PRE-BACKFILL, FRAMING & FINAL	• REVIEW OF CONSTRUCTION UNDER CURRENT INSPECTION PROGRAM • LETTER OF ASSURANCE OF FILED REVIEW (PARTS 3-7)	• REVIEW OF CONSTRUCTION UNDER THE AHJ INSPECTION STAGES: MAY INCLUDE FOOTING, FOUNDATION, PRE-BACKFILL, FRAMING & FINAL	• REVIEW OF CONSTRUCTION UNDER CURRENT INSPECTION PROGRAM • LETTER OF ASSURANCE OF FILED REVIEW (PARTS 3-7 AND PART 8)

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
COMPLIANCE INFORMATION

Application

As of January 1, 2019, the National Energy Code for Buildings (NECB) 2017 Edition is enforced within Saskatchewan. Please refer to Framework Guide for submission requirements.
As per NECB 2017 Division A, Article 1.1.1.1., the Code applies to the design and construction of all *new buildings* and *additions* including:

- Buildings classified under Part 3 of the National Building Code (NBC)
- Buildings classified under Part 9 of the NBC containing non-residential occupancies whose combined floor area exceeds 300 m^2 or medium-hazard industrial occupancies (F2)
- Any building to which NBC Section 9.36. applies but the owner/applicant proposed to design and construct to the NECB.

Notes

The NECB does not apply to *major alterations* unless required by a local authority and *additions*. This form provides for the requirements for *new buildings* and *additions.* For buildings or additions built after January 1, 2019, that are designed and constructed in compliance with the NECB the owner must maintain compliance with the NECB for all future alterations. Contact the authority having jurisdiction, to determine if requirements apply for a specific *major alteration* project.

Compliance Checklists

The Canadian Committee for Building and Fire Codes has worked with the provinces and territories to develop compliance checklists for use with the NECB. These worksheet checklists are available by sending a request to building.standards@gov.sk.ca.

Definitions

Addition means any conditioned space that is added to an *existing building* that increases the building's floor surface area by more than 10 m^2.

Competent person means a person, firm, or corporation, acceptable to the local authority, who is knowledgeable and experienced in the application of the NBC Section 9.36. for the design of buildings and/or building systems.

Ground oriented dwelling units includes:

- traditional individual detached houses with or without a secondary suite;
- semi-detached houses or duplexes (doubles) where each house may contain a secondary suite;
- row houses without secondary suites; and,
- row houses with secondary suites where firewalls are constructed in accordance with NBC Sentence 9.10.11.2.(1).

This means construction and footprint of the base building. The term does not apply to stacked dwelling units or multiple unit residential buildings other than those specifically mentioned above.

New Building means, in the context of energy efficiency standards, a building whose building permit is issued on or after January 1, 2019. It includes the base building and the initial tenant development(s).
Examples:

- If a building and development permit application (BPA) is submitted for an office building and the BPA includes the development of the floor areas, the BPA for the office building is considered the *new building* and will be required to address NECB compliance.
- If a BPA is submitted for strip mall that is designed without tenant development of the interior floor area, the BPA for the strip mall and the future BPA's for the initial tenant development (fit-out) will be considered the *new building* and will be required to address NECB compliance.

Other project types, means any project not related to ground-oriented dwelling units. This includes the entire base building and any interior construction completed for occupancy (owned or tenant improvements/fitout).

Design Professional Involvement for NECB Compliance

*Existing Design Professional requirements remain for NBC
As per *The Uniform Building and Accessibility Standards Regulations* (the UBAS Regulations), a building designed to the NECB shall have a design professional, architect or engineer, licensed to practice in the province of Saskatchewan complete the design or design review of the building and building systems.
A building within the scope of Part 9 of the NBC designed under the NECB requires a competent person to complete the design or design review for components other than NBC Section 9.36.
A coordinating NECB design professional is required to be responsible for coordinating the design work associated with energy compliance and the building and development permit process. The coordinating NECB design professional is required to fill out and sign the NECB Project Summary and the associated compliance report. Other design professionals may be involved in specific parts of NECB; their information will be added to the NECB Project Summary.

Compliance Path	Design Professional Involvement *	Documents to be sealed
Prescriptive	Design professional can either seal for entire compliance or Parts of compliance (must specify). Example: Project may have single design professional sealing for entire NECB or project may have architect seal for Part 3; and, mechanical engineer seal for Part 5 & 6; and, electrical engineer seal for Part 4 & 7.	Drawings that detail NECB compliance *see NECB Drawing Requirements handout
Trade-off	Design professional can either seal for entire compliance or Parts of compliance (similar to prescriptive). Any Parts that do not use trade-off will have to comply with prescriptive. Note: Part 7 does not permit trade-off.	Trade-off calculations and drawings that detail NECB compliance
Performance	A single design professional has to take responsibility for the model and compliance with NECB.	Performance modelling report that details NECB compliance for construction

Note: As of January 1, 2019, the UBAS Regulations include the requirement for a design professional to complete an inspection of the energy standards related components for buildings designed to NECB. A design professional will have to provide assurance to the *authority having jurisdiction* that the inspection has been completed.

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BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATIONS
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
PROJECT SUMMARY

This document outlines project compliance with National Energy Code of Canada for Building (NECB). The project summary, including NECB contact information, and the compliance report for the chosen path are to be submitted as part of the building and development permit application for new buildings and additions that require NECB compliance. See NECB Compliance Information for application to buildings and Framework Guide or Phased Building Framework Guide for submission requirements.

Project Information

Project Address: _____

_____
BPA Number (Office use only)

Coordinating NECB Design Professional Information (The coordinating NECB design professional will be responsible for coordinating the design work associated with energy compliance and the building and development permit process. The coordinating NECB Design Professional is required to sign the project summary and the associated compliance report).

Name:_____

Registered Business Name:_____

Address: _____
Unit Number Street City Province Postal Code

Email:_____ Phone/Cell # : _____

Basic Building Information

Building use:_____

Type of construction: ☐ New Construction ☐ Addition ☐ Major Alteration
☐ Tenant Fitout

If addition, NECB compliance for: ☐ Addition only ☐ Addition & existing

Building information: ☐ Heated ☐ Semi – heated

Vestibule: ☐ Yes ☐ No

Fill out the following details, if applicable:

_____ Building foot print area (m^2)
_____ Area of addition (m^2)
_____ Conditioned space (m^2)
_____ Semi-heated space (m^2)
_____ Unconditioned space (m^2)
_____ FDWR (%)

***Note: The prescriptive path for Part 3 is not permitted if FDWR exceeds the % applicable to the Climate Zone where the building is located and as required for a heated or semi-heated building.**

Climate Zone: # (HDD below 18ºC):_____
(HDD below 15ºC):_____

Compliance Path Summary

Please indicate the compliance path for each Part below. The chosen compliance path requires the associated reports to be completed and submitted.
Please note that only one means of compliance is possible per Part. Performance Path compliance shall conform with Part 8.

Part 3: Building Envelope: ☐ **Prescriptive** or ☐ **Trade-Off or** ☐ **Performance**
Part 4: Lighting: ☐ **Prescriptive** or ☐ **Trade-Off or** ☐ **Performance**
Part 5: Heating, Ventilation and Air Conditioning Systems: ☐ **Prescriptive** or ☐ **Trade-Off or** ☐ **Performance**
Part 6: Service Water Heating Systems: ☐ **Prescriptive** or ☐ **Trade-Off or** ☐ **Performance**
Part 7: Electrical Power Systems and Motors: ☐ **Prescriptive** **or** ☐ **Performance**
OR Part 8: Performance Energy Model: ☐ **Performance**

Drawing requirements are detailed on the NECB Drawing Requirements.

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BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATIONS
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
PROJECT SUMMARY

Declaration

Signature of Coordinating NECB Design Professional who has completed this form:

_____ _____
Signature Date

NECB Contact Information

Part 3: Building Envelope

Name:
_____
Registered Business Name:
_____
Address:
_____
Unit Number Street City Province Postal Code
Email: Phone/Cell#:
_____ _____

Part 4: Lighting

Name:
_____
Registered Business Name:
_____
Address:
_____
Unit Number Street City Province Postal Code
Email: Phone/Cell#:
_____ _____

Part 5: Heating, Ventilation and Air-Conditioning Systems

Name:
_____
Registered Business Name:
_____
Address:
_____
Unit Number Street City Province Postal Code
Email: Phone/Cell#:
_____ _____

Part 6: Service Water Heating Systems

Name:
_____
Registered Business Name:
_____
Address:
_____
Unit Number Street City Province Postal Code
Email: Phone/Cell#:
_____ _____

Part 7: Electrical Power Systems and Motors

Name:
_____
Registered Business Name:
_____
Address:
_____
Unit Number Street City Province Postal Code
Email: Phone/Cell#:
_____ _____

Part 8: Building Energy Performance (if Performance Compliance selected)	Name: _____ Registered Business Name: _____ Address: _____ Unit Number Street City Province Postal Code Email: _____ Phone/Cell#: _____
Other: _____	Name: _____ Registered Business Name: _____ Address: _____ Unit Number Street City Province Postal Code Email: _____ Phone/Cell#: _____

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BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
DRAWING REQUIREMENTS

NECB submissions require the following items listed below to be shown on drawings. For an extensive list of drawing details for NECB Compliance see NECB 2017 Division C, Subsection 2.2.2. Note: Items can be shown on NBC drawings sets or a separate NECB drawing set.

Part	Prescriptive Path
3	• Floor plan of the building giving the floor area of conditioned spaces and gross lighted area of each storey. • U-value overall thermal transmittance of all above-ground opaque building assemblies and assemblies in contact with the ground; provide assembly details and U-values in walls sections and assembly descriptions on drawings. • U-value overall thermal transmittance of all fenestration and doors provide in window schedule. Framing type and spacing must be included in effective thermal transmittance calculation. Note centre of glass value unacceptable; provide overall heat transfer for entire unit considering frame, glass edge and centre of glass. • Thermal bridging calculations to be details in table format including transmittance type (clearfield, linear interface, point interface), transmittance description, transmittance area or length, and transmittance values. • Air leakage: detail air barrier on wall sections, details and/or specifications. Note building envelope shall be designed with a continuous air barrier system. Provide leakage for fixed fenestration, as well as for operable windows/skylights/doors. • Indoor design temperatures for all spaces.
4	• Lighting power density (LPD) requirements for interior and exterior; indicate space by space or building area method and a summary table of calculated wattages/LPD. Table indicating number of fixtures and wattages along with total Lighting Power to be included in drawings. • Clearly indicate equipment to be excluded from interior calculation. • Show interior primary & secondary side lighted areas. Also show day lighted areas under skylights. • Details of required interior and exterior lighting controls and lighting power including exits, entrances and facades. Show controls/sensors on drawings with symbol for interior and exterior spaces.
5	• HVAC equipment and efficiency; list individual components in equipment schedules, including any economizers. • Damper locations to be indicated on drawings. • Duct insulation to be included on drawing or specifications. Insulation values shown. • Piping insulation, to be included in drawings or specifications. Design operating temperature and piping insulation thickness values required. • Show type(s) of fan systems and calculate power demand. Show commercial kitchen ventilation. • Show type(s) of hydronic systems and calculate power demand of pumps. • Table of HVAC controls included. • Exhaust air system calculations shown, and energy recovery system indicated.
6	• Service Water Equipment and Efficiency; list in equipment schedules. • Service water storage tank insulation value shown. • Piping insulation, to be included in drawings or specifications. Piping size and insulation thickness to be included for conditioned and unconditioned spaces on drawings or in specifications. • Shower and lavatory flow rates indicated. • Remote heater details provided, when required. • Pressure booster system details provided when required. • Pool heater, pump, and cover info included when applicable.
7	• Monitoring installation to be described and indicated on drawings if applicable (i.e. > 250kVA).
	Trade-off Path
3,4,5 & 6	• Prescriptive items (as stated above). • Trade-off calculations* (Note: Part 7 does not permit trade-offs to be used.)
	Performance Path
8	• Prescriptive items (as stated above). • Modelling Report.

*The above drawing requirements are only for NECB review. All other NBC drawings requirements still apply.

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
PRESCRIPTIVE PATH REPORT

Project Information	
_____ Project Address	_____ BPA Number
_____ Coordinating NECB Design Professional Name	

Prescriptive compliance requires drawings that detail items referred to in the NECB Drawing Requirements.

Part 3 – Building Envelope

For Additions: fenestration is being calculated for (select one): ☐ **Addition only** ☐ **Addition & existing combined**

General		**Proposed**	**NECB Limit**	
	Gross wall area (m^2)		N/A	
	Total window area (m^2)		N/A	
	Total exterior door area (m^2)		N/A	
	Gross roof area (m^2)		N/A	
	Total skylight area (m^2)		< 0.02*(gross roof area)	
	Exposed floor areas (m^2)		N/A	
			HDD @ 18º	**HDD @ 15º**
Overall Thermal Transmittance – U ($W/(m^2 \cdot K)$)	FDWR (%)		≤	≤
	Opaque walls (above ground)		≤	≤
	Opaque walls (in contact with ground)		≤	≤
	Roofs (above ground)		≤	≤
	Roofs (in contact with ground)		≤	≤
	Floors (above ground)		≤	≤
	Floors (in contact with ground)		≤ 0	≤
Air Leakage ($L/(s \cdot m^2)$)	Opaque doors		≤	≤
	Fixed fenestration and curtain walls		≤	
	Operable windows, skylights, and doors		≤	
	Operable revolving and auto sliding doors		≤	

*** Adjust to FDWR to requirements for climate zone where building is located.**

Part 4 – Lighting

Proposed building IILP (Installed Interior Lighting Power) (kW) (not to exceed the ILPA below)	
Interior Lighting Power Method: (Select One Below)	
☐ ILPA (Interior Lighting Power Allowance - building area method)	
Lighting power density (w/m^2)	
Gross lighted Area (m^2)	
OR	
Proposed ILPA building area method (kW)	
☐ ILPA (Interior Lighting Power Allowance – space-by-space method)*	
*Provide a detailed line-by-line breakdown of spaces, their floor area (m^2), the associated lighting power densities (W/m^2) and the resulting lighting power allowances (kW)	
Proposed ILPA space-by-space method (kW)	

Exterior Lighting Power: (all values below to be in **Watts**)			
Specific Lighting Allowance _____ **+** Portion of Basic Site Allowance _____ = {Table 4.2.3.1-C} (If multiple specific applications used in design, provide a table showing all}		Specific Total Exterior Allowance _____ **≥**	Specific Installed Lighting _____
Sum of General Lighting Allowances _____ **+** Remaining Basic Allowance _____ = {Table 4.2.3.1-D}		General Total Exterior Allowance _____ **≥**	General Installed Lighting _____
	Basic Site Allowance _____ {Table 4.2.3.1-B} (Sum of the portions of basic site allowance above are not to exceed this amount)		**Total Exterior Lighting Installed** **_____**
Interior lighting controls are designed in accordance with Subsection 4.2.2.			☐ Yes ☐ No
Exterior lighting controls are designed in accordance with Subsection 4.2.4.			☐ Yes ☐ No
Interior and exterior installed Lighting Power displayed in table format on the drawings			☐ Yes ☐ No
Interior and exterior lighting controls provided in a table format on the drawings			☐ Yes ☐ No

Compliance Confirmation		
IILE is less than or equal to (≤) ILEA in conformance with NECB Article 4.3.1.3.	☐ Yes	☐ No
Have you supplied the calculations determining the above values	☐ Yes	☐ No

Part 5 – Heating, Ventilating and Air-Conditioning Systems

	Proposed		**NECB Limit**	
	Constant Volume	**Variable Air Volume**	**Constant Volume**	**Variable Air Volume**
Fan system power demand (W/L/s))			≤ 1.6	≤ 2.65
Commercial kitchen design ventilation rate (L/s)			☐< 1410 L/s ☐ Demand control provided	
Economizer system required in conformance with Articles 5.2.2.7.	☐ Yes ☐ No			
Air economizer has been designed to Article 5.2.2.8. or Article 5.2.2.9. (circle one)	☐ Yes ☐ No			
Temperature controls been designed in conformance with Subsection 5.2.8.	☐ Yes ☐ No			
Type of ventilation system operation	☐ Continuous ☐ Non-continuous			
Percentage of outdoor air at design airflow conditions (%)	_____			
Energy recovery system required	☐ Yes ☐ No			
Energy recovery system efficiency (%)	_____			

Please provide details of proposed HVAC equipment and component specifications for the building, using the table below:
(Please note if more space is needed, please submit a separate list using the same format) Table 5.2.12.1.

Component or Equipment	**Cooling or Heating Capacity, kW**	**Standard**	**Rating Conditions**	**Performance Rating**

Part 6 – Service Water Systems

	Proposed	NECB Limit
Shower heads (L/min)		≤ 7.6 L/min
Lavatories (L/min)		≤ Private 5.7 L/min ≤ Public 1.9 L/min

Please provide details of the proposed service water heating equipment specifications for the building, using the table below:
(Please note if more space is needed, please submit a separate list using the same format) Table 6.2.2.1.

Component or Equipment	Input	Capacity (L)	V_t (L)	Input/V_t (W/L)	Standard	Rating Conditions	Rated Performance

Part 7 – Power Systems

	Proposed	NECB Limit
Load carrying capacity (kVA)		☐< 250 kVA ☐ Monitoring system provided

Please provide a description of each system, detailing its function, design details, and performance characteristics.

Compliance Confirmation

Building energy prescriptive compliance meets NECB 2017	☐ Yes	☐ No
Drawings submitted are in conformance with NECB Drawings Requirements	☐ Yes	☐ No

Declaration

Signature of coordinating NECB Design Professional who has completed this form:

_____ _____

Signature Date

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
TRADE-OFF PATH REPORT

Project Information	
Project Address	BPA Number
Coordinating NECB Design Professional Name	

Trade-off compliance requires this report to be filled out for the Parts where trade-off compliance is used. Submit the Prescriptive Report for all other Parts including Part 7.

Part 3 – Building Envelope *Not applicable to additions or semi-heated buildings as per Sentence 3.3.1.1.(2)

For Additions: fenestration is being calculated for (select one): ☐ **Addition only** ☐ **Addition & existing combined**

General		**Proposed**	**NECB Limit**	
	Gross wall area (m^2)		**N/A**	
	Total window area (m^2)		**N/A**	
	Total exterior door area (m^2)		**N/A**	
	Gross roof area (m^2)		**N/A**	
	Total skylight area (m^2)		**N/A**	
	Exposed floor areas (m^2)		**N/A**	
			HDD @ 18º	**HDD @ 15º**
Overall Thermal Transmittance – U ($W/(m^2 \cdot K)$)	**FDWR (%)**		**N/A**	**N/A**
	Opaque walls (above ground)		**N/A**	**N/A**
	Opaque walls (in contact with ground)		**≤**	**≤**
	Roofs (above ground)		**N/A**	**N/A**
	Roofs (in contact with ground)		**≤**	**≤**
	Floors (above ground)		**N/A**	**N/A**
	Floors (in contact with ground)		**≤**	**≤**
Air Leakage ($L/(s \cdot m^2)$)	**Opaque doors**		**N/A**	**N/A**
	Fixed fenestration and curtain walls		**≤**	
	Operable windows, skylights, and doors		**≤**	
	Operable revolving and auto sliding doors		**≤**	
		Proposed ($U_{ip}*A_{ip}$)	**Reference ($U_{ir}*A_{ir}$)**	
	Vertical (above ground portions)			
	Horizontal (above ground portions)			
	Total (Vertical + Horizontal)			

Compliance Confirmation		
$U_{ip}A_{ip}$ is less than or equal to (≤) $U_{ir}A_{ir}$ in conformance with NECB Article 3.3.1.2.	☐ **Yes**	☐ **No**
Have you supplied the calculations determining the above values	☐ **Yes**	☐ **No**

*** Adjust to FDWR to requirements for climate zone where building is located.**

Part 4 – Lighting

Proposed building IILP (Installed Interior Lighting Power) (kW) (not to exceed the ILPA below)	
Interior Lighting Power Method: (Select One Below)	
☐ ILPA (Interior Lighting Power Allowance - building area method)	
Lighting power density (W/m^2)	
Gross lighted Area (m^2)	
OR	
Proposed ILPA building area method (kW)	
☐ ILPA (Interior Lighting Power Allowance – space-by-space method)* *Provide a detailed line-by-line breakdown of spaces, their floor area (m^2), the associated lighting power densities (W/m^2) and the resulting lighting power allowances (kW)	
Proposed ILPA space-by-space method (kW)	

Exterior Lighting Power: (all values below to be in **Watts**)

Specific Lighting Allowance _____ **+** Portion of Basic Site Allowance _____ = {Table 4.2.3.1-C} (If multiple specific applications used in design, provide a table showing all}	Specific Total Exterior Allowance _____ **≥**	Specific Installed Lighting _____
Sum of General Lighting Allowances _____ Remaining Basic Allowance _____ = {Table 4.2.3.1-D}	General Total Exterior Allowance _____ **≥**	General Installed Lighting _____
Basic Site Allowance _____ {Table 4.2.3.1-B} (Sum of the portions of basic site allowance above are not to exceed this amount)		**Total Exterior Lighting Installed _____**

Interior lighting controls are designed in accordance with Subsection 4.2.2.	☐ Yes	☐ No
Exterior lighting controls are designed in accordance with Subsection 4.2.4.	☐ Yes	☐ No
Interior and exterior installed Lighting Power displayed in table format on the drawings	☐ Yes	☐ No
Interior and exterior lighting controls provided in a table format on the drawings	☐ Yes	☐ No

Compliance Confirmation

IILE is less than or equal to (≤) ILEA in conformance with NECB Article 4.3.1.3.	☐ Yes	☐ No
Have you supplied the calculations determining the above values	☐ Yes	☐ No

Part 5 – Heating, Ventilating and Air-Conditioning Systems

Overall $HVAC_{TOI}$	

Compliance Confirmation

HVACTOI is greater than or equal to (≥) 0 in conformance with NECB Article 5.3.1.3.	☐ Yes	☐ No
Have you supplied the calculations determining the above values	☐ Yes	☐ No

Part 6 – Service Water Systems

Overall SWH_{TOI}	

Compliance Confirmation

SWH-TOI is greater than or equal to (≥) 0 in conformance with NECB Article 6.3.1.3.	☐ Yes	☐ No
Have you supplied the calculations determining the above values	☐ Yes	☐ No

Compliance Confirmation

Building energy trade-off compliance meets NECB 2017	☐ Yes	☐ No
Drawings submitted are in conformance with NECB Drawings Requirements	☐ Yes	☐ No

Declaration

Signature of coordinating NECB Design Professional who has completed this form:

_____ _____

Signature Date

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
PERFORMANCE PATH REPORT

Project Information

_____ Project Address

_____ BPA Number (Office use only)

_____ Coordinating NECB Design Professional Name

Compliance Requirements

A performance model report is to be submitted as part of the building and development permit application (BPA). If construction on site differs significantly from the approved set of plans and model, a revised performance report and model report are required to be submitted for review.

The Project Summary and Performance Report shall be accompanied by:

- Sealed energy model report that includes all relevant information as required by NECB Division C, Article 2.2.2.8.
- Drawings/details that correspond to the model inputs

Software and Model Information

Software used	_____		
Software version	_____		
Confirmation that software is ANSI/ASHRAE 140 compliant	☐ Yes	☐ No	
Weather file	_____		
Climate zone	_____		
Exterior lighting design	☐ Part 8	☐ Part 4 Prescriptive	(Fill out Prescriptive Report for Exterior Lighting)

Part 3 Modeled as:	Part 4 Modeled as:	Part 5 Modeled as:	Part 6 Modeled as:	Part 7 Modeled as:
☐ Per design or ☐ Part 3 Prescriptive (Fill out prescriptive report for this Part)	☐ Per design or ☐ Part 4 Prescriptive (Fill out prescriptive report for this Part)	☐ Per design or ☐ Part 5 Prescriptive (Fill out prescriptive report for this Part)	☐ Per design or ☐ Part 6 Prescriptive (Fill out prescriptive report for this Part)	☐ Per design or ☐ Part 7 Prescriptive (Fill out prescriptive report for this Part)

Building Energy Summary

	Proposed	Reference
Electricity (MJ/yr)	_____	_____
Fossil fuel (MJ/yr)	_____	_____
Annual Energy Consumption (MJ)	_____	_____

Compliance Confirmation

Reference building in model has been updated to NECB 2017	☐ Yes ☐ No
Building energy performance model is in compliance with Article 8.4.1.2.	☐ Yes ☐ No
Building energy performance model corresponds to permit application drawing set	☐ Yes ☐ No
Back-up HVAC and SWH systems have been designed to Section 5.2. and 6.2.	☐ Yes ☐ No ☐ N/A – no back-up
Protection of insulation materials is in compliance with Article 3.2.1.1.	☐ Yes ☐ No
Air leakage is in compliance with Subsection 3.2.4.	☐ Yes ☐ No
Effective Thermal Transmittance (including thermal bridging calculations) are in compliance with Article 3.1.1.5 and 3.1.1.7	☐ Yes ☐ No

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
PERFORMANCE PATH REPORT

Thermal Bridging - **Design Professional to provide brief description of how thermal bridging was evaluated:**

Declaration	
Signature of coordinating NECB Design Professional who has completed this form:	
_____	_____
Signature	Date

Phased Permit Application Submission Requirements for NECB Energy Compliance			
	Foundation	**Shell**	**Final**
Performance	• Project Summary • Commitment Letter (Part 3) • Sealed Model Report **or** **Performance Compliance Letter of Agreement • Performance Report (if model report submitted) Note: if mechanical/electrical unknown NECB 2017 Sentence 8.4.3.1.5) provides guidance for modeling using inputs from prescriptive requirements	Confirmation that initial model applicable **or if revised design:** • Project Summary • Performance Report • Sealed Revised Model Report • Commitment Letter (Part 3)	Confirmation that initial model applicable • Commitment Letter (Part 4-7) **or if revised design:** • Project Summary • Performance Report • Sealed Revised Model Report • Commitment Letter (Part 3-7) **or if other compliance chosen (Part 4-7):** • Project Summary • Trade-off Report (Part 4-6) **and/or** Prescriptive Report (Part 4-7) • Commitment Letter (Part 4-7)
Trade-off and/or Prescriptive	• Project Summary • Trade-off Report (Part 3) **or** Prescriptive Report (Part 3) • Commitment Letter (Part 3)	Confirmation that initial submission applicable **or if revised design:** • Project Summary • Trade-off Report (Part 3) **or** Prescriptive Report (Part 3) • Commitment Letter (Part 3)	• Project Summary • Trade-off Report (Part 4-6) **and/or** Prescriptive Report (Part 4-7) • Commitment Letter (Part 4-7)
1) Commitment letters to only be submitted for the scope of work included in the specific phase. 2) Drawings to detail energy requirements in conformance with NECB drawings requirements. **Performance Compliance Letter of Agreement - owner commits to Performance Compliance for future phases and understands the requirements for future building components.			

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT APPLICATION
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
INSPECTION CHECKLIST

Project Information	
_____	_____
Project Address	**Permit No.**
Path: ☐ Prescriptive ☐ Trade-off ☐ Performance	

This is a general list for potential spot check of components of construction during site visits in conformance with the approved plans.

	CATEGORY	ENERGY REQUIREMENT	CODE REFERENCE	CHECK
BUILDING ENVELOPE	INSULATION	Installed as per approved plans. U-value of building envelope where mechanical or electrical components are placed within and parallel to the building envelope shall not be increased. Also, joints between components shall be insulated to provide continuity (e.g., Wall to fenestration joint).	3.2.1.2.	☐
	DOORS & FENESTRATION	Number and size of doors and windows, skylights, and doors installed as per plans. Look for stickers on windows and doors to confirm: □ U-Values of fenestration meet Table 3.2.2.3. □ U-values doors meet Table 3.2.2.4. □ Leakage rates for fixed fenestration ≤ 0.2 L/(s▪m^2) □ Leakage rates for operation doors & fenestration ≤ 0.5 L/(s▪m^2) □ Leakage rates for OH, revolving, auto sliding doors ≤ 5 L/(s▪m^2)	3.2.1.4., 3.2.2.3., 3.2.2.4., 3.2.4.3., 3.2.4.4.	☐
	DOORS	Exterior doors protected by vestibules as per approved plans.	3.2.2.1.	☐
	ABOVE-GROUND OPAQUE BUILDING ASSEMBLIES	Above-ground wall, roof and floor assemblies as per plans.	3.2.2.2.	☐
	HATCHES	Access hatches assemblies that are part of the envelope constructed as per plans.	3.2.2.4.	☐
	BELOW-GROUND OPAQUE BUILDING ASSEMBLIES	Below-ground wall, roof and floor assemblies as per plans.	3.2.3.1. to 3.2.3.3.	☐
	AIR BARRIER	Continuous air-barrier provided.	3.2.4.1. to 3.2.4.2.	☐
	FIREPLACES	Fireplaces to restrict air movement when not in use.	3.2.4.5.	☐

	CATEGORY	ENERGY REQUIREMENT	CODE REFERENCE	CHECK
ELECTRICAL	INTERIOR CONTROLS	Interior lighting controls as per plans? Check items such as: □ Spacing for manual devices (max area) □ Manual On □ 50% Auto Partial ON □ Bi-level □ Photocontrols in sidelighted areas □ 50% Auto Partial Off □ Auto Full Off □ Scheduled Shut Off □ Storage Garage Controls	4.2.2.1. to 4.2.2.2.	☐
	EXTERIOR LIGHTING APPLICATIONS	Exterior lighting applications and controls as per plans.	4.2.3.1.	☐

	CATEGORY	ENERGY REQUIREMENT	CODE REFERENCE	CHECK
Heating, Ventilation and Air conditioning	Duct Sealing	Air-handling ducts and plenums sealed? (Note: sealing tape shall not be the primary sealant.)	5.2.2.3. to 5.2.2.4.	☐
	Duct Insulation	Duct insulation meets requirements of Table 5.2.2.5.? See NECB for additional details (e.g., Exemptions, and ducts outside envelope to be insulated to same requirements as wall insulation). Duct insulation protected with vapour barrier or from mechanical damage, as needed.	5.2.2.5., 5.2.2.6.	☐
	Fan Systems	Fans installed as per plans	5.2.3.	☐
	Dampers	Motorized dampers for openings to discharge air from conditioned to unconditioned space AND for outdoor air intakes. See NECB for exceptions.	5.2.4.1. to 5.2.4.2.	☐
	HVAC Piping Insulation	Piping forming part of HVAC system must be insulated to meet Table 5.2.5.3. See NECB for exceptions. Duct insulation protected with vapour barrier or from mechanical damage, as needed.	5.2.5.3.	☐
	Pumping Systems	Pumps installed as per plans	5.2.6.3.	☐
	HVAC Controls	At least one automatic control provided and accurate to 1. Dwelling units to have control devices for each room. Guest rooms and suites have auto temperature setback within 15 min. Vestibules between conditions space and the outdoors limited to 15 ^{o}C.	5.2.8.1. - 5.2.8.6.	☐
	Energy Recovery	Energy recovery system(s) installed as per plans. Check efficiency.	5.2.10.	☐
	Heat Recovery for Dwelling Units	For single dwelling unit, principal exhaust must be equipped with heat recovery that meets performance requirements?	5.2.10.4.	☐
	Off-hours Controls	Systems serving area not intended for continuous use (capacity ≥ 5 kW) must have controls for setting back the system during non-use.	5.2.11.1.	☐
	Airflow Control Areas	Airflow control areas as per plans (≤ 2500 m^2 and span not more than 1 storey. Zones shall be independently temperature controlled.).	5.2.11.2.	☐
	Multiple Boilers	Multiple boilers installed as per plans.	5.2.11.4.	☐
	Loop Temperature Reset	For chilled- or hot-water systems with capacity > 88 kW, automatic controls are to be provided to reset supply water loop temperatures. Installed as per plans.	5.2.11.5.	☐
	Equipment Efficiency	Check all equipment installed as per plans and meets efficiency	5.2.12.	☐
	Duct Sealing	Air-handling ducts and plenums sealed? (Note: sealing tape shall not be the primary sealant.)	5.2.2.3. to 5.2.2.4.	☐
	Duct Insulation	Duct insulation meets requirements of Table 5.2.2.5.? See NECB for additional details (e.g., Exemptions, and ducts outside envelope to be insulated to same requirements as wall insulation). Duct insulation protected with vapour barrier or from mechanical damage, as needed.	5.2.2.5., 5.2.2.6.	☐

	CATEGORY	ENERGY REQUIREMENT	CODE REFERENCE	CHECK
Service Water	Equipment Efficiency	Service water heaters and pool heaters installed as per plans (meet requirements of Table 6.2.2.1.).	6.2.2.1.	☐
	Equipment Insulation	Service water storage tanks to be covered by insulation having a max U-value of 0.45 W/(m^2▪K) (except for tanks covered by Article 6.2.2.1.).	6.2.2.2.	☐
	Piping Insulation	Hot service water piping to be insulated to Table 6.2.3.1. For non-circulating systems with heat traps, piping between vessel and heat trap to be insulated, along with 2.4 m of piping downstream of heat trap.	6.2.3.1.	☐
	Service Water Heating Controls	Systems (e.g., Tanks, heating elements along pipes) shall have automatic temperature controls to keep temperature within acceptable range. Systems over 100 L shall have a clear shut-off device.	6.2.4.	☐
	Remote Heaters	Where only a small portion of service water (< 50%) has a design temperature of >60 °C, remote heaters shall be provided for those portions of the system (so as to avoid heating all water beyond what is required). Installed as per approved plans.	6.2.5.1.	☐
	Shower Flow Rates	Shower heads limited to max flow rate of 7.6 L/min. Public shower heads controlled by one temperature device must be capable of being shut off individual when not in use.	6.2.6.1.	☐
	Lavatory Flow Rates	Private individual lavatories limited to 5.7 L/min, and public lavatories limited to 1.9 L/min. Public washrooms in assembly occupancy must be able to automatically shut off when not in use.	6.2.6.2.	☐
	Pool Heaters and Pumps	Pool heaters shall have a device to allow for shut off without adjusting thermostat, and for restarting heater without manually lighting pilot light. Pool pumps and heaters must have controls to automatically turn off when not in use.	6.2.7.1.	☐
	Pool and Hot Tub Covers	Heated outdoor pools/tub must have cover for 90% of water surface. If water temperature is > 32 °C, the cover's U-value must be ≤ 0.48 W/m^2▪C.	6.2.7.2.	☐
	Pressure Booster Systems	Constant-speed pressure booster systems shall be provided with a hydro-pneumatic tanks that provides at least 1 min of operation at design flow and pressure. Variable-speed systems must provide 1 min of operation at 10% of design flow and pressure. At least one pressure sensor required to maintain system pressure, and no pressure-reducing devices allowed (except for safety).	6.2.8.	☐

	CATEGORY	ENERGY REQUIREMENT	CODE REFERENCE	CHECK
ELECTRICAL POWER SYSTEMS & MOTORS	Monitoring	For systems > 250 kVA, the system must monitor energy consumption of HVAC, interior lighting & exterior lighting. This shall be done for both the whole building and for each individual tenant or dwelling unit.	7.2.1.1.	☐

LOGO

COMMITMENT FOR FIELD REVIEW
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
This letter must be submitted BEFORE the issuance of a building permit

To: The Building Official
Building Standards
Authority Having Jurisdiction
Address 1
Address 2, Saskatchewan Address 3

_____
Date (YY MM DD)

Re: _____
Name of Project (Print)

_____
Address of Project (Print)

The undersigned hereby undertakes to be responsible for field reviews of the following energy components and substantial compliance with the intent of the design as per the National Energy Code of Canada for Buildings 2017 (NECB 2017):
(Initial those items listed below that apply to this registered professional.)

INITIAL
_____ PART 3 - BUILDING ENVELOPE
_____ PART 4 - LIGHTING
_____ PART 5 - HVAC
_____ PART 6 – WATER SERVICES
_____ PART 7 – POWER SYSTEMS
_____ PART 8 – PERFORMANCE COMPLIANCE

The undersigned also undertakes to notify the authority having jurisdiction in writing as soon as possible if the undersigned's contract for field review is terminated at any time during construction.
I certify that I am a registered professional as required by *The Uniform Building and Accessibility Standards Act*.

(Affix Professional Seal Below)

_____
Name (Print) Initials Sample

_____
Signed Date

_____
Address (Print)

_____
City (Print) Postal Code

_____
Phone Email

If the registered professional is a member of a firm, complete the following:
I am a member of the firm _____
Name of Firm (Print)

_____
Address of Firm (Print)

_____
City (Print) Postal Code

and I sign this letter on behalf of the firm and myself.

Note: The above letter must be signed by a registered professional. A registered professional is defined as:

a) a person who is registered or licensed to practice as a professional engineer under *The Engineering and Geoscience Professions Act*, or
b) a person who is registered or licensed to practice as an architect under *The Architects Act*.

Appendix F – National Energy Code of Canada for Buildings Checklists and Natural Resources Canada Trade-off Tools

Natural Resources Canada (NRCan) has developed materials to support the use of previous versions of the National Energy Code for Buildings (NECB) which may be beneficial to Saskatchewan *code users*. These materials include:

- NECB 2017 Intent Statements
  (available online at www.nrc- cnrc.gc.ca/eng/publications/codes_centre/codes_guides.html)
- 2017 User's Guide – National Energy Code for Buildings 2017
  (available for purchase at www.nrc-cnrc.gc.ca/eng/publications/codes_centre/codes_guides.html)
- NECB Compliance checklists (included in the 2017 User's Guide for the NECB 2017)

The NECB allows for the trade of enhanced energy efficiency of one component against the decreased energy efficiency of another component within the same part of the NECB. For example, in NECB Part 3 Building Envelope, higher roof insulation efficiency levels can be traded off against lower wall insulation levels, but not against lighting levels, which are included under Lighting (NECB Part 4). NRCan has developed publically available trade-off calculators based on the NECB 2011 for Parts 4, 5 and, 6 of the NECB.

Lighting (NECB Part 4) trade-off calculator
This Microsoft Excel-based calculator allows you to demonstrate compliance under the NECB 2011, using the trade-off path for Lighting (NECB Part 4). The calculator considers lighting energy allowances using the space-by-space method and provides all the required data entry fields to define each space as well as calculate the compliance of the *building.* The calculations account for annual day and night operating times, daylight harvesting, occupancy sensors, and personal controls.

Heating, Ventilating and Air-conditioning systems (NECB Part 5) and Service Water Heating (NECB Part 6) trade-off calculator
This Microsoft Excel-based calculator considers the entire heating, ventilating, and air conditioning and system water heating structure as a whole, providing trade-off values for 27 systems and 32 components, including fans, motors, controls, and piping insulation. The calculator provides more flexibility than the prescriptive compliance requirements by allowing a mechanical *designer* to examine a system design and evaluate its overall performance for *code* compliance. Given the complexity of modelling energy use, the trade-off path calculator should be considered as a compliance mechanism, and not as an energy assessment method.

Depending upon the components under consideration and the type of system being designed, these calculators may be useful in assisting with trade-off compliance calculations for a *building* under design but calculations may also be completed without the use of this software. Each calculator is a workbook that includes an introduction, worksheets help information, and summary compliance reports.

For more information or to obtain a copy of the calculators, e-mail info.services@nrcan-rncan.gc.ca.

Appendix G – National Energy Code of Canada for Buildings Performance Assessment Tools

Good engineering practice relies upon *competent persons* or design professionals, using analytical tools, to assess the energy efficiency performance of components of the *building* and to ensure compliance with minimum standards. These analytical tools frequently include computer software for detailed analysis of the performance of those components of a *building.*

Documentation from the analysis needs to be made available to the *appropriate local authority* and an assurance that the design meets the National Energy Code for Buildings (NECB) requirements applicable for that *building.* While the *appropriate local authority* and its building official may question the extent of the analysis, the choice of software to perform an analysis is considered part of the design. A *local authority* may discuss design choices with the *designer* to ensure compliance but the *local authority* shall not get involved in the actual design as stated in *The Uniform Building and Accessibility Standards Regulations* subsection 9(1).

A *designer* is responsible for selecting tools that are appropriate for the project type and location, often using software to undertake the energy performance analysis. A professional *designer* is used to perform the analysis of the *building* component or the whole *building*'s energy performance in comparison to the requirements of the NECB and to provide assurance that the proposed design meets or exceeds the requirements.

Energy Rating Systems

Energy rating systems assess the performance of a *building* against a predetermined set of criteria, including software tools that have been developed based on Canadian energy efficiency standards. In general terms, the assessment process compares the minimum *code* requirements/performance against the performance of design specifications of the proposed *building*. The result is a report providing the performance comparison of the minimum criteria against the proposed *building*.

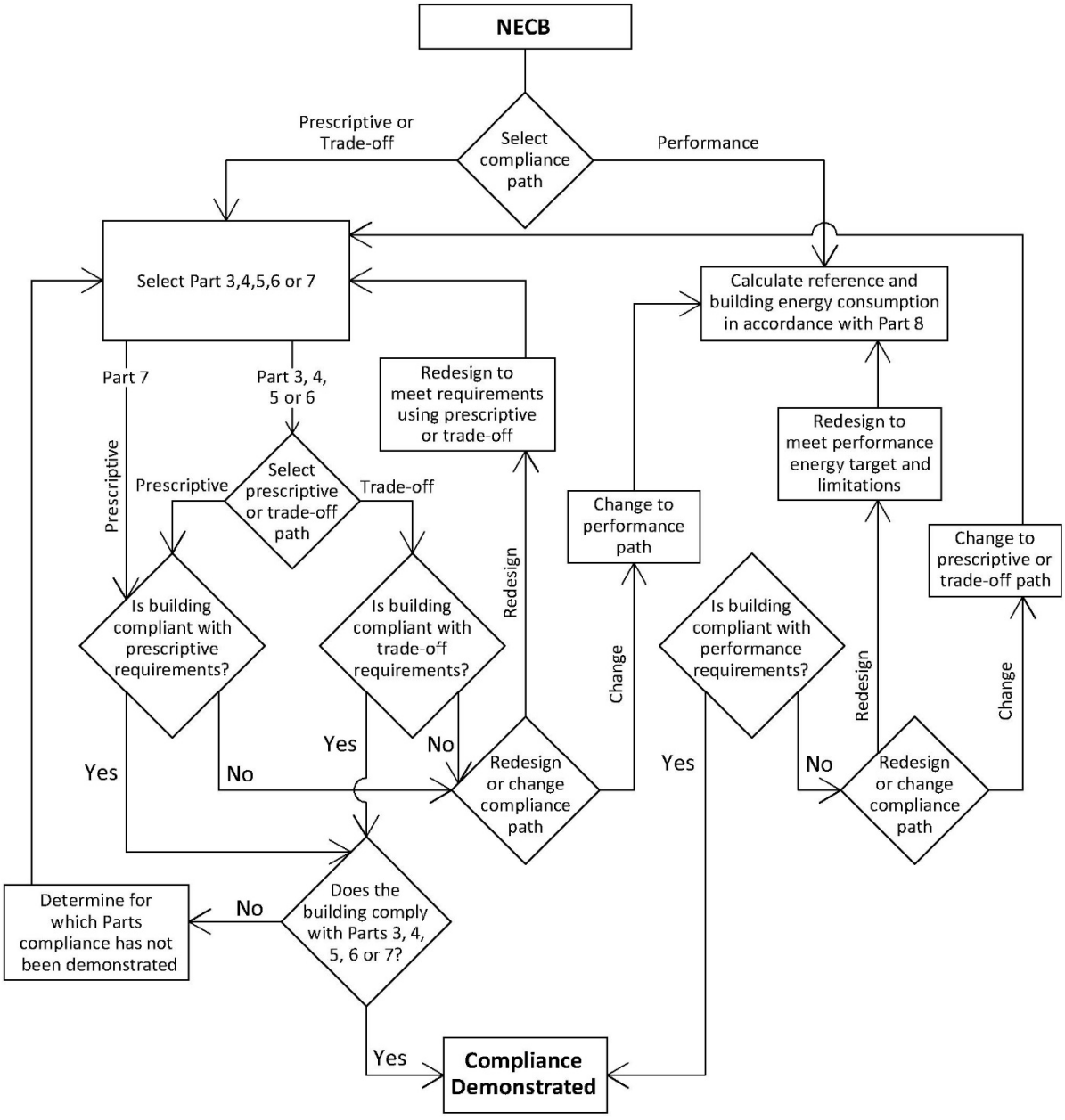
Modelling software used in the performance compliance path must comply with ASHRAE 140 'Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs'. Natural Resources Canada has developed the CAN-Quest Energy Modelling software tool in compliance with ASHRAE 140. CAN-Quest can be used to demonstrate compliance with the NECB 2011 as part of a performance path during the design of commercial and institutional *buildings*.

Adjustments to the criteria within Can-Quest will need to be made in order to attain compliance with the NECB. Other ASHRAE 140 compliant modelling programs are also available but these other tools may not reflect Canadian design conditions or the NECB.

All associated documentation from EnerGuide Rating System modelling should become part of the *appropriate local authority*'s *building* permit file for the *building.*

The graphic on the following page (See Figure G1) provides a summary of the compliance paths for the NECB.

Figure G1: National Energy Code for Buildings Compliance Paths



Source: NECB Division B Part 1 A-1.1.2.1.

Appendix H – Authority Having Jurisdiction Inspection Information

LOGO

BUILDING PERMIT & DEVELOPMENT PERMIT
NBC SECTION 9.36. &
NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS
AHJ INSPECTION INFORMATION

As of January 1, 2019, NBC 2015 Section 9.36. and NECB 2017 are in force within Saskatchewan as the minimum energy efficiency standards. Please refer to Inspection Checklists.

Application to Buildings

NBC 2015 Section 9.36., as per Article 9.36.1.3., applies to the design and construction of all new buildings and additions including:

- buildings of residential occupancy to which Part 9 applies;
- buildings containing business and personal services, mercantile or low hazard industrial occupancies to which Part 9 applies to whose combined floor area does not exceed 300 m^2, excluding parking garages serving residential occupancies; and,
- buildings containing any mixture of the above two.

Energy Performance compliance applies only to:

- houses with or without a secondary suite; and,
- buildings containing only dwelling units and common spaces whose floor area does not exceed 20% of the floor area of the building.

As per NECB 2017 Division A, Article 1.1.1.1., the *Code* applies to the design and construction of all new buildings and additions including:

- Buildings classified under Part 3 of the National Building Code (NBC);
- Buildings classified under Part 9 of the NBC containing non-residential occupancies whose combined floor area exceeds 300 m^2 or medium-hazard industrial occupancies (F2); and,
- Any building to which NBC Section 9.36. applies but the owner/applicant proposed to design and construct to the NECB.

Enforcement of Energy Efficiency Requirements

Construction not meeting the approved energy code compliance path may have the option to move to another path. For example: a project approved for the prescriptive path but unable to comply may be able to demonstrate compliance with either the trade-off path or the performance path. Any changes to an energy path will require approval.

Notification of incorrect construction and or window and door requirements can result in red cards, correction notices or order to remedies issued before construction can continue. Future inspections or site visits may not be facilitated until non-compliance has been corrected and approval to continue is issued by the building official.

As provided by section 17 of *The Uniform Building and Accessibility Standards Act*, orders can be issued to obtain compliance with permit conditions.

NBC Section 9.36 Energy Efficiency

The energy code compliance paths are prescriptive, trade-off and performance modelling (with or without labelling). After submitted information has been reviewed and approved with the issuance of a permit, a building official may choose the following process for energy paths:

1. Review of construction as approved by Plan Review.
    a. All inspections will be under existing required inspection stage process.
    b. Inspecting framing for construction.
        i. Increased construction details/information/calculations located on the drawings such as wall/floor/ceiling details.
        ii. Wall assembly construction.
        iii. Windows and doors labels for compliance
            1. Alternatively, specifications can be submitted for approval, preferably before purchase and installation.
                a. Builder is taking the risk for incorrectly ordered and installed windows and doors.
    c. Inspect wall insulation at vapour barrier stage for coverage and type.
        i. Batt insulation would be required to have the individual batt insulation label or detail visible through the vapour barrier.
        ii. Foam insulation in the wall is spot checked for thickness using foam measuring stick.
            1. Insulation not accessible from ground level within Building Inspector reach is not inspected.
            2. No inspection if spray foam form is not available or submitted.
                a. Spray foam decal to be installed on or near the electrical panel.
        iii. Roof insulation is not inspected, observation only if installed at time of vapour barrier inspection.
        iv. Under slab insulation and vapour barrier is not inspected, observation only.
    d. Increased ventilation verification from the installer.
        i. Verification label submitted and installed on furnace.
        ii. Final inspections are not conducted if (Similar to no framing inspection if no shop drawings):
            1. Ventilation verification label or information is not present.
            2. Energy labelling required to be submitted (if required).
            3. Similarly, any outstanding documentation such as letter of assurance, spray foam.
        iii. General inspection of ventilation; i.e. controls, location of intakes, MUA provided.

NECB Compliance

Design Professional Involvement

Any building utilizing the NECB 2017 requires a design professional to complete the design or design review of the building and all building systems as they pertain to the NECB. Other components of the building may still be designed by a competent person. An inspection of construction of the building or building systems to ensure compliance with the design and reviews required by the Code.

Building Official Involvement

A building official may perform periodic site visits and compare construction to approved permit drawings in accordance with their permit program. A building official may notify the general contractor and/or the design professional of any noted differences between approved drawings and actual construction.