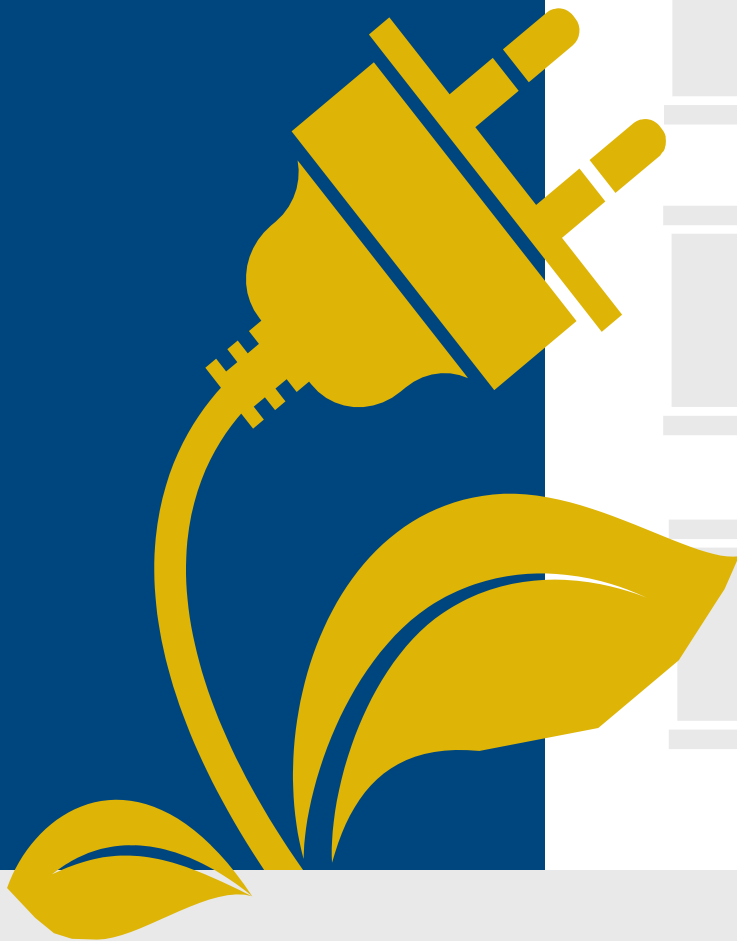


The Corporation of the County of Huron

High Performance Building Standard

Developed 2021



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Table of Contents

Introduction	4
Purpose	4
Scope	5
Process	5
Design Considerations	5
Building Standards	6
High Performance Attributes	6
Net-Zero Energy Ready	7
Future-Ready & Resiliency Planning.....	7
Stormwater Management.....	8
Water Conservation	8
Continuous Improvements	8
Acronyms & Glossary	9

Introduction

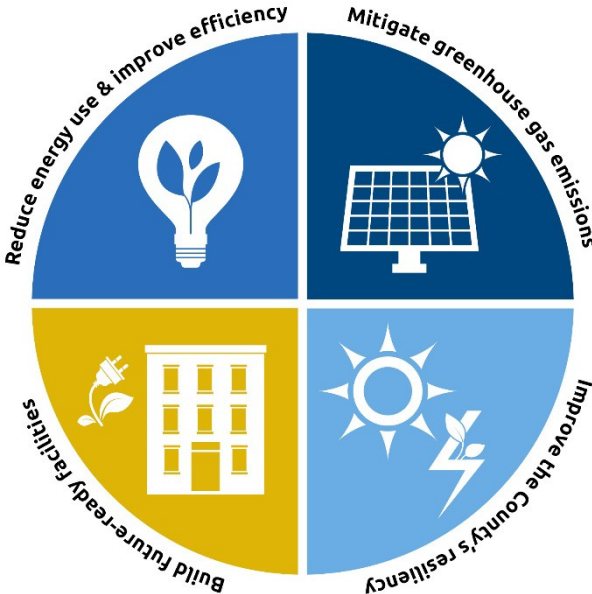
For the County of Huron, the High Performance Building Standard (HPBS) outlines a set of design criteria to prioritize efficiency, resiliency, and sustainability in corporate facilities. By designing and retrofitting the County’s facilities to these standards, it demonstrates the leadership and commitment of the County to advancing efforts for energy conservation and climate change.

Ensuring that the County’s facilities are energy efficient and resilient aligns with the County’s energy reduction goals in the Conservation and Demand Management Plan (CDMP), as well as the goals of the Corporate Climate Change Adaptation Plan (CCCAP). Building more efficient facilities will help the County reduce energy use, mitigate greenhouse gas emissions, and build facilities that are future-ready for the impacts of climate change. High performance buildings can also lead to cost savings for the corporation and provide a healthier and more comfortable environment for staff and building occupants.

Purpose

The purpose of the HPBS is to strive to build and retrofit the County’s facilities to the highest performance possible, with the goals to:

- Reduce energy use and improve efficiency,
- Mitigate greenhouse gas emissions,
- Improve the County’s resiliency to the impacts of climate change, and
- Build future-ready facilities that are efficient, resilient, healthy for occupants, and capable of continuous improvements, as trends in the green building sector continue to evolve.



As identified in the County’s CCCAP, the County is committed to taking action to prepare for the future. Improving the performance of corporate facilities is part of this objective, as high performance buildings, such as those built to Passive House Standards, tend to withstand the impacts of climate change better than traditional builds. Designing facilities to be more resilient will help the County better prepare for the impacts of climate change, which will reduce future damages, save money, and ensure business continuity in the future. Due to their efficiency, high performance buildings:

- Adjust to temperature changes while maintaining a comfortable indoor environment and minimize heating and cooling demands,
- Rely less on grid infrastructure, which increases resiliency, self-reliance, and safety during extreme weather events, and
- Conserve energy use and reduce greenhouse gas emissions, which may help slow the effects of climate change.

Scope

The HPBS will apply to all County facilities, including new builds and major renovations. Exceptions may be made as to when the standard applies if the type or use of a facility hinders the ability to achieve high performance levels. For the County of Huron, buildings that may be exempt from meeting the HPBS could include storage facilities and Public Works buildings.

Process

In order to achieve the highest performance possible for new buildings and retrofits, a subcommittee of the County's Conservation and Climate Change Committee will review the design and development of corporate facilities. The subcommittee will strive to achieve at a minimum the building standards outlined below, in addition to considering evolving trends and innovations in the green building sector. When needed, the subcommittee will consult with other County staff or external experts.

Requirements for projects to meet the minimum performance standards may be adjusted on a project-by-project basis, if achieving the objectives is restricted by the scope or type of a project. This includes considerations of financial restrictions or other barriers, such as the type of facility, which may make it difficult to achieve a high performance standard.

Financial restrictions are not intended to limit the performance of the County's facilities and when possible, the HPBS should be considered as part of the project's budget. These standards should not be considered as optional or discretionary measures that are in addition to the approved budget for a project. The County will strive to analyze the economic performance of corporate facilities to quantify cost savings and the return on investment.

Design Considerations

To achieve a high performance standard for the County's facilities, buildings will be designed with the goal of including the following considerations:

- Energy performance targets exceeding the minimum building code,
- Criteria included in Passive House Standards,

- Being net-zero energy ready,
- Future resiliency planning for climate change,
- Energy and/or emissions targets with ongoing monitoring, and
- Selection of durable and low maintenance building materials and finishes that have few volatile organic compounds (VOCs), low embodied carbon, and do not negatively impact the environment at the end of building life.

Additionally, the County might consider obtaining a certification for facilities built to Passive House Standards, if it is a requirement of funding or another partnership. While building certifications can be beneficial, as they can help confirm that performance measures are being met, they are often costly and do not always guarantee that the building will achieve the desired outcome. If certification is not obtained for a project, the County will strive to monitor and track performance measures to ensure energy efficiency and analyze cost savings through:

- The installation of tracking sensors,
- Comparison of utility bills and energy consumption,
- Comparison to energy modeling done before construction, and/or
- Comparison of annual energy consumption to a similar facility built to code.

Building Standards

High Performance Attributes

The County will incorporate high performance attributes into building design and construction to the maximum extent possible. The County will strive to meet, at a minimum, the performance measures outlined in the international Passive House Standard by the Passive House Institute (Passivhaus Institut).

The Passive House Standard achieves energy efficiency through the consideration of 5 principles, including enhanced levels of thermal insulation, Passive House windows, heat recovery ventilation, airtightness, and reduced thermal bridging. As a result of these principles, buildings designed and constructed to these standards can achieve over a 75% reduction in the amount of energy used for heating and cooling.

In order to achieve Passive House Standards, the County will strive to meet the following criteria:

- **Space heating/cooling:** Maximum energy demand for space heating and cooling not exceeding 15 kWh/m²a or a heating load maximum of 10 W/m²
- **Airtightness:** Maximum pressurization test result of 0.6 ACH at 50 Pa

- **Total primary energy demand:** Maximum energy demand for domestic applications (ie. heating, cooling, electricity, etc.) not exceeding 120 kWh/m²a
- **Thermal comfort:** Living areas should be comfortable year round, with no more than 10% of hours in a year exceeding 25°C

For additional technical details and specifications, the County will reference the full criteria included in the [Passive House Standard](#).

Net-Zero Energy Ready

In addition to the high performance attributes mentioned above, the County will also strive to build and retrofit facilities to be net-zero energy ready (NZER). A NZER facility is a high performance building that is so energy efficient, that it is able to meet its energy demand with on-site renewable energy. Being NZER means that in addition to achieving energy efficiency through Passive House Standards, the County will also strive to include opportunities for on-site renewable energy generation, in the design and construction of corporate facilities.

The County will consider opportunities for renewable energy on a project-by-project basis. This will include a technical and financial evaluation of the opportunities for renewable energy, including exploring innovative technologies, opportunities for pilot projects, and available sources of funding. Examples of technologies that will be considered include solar energy, heat recovery systems, and ground source (geothermal) heating.

When retrofitting existing facilities to be NZER, the County may also explore innovative options such as construction techniques that improve the energy efficiency of existing buildings, while preserving the structure of the original facility. This could include the addition of prefabricated walls and insulated roofs, which would allow buildings to remain operational during construction.

Future-Ready & Resiliency Planning

Building efficient facilities will help the County adapt to the impacts of climate change. Due to their efficiency and durability, high performance buildings tend to withstand the impacts of climate change and extreme weather. This reduces the likelihood of future damages, which can save money, ensure business continuity, and provide a safe and comfortable environment in the event of an emergency.

In addition to building efficient facilities, the County will also consider the type of building materials that are being used and seek to incorporate durable options that are more resilient to the impacts of climate change. The County will seek technical expertise when needed, in addition to referencing available resources including the [Component Database](#) by the Passive House Institute and the [Climate Resilient Home adaptation tool](#) funded by the Federation of Canadian Municipalities.

The County will also use the corporate Climate Lens Tool to ensure that climate risks are considered in the design of County facilities. This includes considerations of modifications that can be made to mitigate risks and improve resiliency.

In addition to considerations for building resiliency, the County will also strive to incorporate innovative, future-ready features in corporate facilities. This includes considerations for electrical capacity and placement for electric vehicle charging stations.

Stormwater Management

As part of building resilient facilities, the County will also strive to improve stormwater management to mitigate climate risks associated with increased precipitation and extreme weather. In addition to the features already considered for stormwater management, the County will strive to incorporate green infrastructure into new and existing facilities. This will include evaluating options that encourage water retention and improve stormwater quality, such as the principles involved in low-impact development (LID), which can include permeable pavements, rain gardens, preservation of existing plant material and trees, undisturbed soils, live roof plantings, and other innovative options.

This may also include evaluating and incorporating landscaping elements around County facilities that will help manage stormwater while supporting local biodiversity, improving soil quality, and reducing the need for watering and maintenance. This will include the consideration of native and drought tolerant plant species, grass alternatives, and tree planting requirements, which may be used to help offset the carbon footprint of a building.

Water Conservation

Having high performance standards for County facilities also includes water conservation and management. The County will strive to reduce water consumption by integrating water saving features throughout the design and retrofit of County facilities. This may include the consideration of low-flow plumbing fixtures, rainwater harvesting and collection cisterns, groundwater collection, and grey water reclamation and reuse (ie. for indoor plumbing), as well as the landscaping elements mentioned above, which help to retain stormwater on site and recharge the local aquifer.

Continuous Improvements

In addition to meeting the HPBS, the County will seek to continually improve facilities to achieve and maintain high performance levels. The County will continue to design and retrofit facilities to the highest performance possible, while taking advantage of innovations and industry trends as they arise. Existing facilities will be upgraded to higher efficiencies as budgets and circumstances allow.

Acronyms & Glossary

ACH: Air changes per hour

CCCAP: Corporate Climate Change Adaptation Plan

CDMP: Conservation and Demand Management Plan

HPBS: High Performance Building Standard

LID: Low impact development

NZER: Net-Zero Energy Ready

VOCs: Volatile organic compounds

Adaptation: Actions that are taken to reduce or respond to the negative impacts of climate change, while taking advantage of potential new opportunities.

Climate change: Changes in long-term weather patterns caused by natural variability and human activity. Changes in climate since the early 20th century are primarily driven by human activities, which have increased greenhouse gas emissions causing surface temperatures to rise.

Embodied carbon: The carbon footprint of a material, which includes the emissions generated from the extraction, manufacturing, transportation, and installation of building materials.

Greenhouse gas emissions: Gases emit from a natural or anthropogenic source that absorb heat in the atmosphere. Carbon dioxide, methane, and water vapour are examples of greenhouse gases.

Low impact development: Refers to the use of landscape features that mimic the natural flow of water to improve stormwater management. Common examples include permeable pavements, green roofs, and rain gardens.

Mitigation: Measures that are taken to reduce or avoid the greenhouse gas emissions that are contributing to climate change.

Net-Zero Energy Ready: A building that is so energy efficient that it is able to meet its energy demand with on-site renewable energy generation.

Passive House: A building constructed to achieve high levels of energy efficiency based on a set of criteria for energy demand, airtightness, and building comfort.

Resilience: The ability of a system or community to anticipate, cope with, and recover from the impacts of climate change.

Volatile organic compounds: Organic chemicals released as gases, which may have adverse health effects.