buildABILITY CORPORATION

Energy and Climate Change Assessment Report

Whitechurch Urban Boundary Expansion Area

December 2024

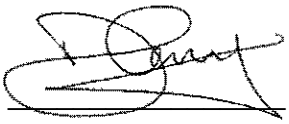
prepared for:

Whitechurch
Landowners Group Inc.

Prepared by:

buildABILITY Corporation

Michael Lio, P.Eng



Dhiyandra Faizal, BA

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1. Introduction

BuildABILITY Corp. has been retained by the Whitechurch Landowners Group Inc. to develop an Energy and Climate Change Assessment Report ("ECCA Report") for the Whitechurch Urban Boundary Expansion Area ("Whitechurch UBEA") to be submitted to the City of Hamilton. The ECCA Report is prepared "to demonstrate the impact of the potential settlement area expansion on the City's ability to achieve carbon neutrality and demonstrate the opportunities to reduce climate change impacts and avoid climate change risks."[1]

1.1 Emissions and Climate Change in Hamilton

Home to over 7.6 million people, the Greater Toronto Hamilton Area (GTHA) represents almost 50% of Ontario's total emissions. In the GTHA, total emissions grew by 2% between 2022 and 2023, from 53.5 million tonnes to 54.5 million tonnes.[2]

In the Hamilton Region, total emissions rose by 2.9% between 2022 and 2023 (see **Figure 1.1**). The industrial sector is the largest contributor, accounting for 45% of the total emissions, followed by buildings at 33% and transportation 19%. The City's sizeable industrial activities contribute significantly to its per capita emissions, which rank the highest among all GTHA regions at 15.72 tCO_2e/person. Even when industrial emissions are excluded, Hamilton remains the highest in the region, with per capita emissions of 8.7 tCO_2e/person—well above Durham Region, the second highest, at 7.79 tCO_2e/person.

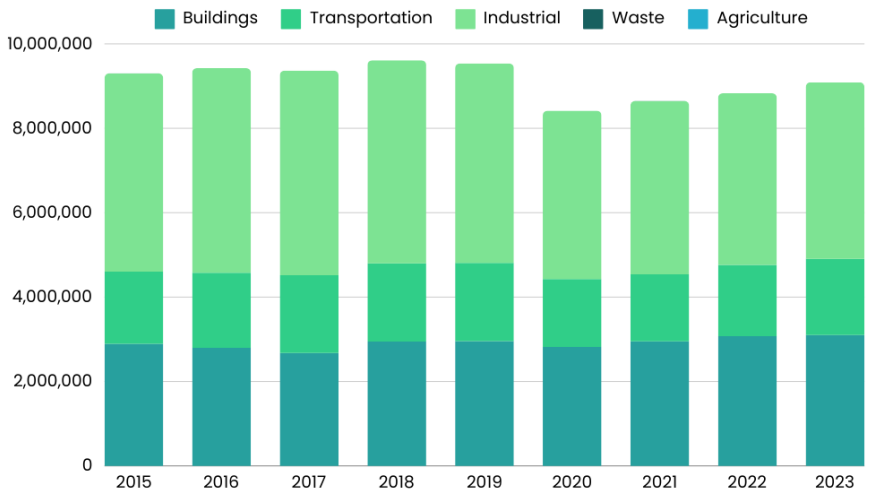

Figure 1.1. Hamilton Region Total Emissions, 2015 – 2023.
Source: The Toronto Atmospheric Fund.

The impacts of climate change driven by carbon emissions are becoming increasingly evident to Hamilton residents. Extreme weather events such as ice storms, power outages, waterfront flooding, and the resulting costly infrastructure repairs highlight the local impacts of climate change. Other effects include increasing escarpment erosion, damage to access roads, basement flooding, more frequent extreme heat events, windstorms, and the spread of vector-borne diseases like Lyme disease.[3]

In 2019, the City Council declared a climate emergency, resulting in the creation of a Corporate Climate Change Task Force. This task force is dedicated to identifying and implementing actions to achieve net-zero emissions by 2050.[4] In 2022, the City's brought together the Community Energy and Emissions Plan and the Climate Change Impact Adaptation Plan together under Hamilton's Climate Action Strategy (HCAS), a coordinated strategy to address mitigation and adaptation in support of the City's vision. This Energy and Climate Change Assessment Report demonstrates how the Whitechurch Urban Boundary Expansion Area aligns with the City's HCAS.

1.2 What is an Energy and Climate Change Assessment Report?

Energy efficiency and greenhouse gas (GHG) emissions reduction are critical strategies in addressing climate change, an increasingly urgent priority as its impacts become more apparent every year. Within the context of the Whitechurch UBEA, this ECCA Report provides a strategic framework for aligning the proposed development with the City's climate change objectives, unique to its built environment. This report will enable Whitechurch's communities to integrate energy and emissions considerations early in land-use and infrastructure planning.

With a strong commitment to sustainability and low environmental impact, the Whitechurch UBEA will be developed with a focus on both mitigating and adapting to the effects of climate change. The ECCA Report outlines a path toward building a low-carbon community that remains mindful of affordability for homebuyers. Ultimately, it aims to demonstrate that growth can be achieved affordably without placing an unreasonable burden on the environment at a price that homebuyers can continue to afford.

1.2 Living Document

At this time, the Energy and Climate Change Assessment Report provides a high-level plan for the community. This ECCA Report a living document that will evolve and adapt through ongoing review, monitoring and consultations as the community builds out. Updates will be undertaken at various phases of the development approvals process to address any necessary changes resulting from innovations in technology, new trends, and any changes in the market and regulations.

1.3 Location and Description of the Lands

The subject lands comprise of a rectangular shaped grouping of parcels bounded by Upper James Street to the west, Airport Road East to the north, Miles Road to the east and White Church Road East to the south (see **Figure 1.1**). The study area is comprised of approximately 364 hectares of land, with approximately 273 hectares being developable when taking into account study area constraints such as natural heritage features, stormwater management ponds, etc. (See **Appendix A** for Concept Plan)

The subject lands are situated within Ward 11 located directly east of the Mount Hope community. The subject lands are occupied by a small collection of single detached dwellings, agricultural plots and the Southern Pines Golf & Country Club which fronts onto Upper James Street. The site has +/- 2,621.0 metres of frontage on Airport Road East, +/- 1,316.0 metres on Miles Road, +/- 2,848.0 metres on White Church Road East and +/- 1,317.0 metres on Upper James Street and is approximately 364.0 hectares in size.

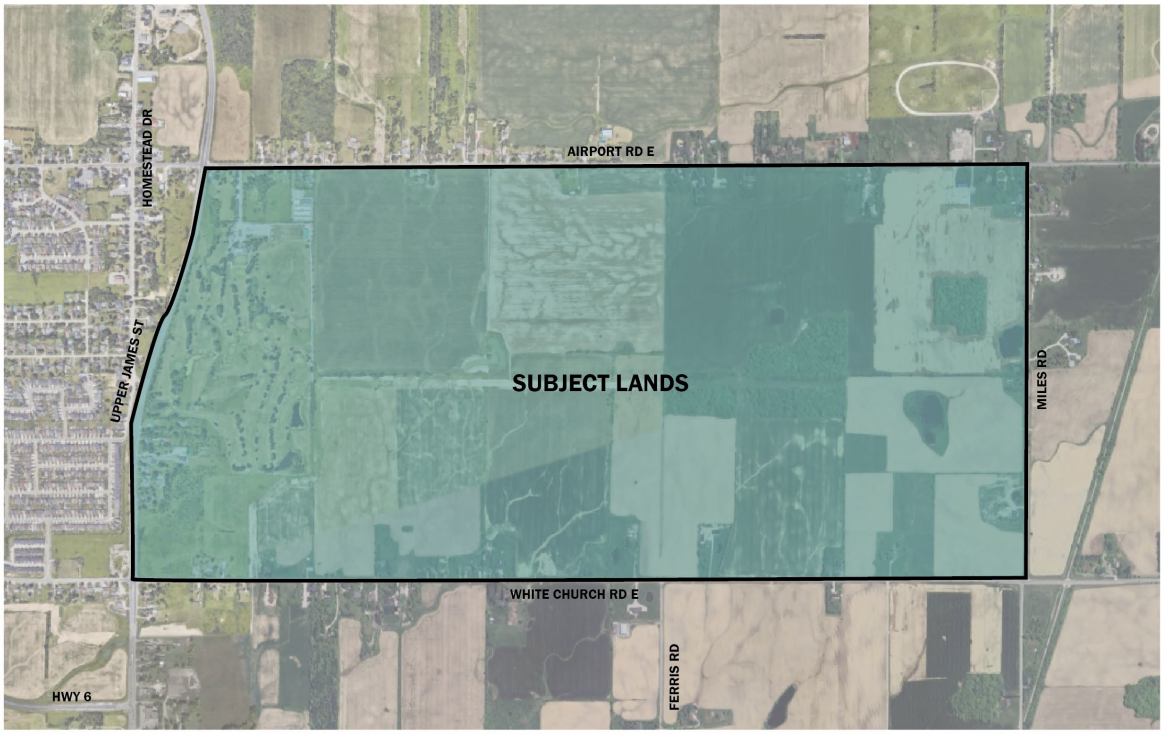

Figure 1.1. Location of subject lands.

1.4 Policy Context

The ECCA Report aligns with, and reflects, the common goals, policies and recommendations described in local, regional and provincial planning policies.

1.3.1 City of Hamilton Plans

ReCharge Hamilton: Community Energy and Emissions Plan (2022)

Recharge Hamilton: Community Energy and Emissions Plan (CEEP) identifies a pathway for the City to become net-zero by 2050, outlining strategies and actions to reduce greenhouse gas emissions, increase the resiliency of the energy systems and improves economic prosperity in the City. It identifies five Low-carbon Transformation to support the transition, namely: (1) Innovating our Industry, (2) Transforming Our Buildings, (3) Changing How We Move, (4) Revolutionizing Renewables, and (5) Growing Green. In Hamilton, industrial emissions make up the largest portion of the city's total emissions, with transportation coming in a distant second and residential emissions third. This ECCA Report focuses on reducing GHG emissions in the residential and transportation sectors within the built environment of Whitechurch subject lands.[5]

The net-zero scenario within the building sector puts precedence and priority on energy efficiency in order to minimize the societal and environmental costs of the low-carbon transition, emphasizing that fuel switching to low-carbon/renewable energy sources could only be considered once energy efficiency measures are in place. The CEEP establishes a target for new dwellings and commercial buildings to be 60% more energy efficient in 2031, compared to 2016 levels.[6] This ECCA Report will position Whitechurch to align with the objective of the CEEP, promoting sustainable, energy efficiency, resilient communities within the subject lands.

Hamilton Climate Change Impact Adaptation Plan (2022)

The Hamilton Climate Change Impact Adaptation Plan (CCIAP) presents a plan for Hamilton to become more resilient to impacts of the changing climate. In Hamilton, the impacts of climate change have become increasingly evident, with extreme heat events, waterfront flooding, escarpment erosion, extended power outages, among other challenges. Following the City's declaration of a Climate Emergency in 2019, the CCIAP draws on the latest climate projections to identify all of the ways that climate change may affect the City operations and the community at large. Four Resilient Themes are identified in the plan: (1) Built Environment, (2) People and Health, (3) Natural Environment, Water and Agriculture, and (4) Energy and Economy.[7] Each theme outlines various actions, action details, and supporting actions that will be reflected in this ECCA Report.

The CCIAP establishes a vision that "the City of Hamilton will be a national leader on Climate Adaptation: a healthy, equitable, vibrant, and sustainable community that responds to the needs of residents, businesses and institutions, and is resilient in the face of a changing climate."[8]

Urban Hamilton Official Plan (2024)

The ECCA Report will align with the Urban Hamilton Official Plan (UHOP) policies. Complete communities require a mix of land uses including housing, uses which provide goods and services, and a range of transportation modes including public transit, all of which depend on energy.[9] Policy 3.6.2 addresses climate change through two complementary actions: mitigation (i.e. reduction) and adaptation. Some of the goals and policies of the UHOP to reduce emissions and improve air quality are as follows:

a) promoting compact, mixed use urban communities;
b) integrating the transportation network to include all modes of transportation
c) promoting active transportation, including walking and cycling, and the use of public transit; (OPA 167)
d) achieving a natural heritage ecosystem through the protection and enhancement of natural heritage features and functions;
e) implementing urban design features to reduce fugitive dust;
f) enhancing vegetative cover; and,
g) reducing the heat island effect through the use of reflective roofs, green roofs, natural landscaping, and increasing the tree canopy.

Hamilton City-Wide Green Building Standards (2024)

The City of Hamilton City-Wide Green Building Standards (GBS) was endorsed by council on October 9th, 2024. In efforts to achieve net zero greenhouse gas emissions by 2050, the GBS establishes sustainability performance requirements and metrics applicable to all new residential, institutional, commercial and industrial uses in the urban area. These standards apply to all site plans and aim to promote energy-efficient, sustainable communities. Although this ECCA Report pertains specifically to the Urban Boundary Expansion application, it is crucial to recognize the GBS requirements, which will be applicable at later stage of the planning processes.

The GBS is structure into two Tiers: Tier 1, which includes mandatory requirements, and Tier 2, which consists of voluntary targets. These standards are further organized into five key Impact Categories

1. Energy and Carbon
2. Ecology and Biodiversity
3. Water
4. Waste and Management and Materials
5. Community and Urban Design[10]

1.3.2 Provincial Plans

Provincial Planning Statement (2024)

The Provincial Planning Statement (PPS), effective October 20, 2024, replaces the Provincial Policy Statement, 2020, and A Place to Grow: Growth Plan for the Greater Golden Horseshoe, consolidating both into a single land use policy document. Policy 2.9 requires planning authorities to plan to reduce GHG emissions and prepare for the impacts of a changing climate. Approaches that could be taken include, supporting the achievement of compact, transit-supportive, and complete communities; promoting energy conversation and efficiency; encouraging green infrastructure, low-impact development, and active transportation; and building community resilience to the impacts of a changing climate.[11]

2. The Vision

It is the objective of the Whitechurch UBEA to support the City of Hamilton in maintaining their ability to accommodate residential growth for the next 15 years, applying a full range of housing types and tenures across its lands. Crucially, the Urban Boundary Expansion would ensure the City has the appropriate mix of greenfield and intensification lands to support the current population and anticipated population growth in a range and mix of housing options to support housing affordability.

The vision of this proposed expansion is for the City of Hamilton to achieve its growth target with an appropriate greenfield development of a complete community adjacent to built-up areas. Aligning with the City of Hamilton's community vision referenced in Our Future Hamilton (2017), the Whitechurch UBEA will aim to advance an environmentally sustainable community through the *Clean and Green* objectives.

Shaped by extensive community engagement, Our Future Hamilton reflects the community's priority to tackle climate change, protect and improve water and air quality, strive to be a zero-waste community, preserve and rehabilitate the City's natural ecosystems, and transition to more sustainable practices. It is the objective of the Whitechurch UBEA to foster growth in the City of Hamilton that uphold these priorities.

2.1 Guiding Principles

This Energy and Climate Change Assessment Report is founded on the Low-carbon Transformations as described in the City of Hamilton's Community Energy and Emissions Plan. The guiding principles of this ECCA Report are as follows:

1. **Transforming our buildings**
2. **Revolutionizing renewables**
3. **Changing how we move**
4. **Growing green**

Transformation 1: Innovating Our Industry from the CEEP is not included in this ECCA Report's guiding principles, as there will be little to no heavy industrial uses (e.g. steel mills) within the Whitechurch UBEA.

2.2 Areas of Impact

To align with local and provincial policies, this ECCA Report focuses on the following areas of impact:

1. Energy and Carbon

This section addresses energy efficiency and carbon reduction efforts to align with the emission targets established in the CEEP. Key areas addressed are Site Design, Land Use Pattern, Building Design, and Overall GHG Emissions.

2. Low-carbon Energy Solutions

This section explores opportunities for low-carbon energy solutions, such as solar, ground-source heat pump, and district energy systems, that may be feasible and appropriate to the built environment of the Whitechurch UBEA.

3. Sustainable Mobility and Active Transportation

A sustainable community is one that reduces car dependency, facilitates active transportation, and supports public transit. Emphasis on sustainable mobility not only reduces energy use and GHG emissions, but also contributes to improved public health and quality of life.

4. Natural Environment and Water

The Whitechurch UBEA include areas of Significant Woodland on the east side of the subject lands. It is the intent of the development to protect and enhance existing natural heritage features, minimize impacts and consumption of agricultural lands, and be compatible with adjacent planned and existing land uses.

5. Climate Resilience

Resilience in the context of emergency preparedness and climate change adaptation refers to a building's ability to withstand extreme weather events while ensuring occupant safety and comfort. Achieving this requires a holistic, integrative design process that views the building as a system and addresses foreseeable challenges. This section will explore resilience strategies through the built environment and building enclosure.

3. Energy and Carbon

In 2023, the building sector accounted for 33% of the total emissions in Hamilton.[12] Emissions from the building sector are primarily driven by the use of natural gas for space and water heating.,

As outlined in the CEEP, **the City of Hamilton established a target that, by 2030, new dwellings are 60% more energy efficient relative to 2016 and that only 20% of new dwelling are single detached by 2050.[13] For commercial buildings, the City set a target to achieve 60% lower energy use intensity than 2016 by 2050**.[14]

The Whitechurch UBEA presents a unique opportunity to promote sustainable urban growth by integrating thoughtful energy efficiency and emissions strategies from the initial planning stages through to construction and occupancy.

3.1 Site Design

It is the objective of Whitechurch to monitor, maintain and improve the diversity and resiliency of urban trees and forests to mitigate the urban heat island effect (CCIAP Objective 8). The existing Natural Heritage System within the subject area will be protected for the long term, in a manner that is consistent with the PPS 2024. Land uses surrounding the Significant Woodlands in the subject lands will be sensitive to the biodiversity and ecological functions of the natural heritage systems.

The development will aim to use green infrastructure, including parklands, stormwater management systems, and street trees, to maintain and increase carbon sequestration (CEEP 6.5). Whitechurch will consider the implementation of the City's Urban Forest Strategy (2021) to maintain a healthy and resilient urban forest (CCIAP Action 8.2). To ensure that all residents have adequate access to trees and green spaces, the development could aim to achieve the 3-30-300 urban forest rule. This rule advocates for each resident having access to at least 3 trees, a tree canopy cover of 30% within the neighborhood, and being within 300 meters of green space.

In addition, the Whitechurch UBEA will also be designed to mitigate urban heat island effect. The urban heat island effect is a phenomenon where urban areas experience higher temperatures than surrounding rural areas due to factors like reduced vegetation and increase heat absorption by buildings and pavement. The Whitechurch community will consider measures, such as designing buildings with green roofs or cool roofs, increase tree canopies along for shade, and using paving materials with high solar reflectance index (SRI) (GBS CD6.1).

3.2 Land Use Pattern

The Concept Plan for Whitechurch envisions a predominantly residential community complemented by neighborhood parks throughout the development, providing residents with greater access to open spaces. Two neighbourhood parks abut the Significant Woodlands, providing connectivity and enhancements to the natural environment while offering recreational spaces for the community. A 16-hectare commercial area is planned for the southeast quadrant of Airport Road East and Upper James Street, serving as a hub for local businesses and services. Additionally, the Plan includes three elementary schools: one located in the northeast corner and two in the southwest corner of the development.

3.3 Building Design

"Transforming Our Buildings" is a key pillar of the CEEP, highlighting energy efficiency as the top priority for reducing GHG emissions in the building sector (CEEP 6.2). Buildings within the subject lands will aim to achieve better than Code energy efficiency and conservation levels.

Applicable to Draft Plan / Site Plan Applications, the development will aim to align with the requirements of the council-approved Hamilton Green Building Standards. This involves designing, constructing, and labeling Part 9 low-rise residential to meet ENERGY STAR for New Homes (ESNH) v17.1, enabling new homes to be approximately 20% more energy efficient than a typical home built to Code minimum (GBS EC1.1). An ESNH certified home typically features more energy efficient space conditioning systems, ENERGY STAR certified fenestration produces, higher levels of insulations, enhanced airtightness, and reduced electrical loads.

In addition, energy use and GHG emissions in large buildings will also aim to meet the targets outlined in the GBS. This applies to buildings that exceed 600m^2 and are under the scope of Part 3 of the Ontario Building Code (OBC), including those within the Potential Intensification Hub and Potential Intensification Corridor. Key considerations include meeting the specified Total Energy Use Intensity (TEUI), Thermal Demand Use Intensity (TEDI), and Greenhouse Gas Emissions Intensity (GHGI) (GBS EC1.3). Achieving lower values of these key metrics reduces the environmental impact of building operations.

While GHGI focuses on operational carbon, embodied carbon should also be given consideration, as outlined by the GBS. Embodied carbon refers to the carbon emissions associated with the manufacture and supply of all of the materials, components, and systems used in the construction of a house, building, or community. It is encouraged that a Materials Emissions Assessment and a whole building life cycle assessment by conducted to measure carbon emissions generated at different phases of the material's life (GBS EC2.1).

3.4 Overall Carbon Emissions

The proposed urban boundary expansion includes a residential target of approximately 5,500 new residential dwelling units of various housing typologies. While the development will inevitably

contribute to the City's overall carbon emissions, the impact can be mitigated through the adoption of energy-efficient designs and low-carbon construction practices. Despite an anticipated rise in total emissions, per capita emissions may remain stable or even decline due to the population growth that the development is planned to accommodate.

The estimated total overall carbon emissions of the community at full build out could be modelled to assess alignment with the City's emission targets. Once building archetypes and unit counts are established, this modelling process could include an analysis of energy consumption and carbon emissions across various whole-community scenarios. This analysis can be included in a Community Energy Plan as required by the GBS (GBS EC5.1).

Each modeled scenario could represent incremental improvements in energy efficiency and carbon reduction, with the Ontario Building Code minimum requirements serving as the baseline and Net Zero Energy and Emissions as the most ambitious target—a goal set by the CEEP by 2050. A scenario where buildings satisfy the Hamilton Green Building Standards could also be incorporated. These scenarios will be defined by building measures and practices of each building archetype, incorporating a range of potential technologies and strategies. Consideration should also be given to the economic and technical feasibility of each scenario to ensure that increased energy efficiency and low-carbon measures do not compromise homebuyer affordability.

By comparing the energy and emissions outcomes of each scenario, developers and builders can identify a pathway to align with the City of Hamilton's energy and emissions targets effectively.

4. Low Carbon Energy Solutions

In addition to improved energy efficiency and GHG reduction measures, the Whitechurch UBEA could consider alternative energy solutions that can provide low-carbon energy solutions to the community and potentially the surrounding area.

The City of Hamilton set a target that starting in 2031, all new homes will have 30% of its annual load covered by solar PV, before the introduction of heat pumps. In addition, starting in 2026, all new commercial buildings will include rooftop solar PV panels.[15]

4.1 Solar

Low-rise homes may benefit from roof-mounted solar PV technologies. Due to large roof areas, the energy benefits may offset a good portion of the home's energy consumption. High-rise on the other hand, have little roof space and high energy use. If solar energy were to be implemented in the community, installation of roof-mounted solar photovoltaic (PV) on low-rise homes could be prioritized.

The City of Hamilton's Green Building Standards outlines that all new buildings must be designed and constructed to be solar-ready (GBS EC5.2).[16] A solar-ready home is one that is built to allow for the installation of a future solar PV system. Under NRCan's guidelines, it includes design considerations for roof space, solar PV conduits, plumbing connections to a hot water heater, an electrical outlet, mechanical room floor space and mechanical / electrical room wall space.[17] In addition, the GBS requires builders to include an opt-in for new owners to install solar PV or thermal systems at the new owner's expense, where applicable (GBS EC5.2).

Building-integrated Photovoltaics (BIPV) solar façade systems offer an innovative solution for high-rise buildings, where there is limited roof space but ample façade surface area available for solar installations. In recent years, BIPV technologies have become more advanced and cost-effective, making them a viable option. Beyond reducing operational energy costs and improving energy supply resiliency, BIPV systems have the potential to generate excess energy that can be sold back to the grid, creating a direct profit stream for building owners while significantly increasing property value.[18]

4.2 Ground-source Heat Pump

Ground-source heat pumps (GSHP), or also known as geo-exchange heat pumps, are electric heat pumps that transfer heat between the building and the ground, which maintains a constant temperature of around 10 degrees Celsius year-round. In Ontario, residential homes benefit from

electric heat pumps as they are among the most cost-effective and climate-aligned technologies available for space and water heating.[19] The installation of ground-source heat pump is encouraged but not mandated by the GBS Tier 2 metric (GBS EC5.3).

In the context of the Whitechurch UBEA, installing GSHPs in each low-rise unit is impractical due to the community's scale. A more viable option is to install GSHP systems underneath the high-density residential buildings in the Potential Intensification Hub. A study suggests that GSHPs in multi-unit residential buildings (MURB) can achieve a 33% reduction in annual energy use and a 47% decrease in GHG emissions compared to conventional 2-pipe fan coil unit HVAC systems.[20] A feasibility study conducted in later planning stages could be considered to assess heating and cooling loads of the building(s), evaluate if GSHP systems are a good fit, and explore ownership structures.

One of the main advantages of GSHPs is their high efficiency throughout the year and lower lifetime costs compared to conventional gas systems or air source heat pumps, despite their higher initial upfront costs.[21] Engaging with a third-party to own and operate GSHPs in large buildings can help lower capital costs. Furthermore, opportunities for government-initiated incentives, such as the Clean Technology Investment Tax Credit, could be explored to reduce capital cost.

4.3 District Energy

When tackling carbon emissions, it is crucial to address on space heating and domestic water heating. Space heating was reported to have the highest share of emissions by end use in the residential sector, followed by water heating.[22] A District Energy (DE) system, which consists of a network of pipes distributing thermal energy to multiple buildings within a community, sources this energy from a centralized heating and cooling center.

A district energy system is not unfamiliar in the Hamilton Region. The McMaster Innovation Park (MIP) DE system provides a centralized heating and cooling plant for three MIP buildings with a total GFA of 441,000 sqft, which generates, extracts, and shared thermal energy through the use of highly efficient geothermal and combined heat and power (CHP) engines, and mechanical equipment.[23][24] The captured thermal energy is distributed through a network of underground pipes where it is used for space and water heating.

To evaluate the potential for a district energy system in the Whitechurch UBEA (GBS EC6.1), a comprehensive feasibility study could be conducted. This study could assess the technical and economic viability of the system, analyze the community's thermal energy demand, and evaluate whether the concentrated load density is sufficient. It could also involve engagement with developers, the City of Hamilton, and potentially third-party organizations who oversee ownership and operations, to determine if a DE system is appropriate and both economically and technically feasible.

5. Sustainable Mobility and Active Transportation

The Toronto Atmospheric Fund reported that total emissions increased by 2.9% from 2022 to 2023 levels, with the transportation sector as the biggest driver of this increase (up 7%).[25]

The City of Hamilton set a long-term target to lower the share of daily trips made by single-occupant vehicles from the 2011 baseline of 67% to 53% by 2031 (see **Figure 5.1**).[26]

It is the objective of the proposed development to create a transit-supportive community that is compact and well-connected to increase opportunities for active transportation. Measures to promote active transportation will reduce trips made by single-occupancy vehicles, leading to lower carbon emissions, and improved air quality and health benefits.

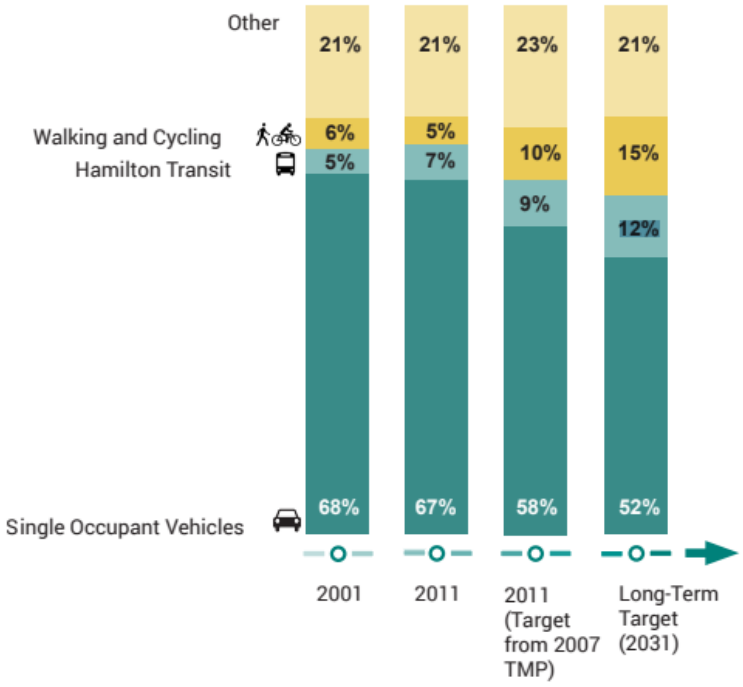

Figure 5.1. Share of daily trips made by different modes of travel. Source: City of Hamilton

5.1 Active Transportation

Whitechurch UBEA will aim to provide safe and direct routes that encourage the use of active transportation modes (GBS CD1.3). The subject lands will include a network of suitable cycling facilities and multi-use paths which also connects to the bicycle network (GBS CD1.2). A Transportation Master Plan Study (TMP) has been developed for the Whitechurch UBEA by nexTrans Consulting Engineers which recommends pedestrian and cycling networks as shown in **Figure 5.2** and **Figure 5.3**.

The proposed networks will increase mobility and promote active transportation within the community. Other factors that can promote walking are as follows:

- Type of land use mix;
- Complete community and amenities;
- Limited vehicle traffic;
- Security and safety (i.e. illumination);
- Physical space (sidewalk size, street trees, buffer and street furniture); and
- Crossing distance and ease to cross intersections

In addition, guided by the City of Hamilton's Complete Streets Design Guidelines, the TMP recommends street cross-sections that prioritize the creation of complete streets. These designs incorporate bike lanes and sidewalks on both sides of the street, ensuring safe and accessible spaces for active transportation. These street sections are to be considered in the Whitechurch UBEA. An example of a 26 m right-of-way is provided in **Figure 5.4.**

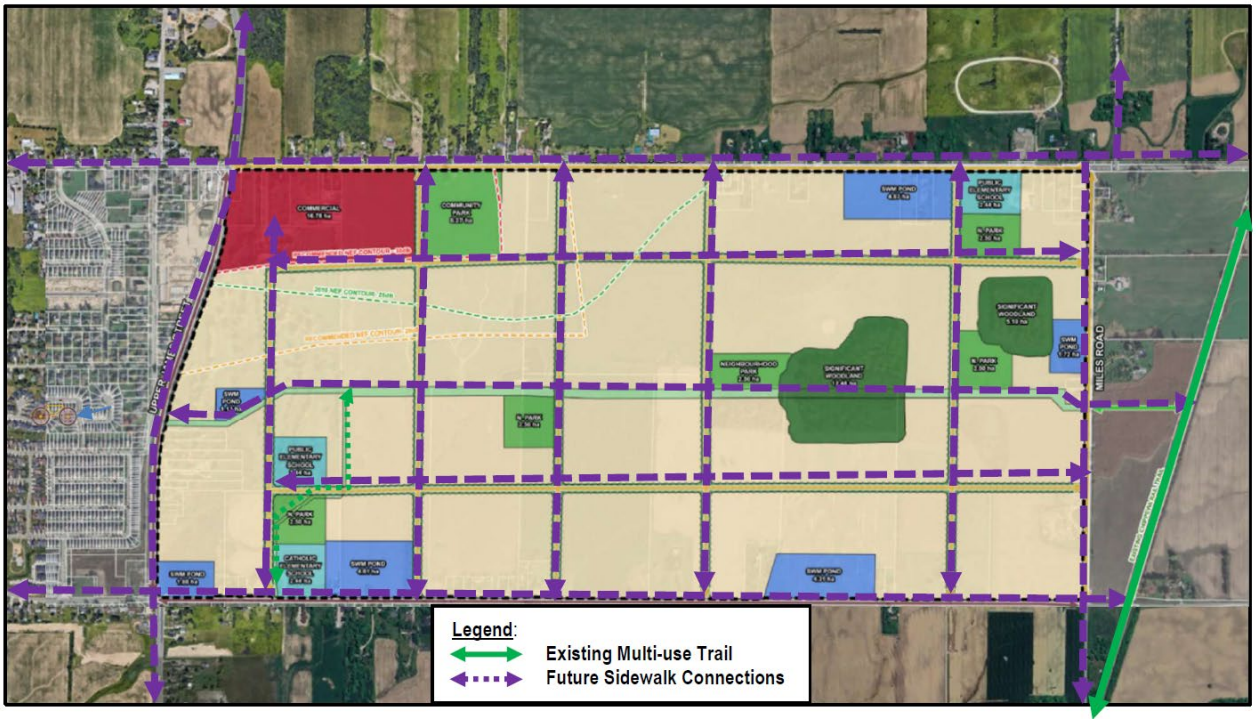

Figure 5.2. Main Pedestrian Connections and Network. Source: nexTrans Consulting Engineers.

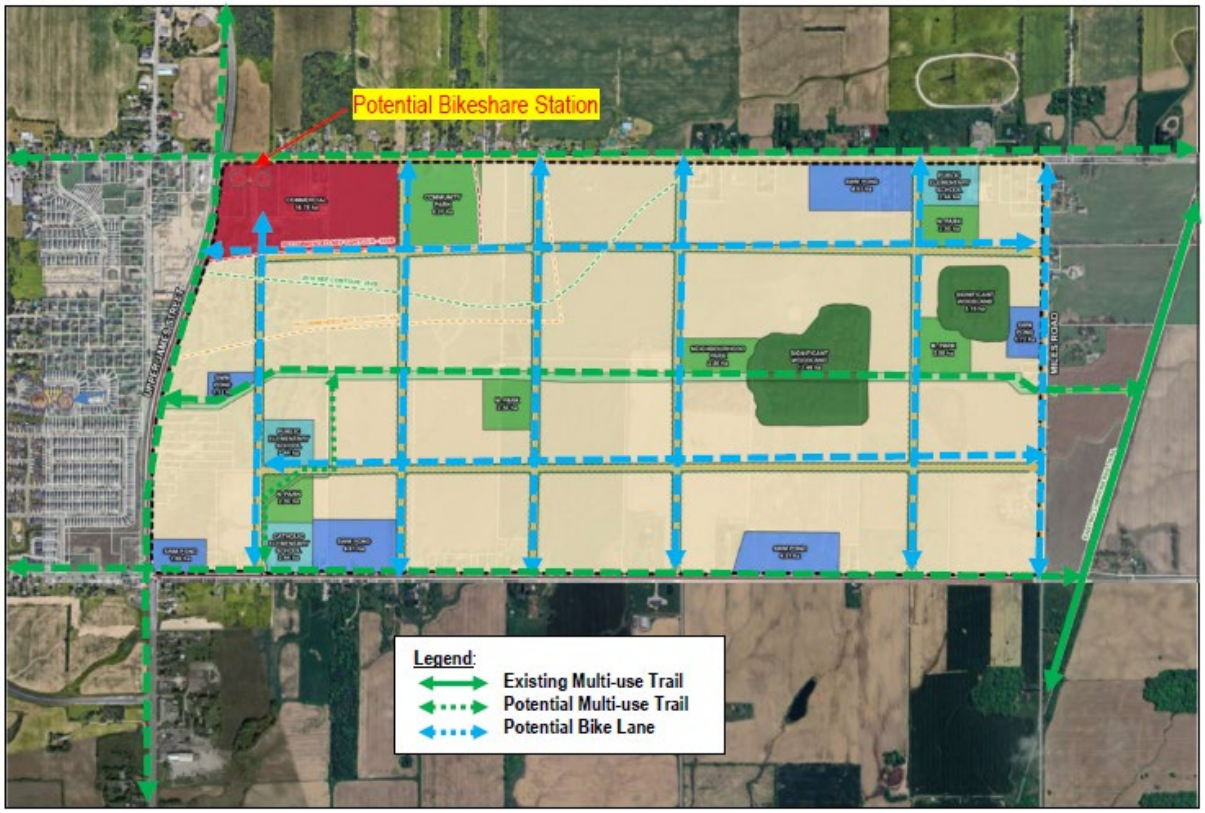

Figure 5.3. Proposed Cycling Network. Source: nexTrans Consulting Engineers

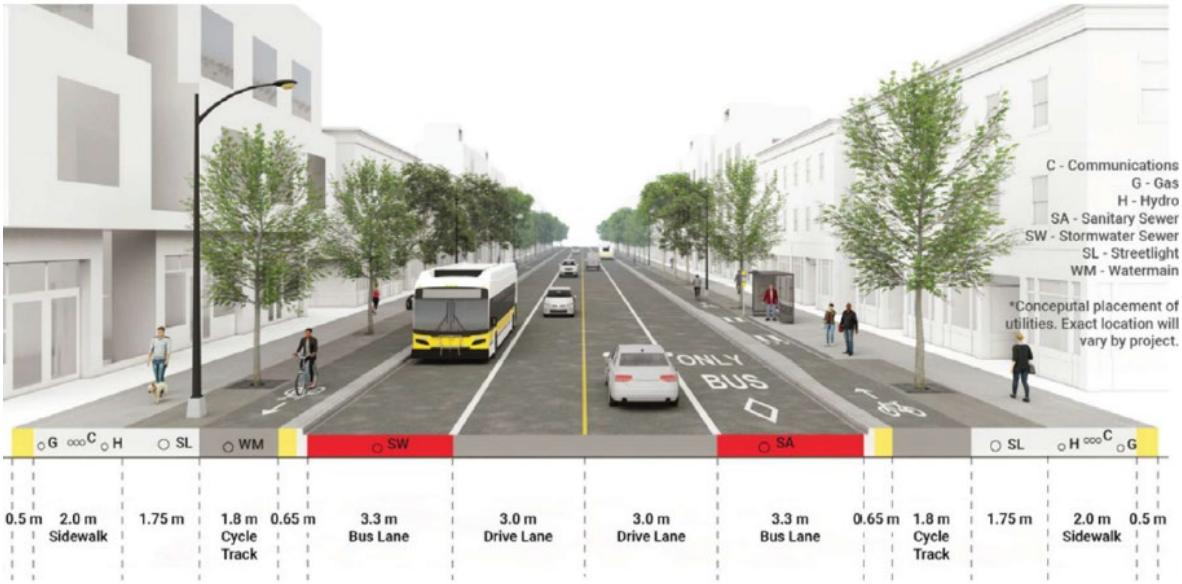

Figure 5.4. 26 m ROW Urban Avenue Typical Cross-Section Design. Source: nexTrans Consulting Engineers

5.2 Transit Infrastructure

The City of Hamilton set a long-term target to achieve 12% of daily trips being made by Hamilton Transit by 2031.[27] It is the intent of the Whitechurch UBEA to support a transit-oriented community that is compact and well-connected.

Transit Oriented Development (TOD) is generally defined as compact, mixed-use development near transit facilities with high-quality walking environments. In a transit-oriented development community, there is an increased emphasis on providing access to transit through mixed-use areas with higher density, degree of activity and amenities. TOD encourages transit supportive land use with the intent to provide more balanced transportation choices so that travel by transit or active transportation such as walking and cycling is encouraged instead of driving a private vehicle.

Currently, the existing Hamilton Street Railway (HSR) provides efficient, sustainable and affordable access to employment, essential services and recreational destinations for all residents. However, the area of the Whitechurch UBEA currently has limited HSR services. Two existing HSR Transit Bus Routes currently provide service to the west of the Whitechurch UBEA.

It is envisioned, as part of the Airport Employment Growth District (AEGD) and the City of Hamilton Transportation Master Plan Update (2018), that several significant planned transit network improvements will be built to connect the proposed expansion, including:

- Future Bus Rapid Transit (BRT) Route 20 – A Line along Upper James Street from Downtown Hamilton to
- Hamilton Airport;
- Future Regional Express Bus connecting the Hamilton Airport to other parts of the City and surrounding regions;
- Proposed Route 101
- Proposed Route 102
- Proposed Route 103
- Proposed Route 116 (A Route)
- Proposed Route 35
- Proposed Route 34; and
- Future Hamilton International Airport to Red Hill Valley Parkway Corridor future transit route

In addition, the TMP outlines proposed future internal transit network within the Whitechurch UBEA as well as proposed bus stops (**Figure 5.5**).

There are also several factors that can promote transit mode, such as:

- Type of land use mix;
- Complete community and amenities;
- The transit user experience;
- First mile and last mile;
- Comfort and safety while waiting for transit; and

- The efficiency of movement between destinations

Aligning with the TMP, it is recommended that the proposed Whitechurch UBEA follows the recommendations and objectives outlined in the Transit Oriented Development Guidelines for Hamilton.

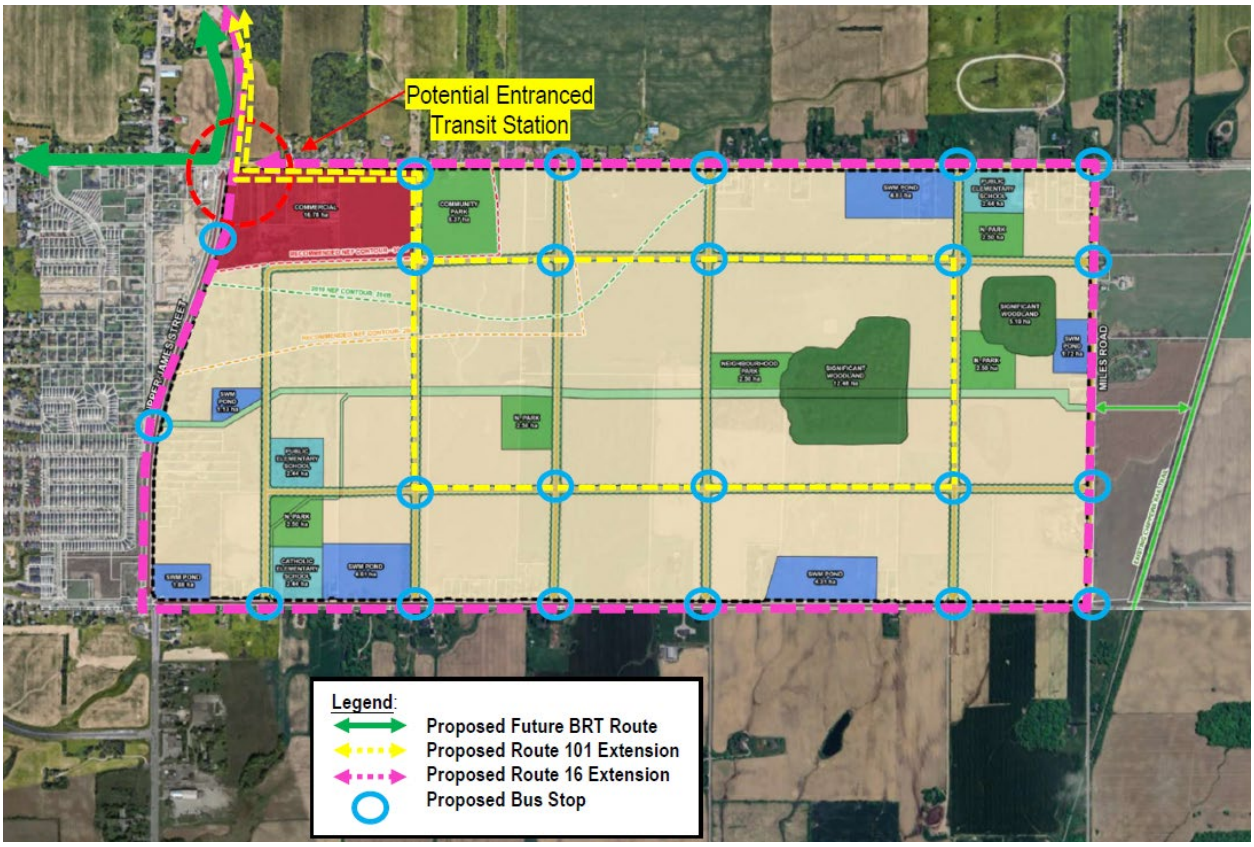

Figure 5.5. Proposed Future Internal Transit Network in the Whitechurch Urban Boundary Expansion. Source: nexTrans Consulting Engineers.

5.3 Electric Vehicles

It has been reported that in 2023, the Region of Hamilton saw a moderate rise in electric vehicle (EV) registrations compared to 2022 levels – approximately 4,000 EVs (up 39%) and 1,800 PHEVs (up 19%). To support and promote the use of electric cars and lower GHG emissions, the development could consider constructing building parking spaces in residential buildings that are EV-ready (GBS EC11.1). This involves providing a rough in for the future installation of EV charging stations.

In addition, section 5.7 of the City of Hamilton Zoning By-Law establishes minimum electric vehicle parking requirements in accordance with the Minimum Electric Vehicle Parking Rate. To align with City's broader environmental goals, this section will be revisited once the City's EV Strategy has been made public.

6. Natural Environment and Water

Protecting and restoring natural areas plays a vital role in addressing climate change by conserving biodiversity, capturing and storing carbon, and protecting ecosystem services. Similarly, urban forests help in reducing the urban heat island effect, improving stormwater management, creating habitat for local wildlife and pollinators, and improving overall psychological and social well-being of the community. The Whitechurch UBEA can achieve balance between urban uses and environmental preservation by implementing these strategies to foster sustainable habitats for both wildlife and human communities.

6.1 Protect and enhance the Natural Heritage System

The Whitechurch UBEA features over 17 hectares of Significant Woodlands, designated as Natural Heritage System (NHS). A healthy urban forest plays a vital role in mitigating climate change by acting as a natural carbon sink, offsetting GHG emissions and reducing their impact on the environment. Recognizing the importance of trees and woodland, it is the objective of the proposed expansion to protect and enhance the NHS, aligning with the local and regional guidelines.

The proposed expansion will aim to protect the trees within the NHS and the greater subject lands according to the City of Hamilton's Tree Protection Guidelines, ensuring that preservation of existing valuables trees in the development will be optimized. The development will also aim to advance the objectives of City's Urban Forest Strategy by planting non-invasive, native, resilient plants, and enhancing urban canopy cover to work toward the City's goal of achieving 30% canopy coverage.

Furthermore, Policy C2.1 of the UHOP outlines the following goals:

- Protect and enhance biodiversity and ecological functions.
- Achieve a healthy, functional ecosystem.
- Conserve the natural beauty and distinctive character of Hamilton's landscape.
- Maintain and enhance the contribution made by the Natural Heritage System to
- the quality of life of Hamilton's residents.
- Restore and enhance connections, quality and amount of natural habitat
- Provide opportunities for recreational and tourism uses where they do not impact natural heritage features.
- Monitor and periodically assess the condition of Hamilton's natural environment

In addition, the PPS highlights that natural features and areas shall be protected for the long term. The long-term ecological function and biodiversity of NHS should be maintained, restored, or where possible, improved, recognizing the linkages between and among NHS and areas, surface water features and ground water features.

According to the Conceptual Plan dated August 9, 2024, the Significant Woodlands are interconnected through a proposed pipeline/trail network extending to the Chippewa Rail Trail. The centrally located trail runs through the development, enhancing connections between the NHS, neighbourhood parks, and other parts of the development.

6.2 Low Impact Development

Low Impact Development (LID) encompasses a range of strategies to increase the infiltration of rainwater into the ground to reduce the impact of contaminated runoff flowing into water streams. These strategies not only address stormwater management, but also provide social and economic benefits, including health benefits, and improved property aesthetics and property value.[28]

Key LID best practices include bio-retention / rain gardens, permeable pavements, green roofs, bio-swales, and rainwater harvesting. By leveraging landscape-based development and green infrastructure, LID supports stormwater flow control, promotes the creation of native habitats, and boosts local biodiversity.

Aligned with the Green Building Standards (GBS), Whitechurch will aim to comply with the Green Standards and Guidelines for Low Impact Development to meet the City's stormwater quantity and quality requirements.

6.3 Water

It is the objective of the Whitechurch UBEA to support efficient and sustainable use of water resources, including water conservation (GBS). The development will consider incorporating rainwater capture systems in residential development for water capture/irrigation and/or local food growing, aligning with the City's CCIAP.[29] Buildings within the development will aim to conserve water use by using efficient water fixtures, balanced irrigation practices, and through ongoing monitoring, reporting and benchmarking (GBS W1,2,3).

7. Climate Resilience

Resilience can be understood in the context of emergency preparedness and climate change adaptation.[30] It refers to the ability of buildings to withstand disruptions caused by extreme weather events, while continuously providing shelter that ensures occupants are safe and comfortable until conditions are restored. Building resiliency must be taken into consideration through an integrative process involving all key players and stakeholders. It is important to approach building design through a holistic building-as-a-system principles, ensuring that all reasonably foreseeable challenges have been considered, and that buildings are durable, energy efficient, and can perform under extreme weather events.[31] Key measures that the Whitechurch UBEA could consider are described below.

7.1 Built Environment Resilience Strategies

- **Community Planning, Infrastructure and Services**: Critical considerations at the community scale include the planning of detours and evacuation routes in the event of automobile accidents, chemical spills, fires or flooding.[32]
- **Low Impact Development (LID) and Building Sites**: Natural landscapes are more resilient and adaptable than man-made infrastructure. LID is a stormwater management strategy designed to mitigate runoff and mimic natural water absorption processes. LID practices that could be considered include, but are not limited to, rain gardens (bio-retention basins), bio-swales, green roofs, and permeable pavements.[33]

7.2 Building Enclosure Resilience Strategies

- **Resilient Building Envelope:** Building enclosures serve as the first line of defense against extreme weather events. Strategies for flood, hail, and high wind protection should be considered in the design of residential buildings. Some of these strategies are already provided in the requirements of the Ontario Building Code and familiar to most builders, such as installing roof sheathing at tighter nail patterns to withstand high winds and hurricane ties at roof, top plate, stud connections. Better than Code resilience strategies could also be considered, including, installing high-wind-resistant sidings products and enhanced secondary water barrier.

  In addition, a high-performing building envelope has the ability to regulate temperature, keeping heat both in during colder months and out during warmer ones. They are able to

utilize heating inertia, passively maintaining occupant comfort for extended period, even during power outages.[34]

- **Basement flooding and sewer backup protection:** Climate change has increased the frequency and severity of extreme rainfall events that would exceed the design capacity of stormwater systems, resulting to increased risks of basement flooding. Key considerations include installing backwater valves to prevent sewer backups, ensuring proper drainage in basements, and grading the lot to direct runoff away from the building.

8. Conclusion and Next Steps

The Energy and Climate Change Assessment Report provides a roadmap for the Whitechurch UBEA to develop an energy-efficient, low-carbon community that aligns with local and regional policies and targets. Through five Areas of Impact, the ECCA Report demonstrates that growth can be achieved affordably without placing an unreasonable burden on the environment at a price that homebuyers can continue to afford.

At this time, the ECCA Report provides a high-level plan for the community, serving as a Phase 1 Report. It is the intent that Phase 2 of the Report will be developed at the Secondary Plan stage. This report will be a living document that will go through multiple iterations, with greater clarity and detail in each iteration. Through an iterative process, involving many stakeholders, including developers, builders, planner, and City staff, the ECCA Report will guide the development of the Whitechurch UBEA into a complete, transit-oriented, mixed-use area. The report will ensure the development is compact, well-connected and both environmentally and economically sustainable, all while promoting and protecting existing natural heritage features, minimize impacts and consumption of agricultural lands, and be compatible with adjacent planned and existing land uses.

Appendix A

Whitechurch Boundary Expansion Area Concept Plan

WHITE CHURCH BOUNDARY EXPANSION AREA

SCALE 1:9000

0 100 200 300 400 500

NOTES:

- Base information prepared by A.T. McLaren Limited
- Aerial Imagery: Google Earth 2023

URBAN SOLUTIONS est.2014 PLANNING & LAND DEVELOPMENT

LEGEND

- SUBJECT LANDS
- RESIDENTIAL
- INSTITUTIONAL
- PARK / OPEN SPACE
- COMMERCIAL
- STORM WATER MANAGEMENT POND
- PIPELINE / TRAIL NETWORK
- NATURAL HERITAGE SYSTEM
- 26m COLLECTOR RIGHT OF WAY
- ARTERIAL RIGHT OF WAY
- CHIPPEWA RAIL TRAIL

LAND USE SCHEDULE

ITEM	AREA (ha)
RESIDENTIAL	249.44
INSTITUTIONAL	7.32
PARK / OPEN SPACE	18.88
COMMERCIAL	16.78
STORM WATER MANAGEMENT POND	18.52
PIPELINE / TRAIL NETWORK	6.59
NATURAL HERITAGE SYSTEM	17.57
RIGHT OF WAY	29.27
TOTAL	364.37

POPULATION

POLICY DOCUMENT	NET RESIDENTIAL DENSITY (UPH)	PEOPLE PER HECTARE	ESTIMATED NUMBER OF UNITS (@ 3.5 PERSON PER UNIT)	ESTIMATED POPULATION
WHITE CHURCH SECONDARY PLAN	31	77	7,629	26,703
PROVINCIAL PLANNING STATEMENT	20	50	4,954	17,340
URBAN HAMILTON OFFICIAL PLAN TARGET	28	70	6,936	24,275

AIRPORT ROAD EAST

COMMERCIAL 16.78 ha

2010 NEF CONTOUR- 30dB

RECOMMENDED NEF CONTOUR - 30dB

2010 NEF CONTOUR- 28dB

RECOMMENDED NEF CONTOUR- 28dB

COMMUNITY PARK 6.37 ha

SWM POND 4.87 ha

PUBLIC ELEMENTARY SCHOOL 2.44 ha

N. PARK 2.50 ha

SIGNIFICANT WOODLAND 5.10 ha

SWM POND 1.72 ha

N. PARK 2.50 ha

NEIGHBOURHOOD PARK 2.50 ha

SIGNIFICANT WOODLAND 12.48 ha

UPPER JAMES STREET

MILES ROAD

SWM POND 1.13 ha

N. PARK 2.50 ha

PUBLIC ELEMENTARY SCHOOL 2.44 ha

N. PARK 2.50 ha

CATHOLIC ELEMENTARY SCHOOL 2.44 ha

SWM POND 4.61 ha

SWM POND 1.88 ha

SWM POND 4.31 ha

EXISTING CHIPPEWA RAIL TRAIL

WHITE CHURCH ROAD EAST

FERRIS ROAD

N

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Endnotes

[1] Dillon Consulting, “Memo, PED24109 Appendix A1”, July 26, 2024
[2] The Atmospheric Fund, “Carbon Emissions Inventory Report 2023”, https://carbon.taf.ca/2023/
[3] City of Hamilton, *Climate Change Impact Adaptation Plan*
[4] Ibid.
[5] City of Hamilton, Community Energy and Emissions Plan
[6] Ibid.
[7] City of Hamilton, Climate Change Impact Adaptation Plan
[8] Ibid.
[9] City of Hamilton, Urban Hamilton Official Plan, 2023, s 3.7
[10] City of Hamilton, Green Building Standards, 2024
[11] Ministry of Municipal Affairs and Housing, *Provincial Planning Statement,* (2024), p 15
[12] The Atmospheric Fund, “Carbon Emissions Inventory Report 2023”, https://carbon.taf.ca/2023/
[13] City of Hamilton, *Community Energy and Emissions Plan,*
[14] Ibid.
[15] City of Hamilton, *Community Energy and Emissions Plan,* August 2022
[16] Hamilton, Green Building Standards
[17] Natural Resources Canada, *Solar Ready Guidelines,* (2013), p 1
[18] International Energy Agency, *Development of BIPV Business Cases,* 2020
[19] Ontario Clean Air Alliance Research, *An Analysis of the Financial and Climate Benefits of Using Ground-source Heat Pumps to Electrify Ontario’s Gas-heated Homes,* (November 2022) p 15
[20] Sustainability Buildings Canada, *Geothermal for Multi-Unit Residential Buildings,* (January 2020), p ii
[21] Ontario Clean Air Alliance Research, *An Analysis of the Financial and Climate Benefits of Using Ground-source Heat Pumps to Electrify Ontario’s Gas-heated Homes,* (November 2022) p 5
[22] City of Hamilton, *Community Energy and Emissions Plan*
[23] McMaster Innovation Park, “https://mcmasterinnovationpark.ca/sustainable-technology”
[24] International District Energy Association, “McMaster Innovation Park’s hybrid energy solution”, 2017
[25] The Atmospheric Fund, “Carbon Emissions Inventory Report 2023”, https://carbon.taf.ca/2023/regions/hamilton
[26] City of Hamilton, *Transportation Master Plan Review and Update,*
[27] Ibid.
[28] City of Hamilton, Climate Change Impact Adaptation Plan, 2022
[29] Ibid.
[30] Ted Kesik, *Resilience Planning Guide*, November 2017
[31] Ibid.
[32] Ibid.
[33] Ibid.
[34] Ibid.