



## Urban Design Plan

*Old Industrial & Outer Station Area, Kingston, Ontario*

*Green Team*



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*SURP 848: Community Design*

*Queen's University School of Urban and Regional Planning*

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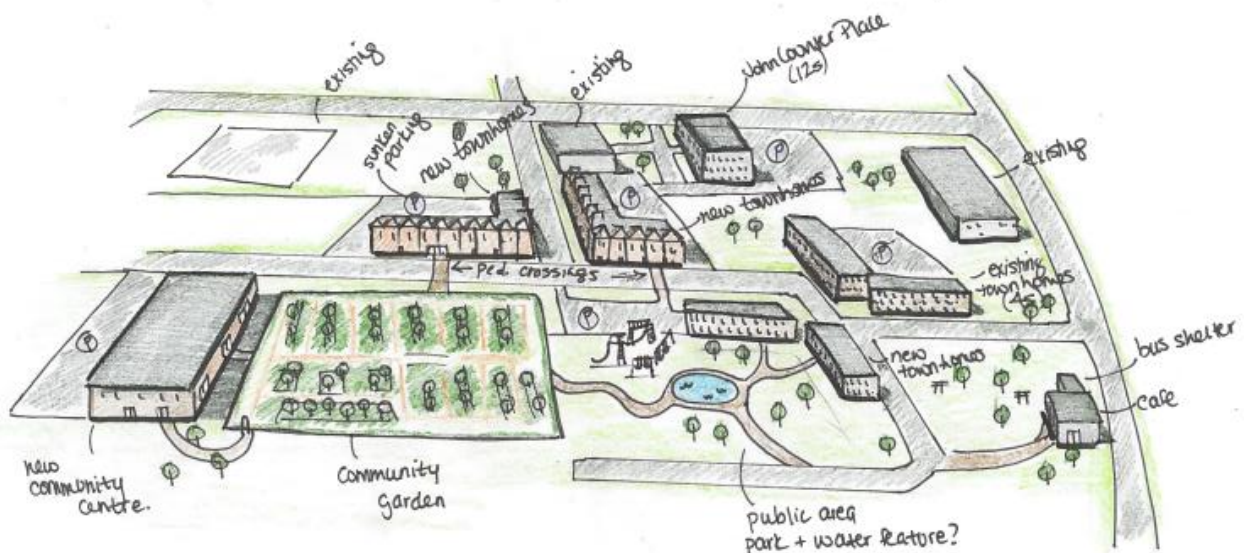
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### The Green Team

Our design team consisted of seven students from the School of Urban and Regional Planning at Queen's University have worked to create the following report for the Old Industrial Area and Inner Harbour Site located in Kingston, Ontario. This area has a long and varied development history, which has resulted in a unique built form and composition. Built through collaboration of a land-use and design group, our team has worked to embrace and enhance the existing character of the area throughout our proposed design plans. Respecting the existing community, land-uses, and essential services featured in the site area. Guided our efforts.

Tasked with incorporating a 'green vision' for the development and design scheme, our team has sought to retain many of the existing structures and natural features. Additionally, we have attempted to provide suggestions of feasible real-world developments that could be transferred and implemented to address identified issues. Green considerations such as infrastructure types, housing alternatives, community gardens and landscaping, as well as related precedents have been included in this report to offer potential ways of achieving design suggestions.



**Figure 1:** Conceptual Community Design Plan

Source: Mushet, 2016



### **Executive Summary**

This urban design plan for the 'Old Outer Station' area provides a planning analysis as well as design recommendations plan for the site. Several methods were used in the development of this plan, including an analysis of social and economic conditions, demographics, built form and heritage, and current land uses, as well as research on urban design precedents, local bylaws and policy, and various urban design guidelines. Results of our Urban Design Plan conclude that there are a number of possible interventions for the area, but due to current conditions and remediation costs, they should be kept very minimal. Our Design Plan also determined that in the short term, it is much better to focus on small, low cost interventions rather than big land use changes.

Our group recommends that the City of Kingston focus on place making, and trying to bring the community into the design process, and provide local residents with job opportunities. We also recommend that the City of Kingston re-orient the design, so less buildings are outward facing. There are also many opportunities to enhance the existing greenspace and incorporate environmentally sensitive design. The area could become a leader in sustainability in, not only Kingston, but the entire nation.

When designing our urban design plan, we included some assumptions as well as limitations. Our plan had no financial costing, as we produced our final plan iteration based on the assumption of a limitless budget. Another large assumption our group had to make was the general pulse of the community. Our group also faced time limitations for data collection due to the time frame of the course. We also faced market feasibility limitations due to a lack of data. Unfortunately, we were unable to speak to many things due to the lack of knowledge or available data about certain interventions that would be site specific to the Old Outer Station area.

## **1. Introduction**

### **1.1 Purpose and Assumptions**

The subject of this report is the development of an area in north Kingston, Ontario. The former railway lands and the surrounding historic industrial district form a distinct neighbourhood which has been variously referred to as “North Kingston”, “the Old Industrial Area”, “Rideau Ward” as well as by the nickname “Swamp Ward”. This area is primarily comprised of light and heavy industrial enterprises, low-income residential pockets and vacant land. It has a long and storied history, intrinsically connected with Kingston lore. Currently, the neighbourhood faces numerous planning challenges, including a lack of cohesion in uses and character, poor connectivity, heritage buildings in disrepair and severely underutilized land. Our objective is to develop a comprehensive vision for the area that allows for organic, sustainable change while maintaining local character, employment opportunities and existing green space.

Our team is comprised of seven graduate students from the School of Urban and Regional Planning (SURP) at Kingston-based Queen’s University. We have been tasked with creating a redevelopment plan for the “Swamp Ward”. In doing so, there are a number of implicit assumptions we are making. For one, this plan does not take into account the potential construction of the proposed Wellington Street extension which would run through the site. Secondly, we assume the desirability of maximizing sustainability and green infrastructure. Lastly, we are assuming that there is a local neighbourhood character which we are seeking to enhance in an incremental fashion. These assumptions guide the development of our proposal throughout this report.

This document is divided into a number of parts. A discussion of how each portion of our plan was developed can be found in the Methodology section. Following this, there is a discussion of the extensive background research our team has conducted. This includes developing a thorough understanding of the area’s history as well as its current demographics, economy and character. Additionally, an analysis of the applicable policies was carried out, including current zoning and land uses, City of Kingston policies and legal requirements for various types of redevelopment. Based on this understanding of the site, an analysis of its Strengths, Weaknesses, Opportunities and Challenges was conducted. Next, the team developed a general vision statement and a set of guiding principles. From these, we were able to determine the objectives of the plan. Lastly, the physical plan was created and is comprised of a number of considerations, including naturalization, stormwater management, connectivity, infrastructure, housing and community spaces.

What is presented below is the culmination of the team’s background research, policy analysis and design work. It represents what is, in our view, the most prudent course of action for the City of Kingston to take in developing a vision for this area of the city.

### 1.2 Methodology

The methodology used in generating this report was varied and multifaceted. It involved a combination of case study and best practices research, policy document review, numerous site visits, research into local history, character and demographics as well as the use of multiple design techniques ranging from simple sketches and models to 3D software. The overarching vision was developed based on the above-mentioned assumptions which were used to create a set of guiding principles.

Preliminary research focused on the site itself. Multiple walking tours were conducted in order for team members to develop an intimate familiarity with the area. Furthermore, four research teams were tasked with developing reports about, respectively, the site's history, socio=demographics, current land uses and city policy as it relates to the site. This research was synthesized and helped to inform our understanding of the neighbourhood and develop design considerations for the future.

After the team felt it had a sufficient body of knowledge, a set of guiding principles was developed based on the research that had been conducted and the assumptions being made. These loose principles were then used to create a set of general objectives for the redevelopment. Objectives and principles are found in sections 4.1 and 4.2.

Extensive external research into best practices and case studies was also conducted. This involved, based on the objectives, creating a list of items that may possibly be incorporated into the site including, but not limited to, affordable housing, community gardens and stormwater infrastructure. These concepts were then studied to find best practices and, wherever possible, case studies from similar plans. A number of options for each was considered and the feasibility determined, based on realistic budgetary concerns, scale, appropriateness and city policy.

Once the team had a general idea of the types of features that were desirable and feasible, we moved into the design stage. Preliminary design work involved a number of hand-drawn sketches showing different portions of the site under various development scenarios. These included both street-level views of individual streets and intersections as well as higher-level land use plans from a bird's eye view. Multiple iterations of these sketches were developed and eventually coupled with other design methods including physical models and SketchUp renderings.

Throughout this process, the team's plan continued to evolve based on discussion sessions and further research. A general consensus was reached regarding each sub-section of the area. However, this continued to undergo refinement as the team thought of new ways to apply urban design guidelines, City policies and urban planning best practices. As the process continues to move down in scale, a detailed land use plan will be developed, down to individual lots. This will include lots that are unchanged, lots which are to be rezoned, lots which are to be created in undeveloped areas and space which should be preserved as public, either in the form of green space or for the purpose of future infrastructure (e.g. road) construction.

## 2. Site Analysis

### 2.1 Current Policy Regulations

The following subsection of this report is drawn from the 2016 report “*Land Use Policy Review: Kingston’s Swamp Ward District*” by Carr, A., Church, N., Coyle, E., Goodge, B., Shanks, A. & Taylor, A. For additional information, or for a more detailed account of the numerous Kingston policy regulations and zoning by-laws, please consult this document.

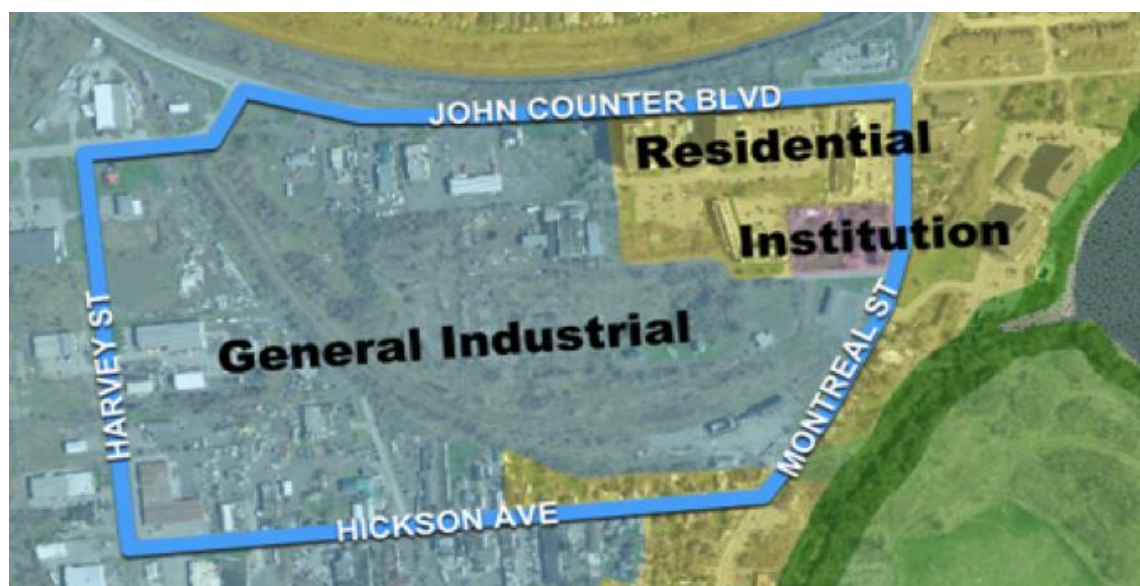
The following section will review the land use planning policies that are either currently in effect, or that are soon to be in effect, that directly pertain to the Design Plan proposed within this document. This section aims to provide pertinent information and provide context for our proposal.

The specific land use policies reviewed in this report include the following:

- City of Kingston Official Plan (2015 Update, Draft #2)
- City of Kingston Zoning By-Law No. 8499
- City of Kingston Community Improvement Plan (CIP) for Brownfields Project Area 1A, 1B & 1C (2013 Update)

### 2.2 Official Plan Review

As delineated in Schedule 3-A of Kingston’s Official Plan (OP), the study area is primarily designated “General Industrial.” There are also small pockets of the area designated as either “Residential” or “Institution,” located at the corner of John Counter Boulevard and Montreal Street, and Hickson Avenue and Montreal Street.



**Figure 2:** Land use designations in the study area, per Schedule 3-A of the City of Kingston Official Plan.  
Source: City of Kingston, 2015

General Industrial	Residential	Institution
Municipal work yards (s. 3.2.7)	Various forms of housing (s. 3.3.1)	Private elementary schools* (s. 3.2.1)
Manufacturing, assembling, fabricating, and processing operations (s. 3.6.B.1)	Senior citizen buildings (s. 3.3.D.1)	Government and religious administration offices (s. 3.2.6 & s. 3.5.1)
Construction and transportation activities and facilities (s. 3.6.B.1)	Care facilities (i.e. community homes, residential care facilities, housing crisis shelters, detoxification centres, recovery homes, corrections residences, community support houses)* (s. 3.3.D.3)	Post-secondary institutions (s. 3.5.1)
Storage, warehousing, and wholesale trade activities (s. 3.6.B.1)	Bed and breakfast operations* (s. 3.3.D.9)	Hospitals and care facilities (s. 3.5.1)
Communications facilities and utilities (s. 3.6.B.1)	Publicly-funded elementary schools* (s. 3.2.1)	Extended care complexes (s. 3.5.1)
	Small-scale convenience commercial uses within apartment buildings or on a site specific basis on low or medium density residential sites* (s. 3.3.2)	Corrections facilities (s. 3.5.1)
		Military Establishments (s. 3.5.1)

**Table 1:** Permitted Uses in the Study Area, City of Kingston Official Plan  
 Source: City of Kingston, 2015

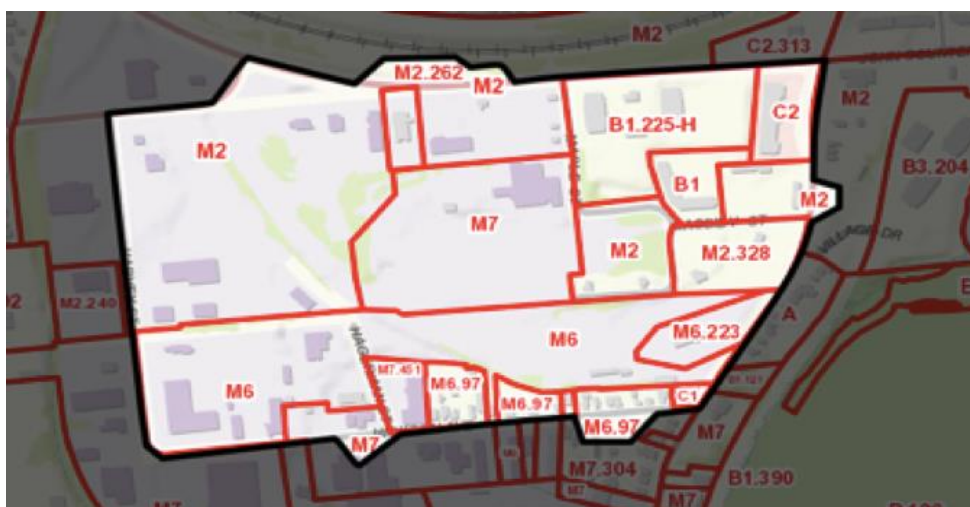


General Industrial	Residential	Institution
Automotive, heavy equipment, and truck repair facilities, and	Publicly-funded and private secondary schools* (s. 3.2.2)	
Institutional uses with General	Centres providing care during the day for infants and children, as well as adults with special needs (medium and high density zones only)	
Industrial characteristics*	(s. 3.2.3)	
(s. 3.6.B.1)		
Municipal works yards and water treatment and sewage treatment facilities*	Places of worship* (s. 3.2.4)	
(s. 3.6.B.1)	Libraries, museums, and small-scale community centres or other social or cultural centres (s. 3.2.5)	
Municipal infrastructure, stormwater management facilities, small-scale electrical power transmission facilities, oil and natural gas pipelines, and energy transmission and distribution infrastructure* (s. 3.1.1)		
Parks (s. 3.1.5)		
Emergency response uses such as fire halls, police stations, ambulance stations, and similar public response uses (s. 3.1.6)		
Home occupations* (s. 3.1.7)		
Community-based initiatives such as community gardens, other forms of urban agriculture, and tree planting projects (subject to site by site evaluation)(s. 3.2.8)		
Other “complimentary” uses*	<i>* Denotes that some conditions exist, see applicable OP policy for more information.</i>	
(s. 3.6.B.1)		

**Table 1 continued:** Permitted Uses in the Study Area, City of Kingston Official Plan  
Source: City of Kingston, 2015

## 2.3 Zoning By-Law Review

The area bound by Hickson Avenue, John Counter Boulevard, Montreal Street, and Harvey Street contains a variety of different zones under the City of Kingston's Zoning By-Law No. 8499, Figure 2. For the most part, it consists of industrial zoning (M2, M6, or M7, with some site-specific zoning). The eastern portions of the study site, however, contain some residential and commercial zoning, especially around the intersection between John Counter Boulevard and Montreal Street. The types of residential zoning that are permitted in the study area range in density from one- and two-family dwelling units ("A" along Montreal Street; and "A5" just outside of the study area, in the Day Street area) to multiple family dwelling units, such as apartments, row houses, and senior citizens' homes, that can be of a density of up to 69 dwelling units per hectare ("B1" in the Zoning By-Law). Residential zones also permit the inclusion of some institutional uses, such as museums, libraries, churches, and schools.



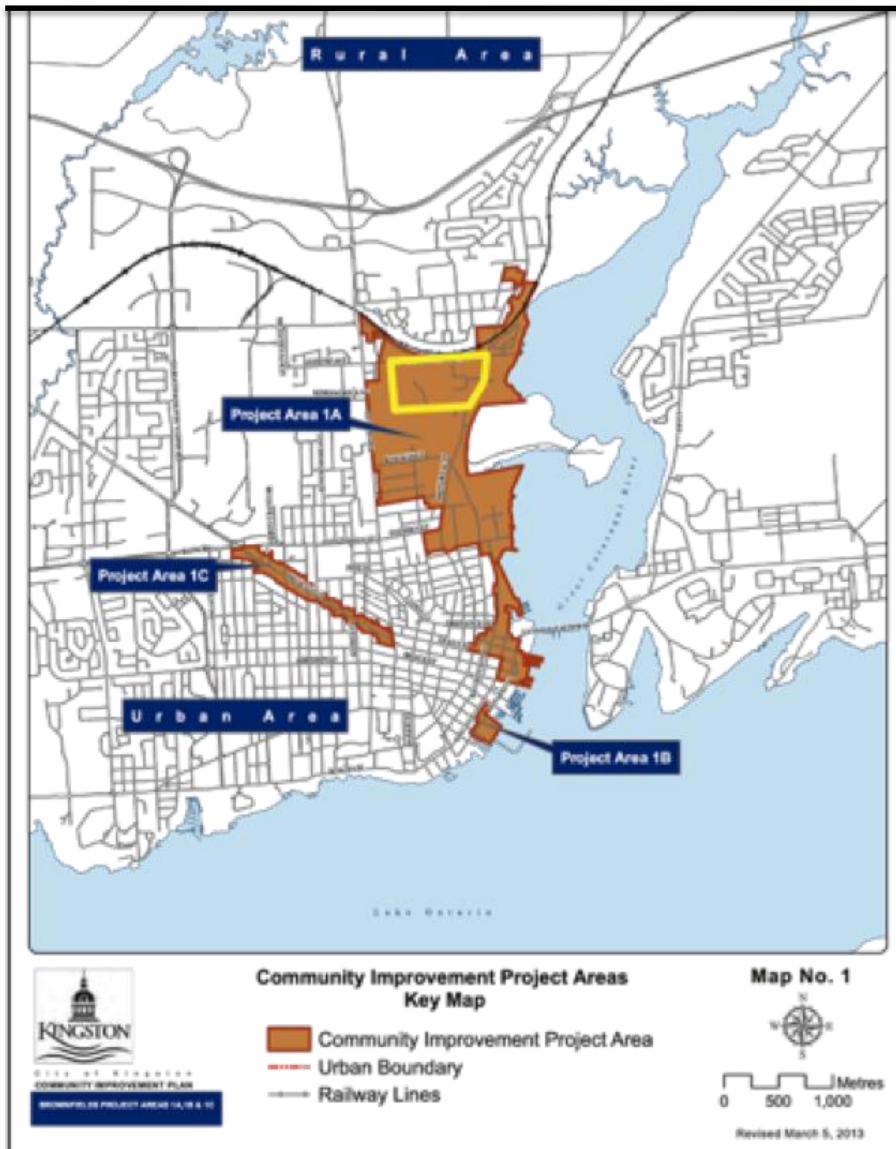
**Figure 3: Zoning Designations in the Study Area**  
Source: City of Kingston, 2015

The industrial zoning is dominated by three different designations: M2, M6, and M7. While M2 zoning also allows for agricultural and horticultural uses, M2 and M6 primarily permit light industrial uses in which operations are completely done indoors and do not emit any noxious fumes. M7 uses are roughly similar to those offered in the other industrial zones onsite, though they allow for chemical industries that may emit dangerous fumes. A variety of other odd uses can also be found in the industrial zoning, such as animal hospitals, taxi dispatch services, auto repair garages, and even restaurants.

Commercial zoning within the study area is fairly constrained to the intersection of John Counter Boulevard and Montreal Street, where land is zoned as arterial commercial ("C2"), while a small property is designated as neighbourhood commercial ("C1"). Permitted arterial commercial uses include motels, restaurants, retail, limited office spaces, theatres, banks, and shopping centres. These provisions are slightly denser and more commercially oriented than neighbourhood commercial zoning, which allows for a mix of institutional and residential with commercial uses.

#### 2.4. City of Kingston Community Improvement Plan (CIP) for Brownfield Projects Areas 1A, 1B & 1C (2013 Update)

As shown in Figure 3, the site outlines in yellow, is located entirely within Project Area 1A of the Community Improvement Project Area (CIP). The CIP for Brownfields includes a series of grants, loans and tax relief from public funds, which aim to leverage private investment to stimulate rehabilitation and development on vacant, contaminated or neglected brownfield sites. The program is slated to accept applications until December 31, 2025.



**Figure 4:** Community Improvement Project Areas in Kingston – study area labeled in yellow  
Source: City of Kingston, 2013

### Eligible Costs

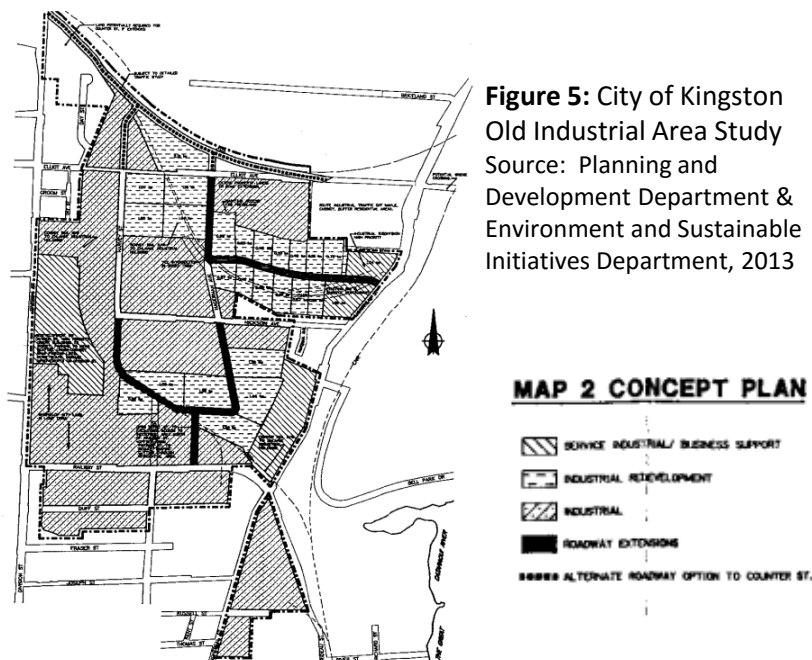
There are 11 planning and development costs, which may be recovered by property owners using the CIP for brownfield programs. They include the costs for the following:

- 1) Environmental rehabilitation;
- 2) Fill and grading;
- 3) Phase II & III ESA's and/or a Site Specific Risk Assessment;
- 4) Record of Site Condition;
- 5) Building demolition;
- 6) 50% of the improvement of underground infrastructure above normal costs due to contamination;
- 7) Environmental monitoring program, environmental monitoring technologies;
- 8) Financing for any of the above;
- 9) Insurance to guarantee work;
- 10) Legal costs associated with the above; and
- 11) LEED Accreditation.

To be eligible, properties must prove that environmental rehabilitation is required. Only property owners may apply. Applications must include a development proposal and completed ESAs. Funds can only be accessed for future work. Future land uses that are at least partially exempt from municipal taxes cannot be included.

### 2.5 Conclusion

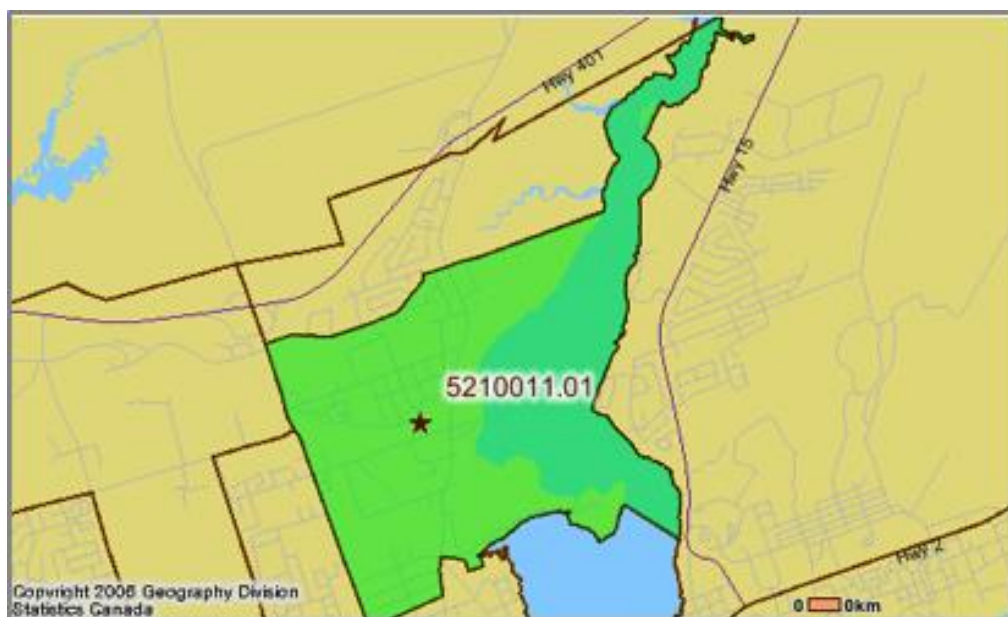
There are a number of land use policy matters that will have significant implications for any redevelopment proposal for the subject area. Careful analysis will be required to ensure the opportunities and constraints they pose are properly managed. Of particular concern is ensuring the proposal supports the vision the city has for this area. If it does not, getting approval will be very difficult, if not impossible.



### 3. Demographic Analysis

Similarly to the previous section, information regarding the demographics of the study area has been drawn from the 2016 report, *"Socio-Demographic Report: Census Tract 5120011.01, Kingston, Ontario"* by Byrd, J., Khalid, R., Matusik, D., Mushet, L. & Pineau, A. For additional information regarding the socio-demographics of the study site please consult this document.

The following section will briefly outline some relevant demographic information regarding the study area, located entirely within census tract (CT) 5120011.01 (Figure 1). Although the CT comprises more than just the study area, we feel that the data provided still presents a general understanding of the socio-demographics of our subject area, while also providing valuable information regarding the larger neighbourhood context.



**Figure 6:** Boundaries for census tract 5120011.01

Source: Statistics Canada, 2012

#### **3.1 Population and Age**

As of 2011, the population of the CT was 6,859 with a positive 3.7% growth rate over 2006 (lower than the Kingston CMA rate of 4.7%). The CT's age characteristics are not particularly divergent from those of the Kingston CMA, although a few dissimilarities should be noted (see Table 2). Within the CT, the age cohort of 0 – 9 years shows a larger percentage than in Kingston, as children make up 14.4% of the CT population. As well, those aged 30 – 39 years is slightly higher, 13.1% compared to 11.9% for the CMA. From this, it can be inferred that there are slightly more young families in the area, as the average number of children is 1.1 compared to 0.9 in the CMA.



3.1 Age and Population Continued

Age Characteristics	Census Tract 5210011.01		Kingston CMA	
Age Group	Population	% of Population	Population Count	% of Population
0-9 years	985	14.4	15595	9.8
10-19 years	870	12.7	18790	11.8
20-29 years	1075	15.7	23570	14.8
30-39 years	900	13.1	18985	11.9
40-49 years	965	14.1	23070	14.5
50-59 years	860	12.5	23265	14.6
60-69 years	645	9.4	18110	11.3
70+ years	565	8.2	18170	11.4
Total Pop	6,860		159,560	

**Table 2:** Age Characteristics of Study Area: CT 5210011.01, Kingston CMA, ON  
Source: Statistics Canada, 2006 Census



Source: Stoyle,, 2014

### 3.2 Income

The income of residents within the CT, and thus those also found within our study area, report a drastically lower income status than those found within with Kingston CMA. On average, over 20% more persons than the Kingston CMA are reporting to be within a low income category, a percentage that only increases when looking at earnings before taxes.

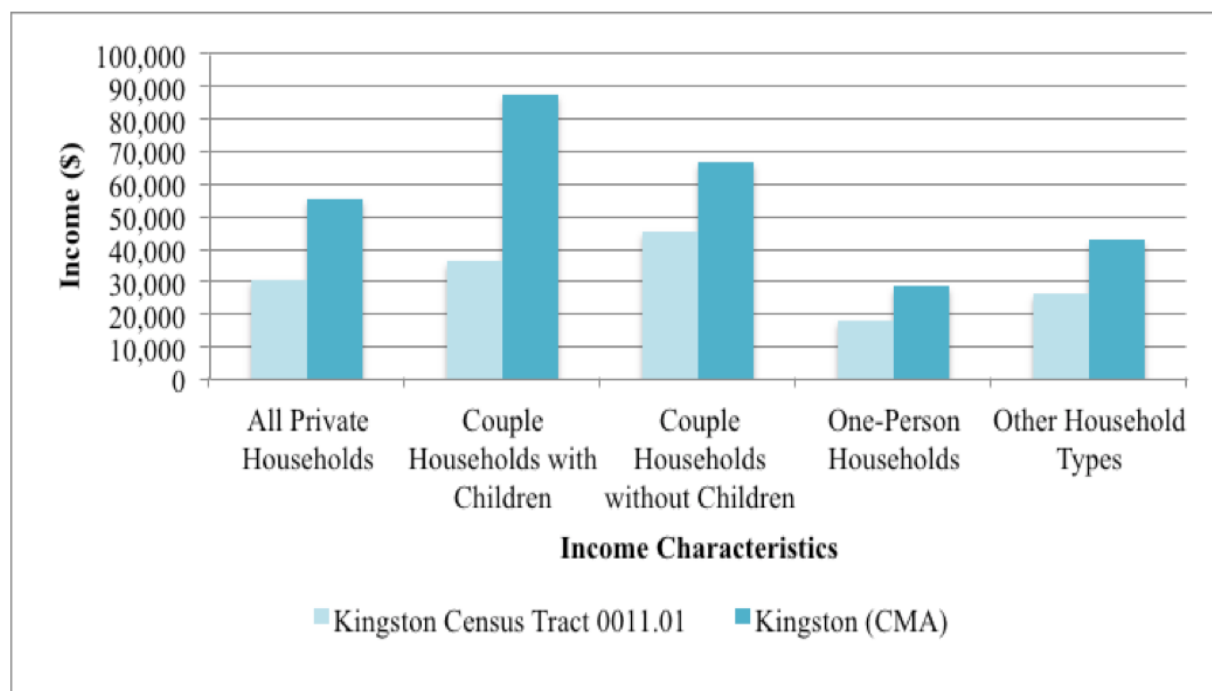
Income Measurements in 2005		Kingston Census	Kingston CMA	Difference
Persons 15+ years with income (counts)		4,770	118,495	
Median Income – Persons 15+ (\$)		17,133	27,762	
Median Income After Tax – Persons 15+ (\$)		16,554	24,942	
Composition of Total Income (100%)		100	100	
	<i>Earnings (%)</i>	54.1	71.4	17.3
	<i>Government transfers (% of total income)</i>	32.1	11.2	-20.9
	<i>Other money (% of total income)</i>	13.8	17.4	3.6
Income Status of All Persons in Private Households (counts)		6,590	147,455	
	<i>% in low</i>	42.9	13.4	-29.5
	<i>% in low income after tax – All persons</i>	31.3	9.6	-21.7
	<i>% in low income before tax – Persons less than 18 years of age</i>	53.8	14.3	-39.5
	<i>% in low income after tax – Persons less than 18 years of age</i>	40.5	9.8	-30.7

**Table 3.** Recorded Income within the CT Compared to that of Kingston CMA, 2006 Census  
Source: Statistics Canada, 2012

## 3.2 Income Continued

### 3.2.1 Median Income

The following graph (Figure 7) compares the median income of private households within the study area. As it can be seen, in every single category the study area reports much lower household income. To be more specific, the CT data clearly shows that households report on average 50% lower household incomes than that of the CMA. This is a drastic difference and one that will certainly influence not only the conceptual designs for the neighbourhood, but as well the overall approach to revitalization.

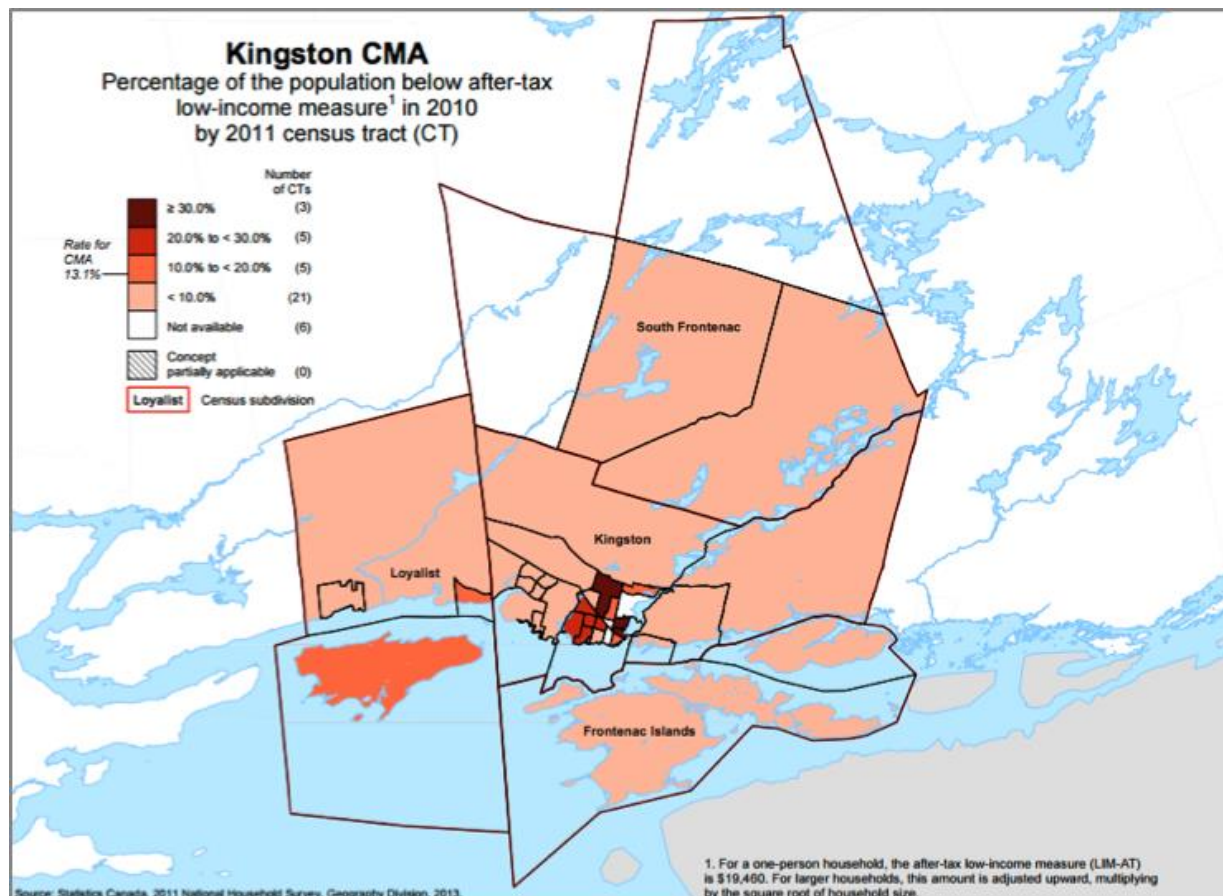


**Figure 7:** CT Median Income Compared with Kingston CMA, 2006 Census

Source: Statistics Canada, 2012

### 3.2.2 Geographical Distribution of Low-Income Households

As seen in Figure 6, CT 0011.01 unfortunately does not have any available information regarding the percentage of the population below the after-tax low-income measure.



**Figure 8:** Distribution of Low-Income Households in the Kingston, Ontario CMA

Source: Statistics Canada, 2013

This map does lend itself to the understanding of the broader neighbourhood north of Princess Street and outside of the Kingston downtown core. The subject site is located within an area reporting a relatively diverse income distribution; over 30% of households south of the CT are classified as low-income, and between 10 – 20% of households north and west of the CT are classified as low-income. Our team will remain cognizant of the economic mix that exists within the larger area, and moving forward this will influence our design plan.

### 3.3 Family Composition and Housing

The CT is comprised of 1,905 “census families”. A notable characteristic is the number of single-parent families, making up 37.3% of households (31.5% are single-mother families) compared to only 16.1% in the Kingston CMA (12.8% single mothers). Of residents over 15 years of age, 35.4% are married (compared to 47.9% in the CMA) with a large proportion of divorcees (12.6% are divorced or separated compared to 7.9% in the CMA).

In terms of housing tenure, the CT is almost a perfect opposite of the CMA with two thirds renting and one third owning in the former and vice versa in the CMA as a whole. There are a variety of housing types present within the CT and associated study area. Residents are concentrated in apartment buildings with five or more stories. The study area also accounts for over half of the city’s total movable dwelling units, indicating that residents in this area live in low-cost housing types. There are also a significant amount of high-density dwelling types including row houses, apartments, and duplexes.

Housing Tenure	Census Tract 5210011.01		Kingston (CMA)	
Rent	2,045	66.70%	21,750	33.00%
Owner Occupancy	1,020	33.30%	44,215	67.00%
Total	3,065	100%	65,965	100.00%

**Table 4:** Housing Tenure Type within Census Tract 5210011.01, Kingston, Ontario  
 Source: Statistics Canada, 2012

### 3.4 Conclusion

Research into the CT has revealed a number of anomalies when compared to Kingston CMA, as well as some consistencies. Population, growth and age distribution is relatively in line with the CMA, albeit with a slightly younger population. The CT also has a slightly higher proportion of visible minorities, though the difference with the CMA is nearly negligible. As expected, income levels, as well as the proportion of individuals on government assistance, is significantly higher than in Kingston as a whole. Family characteristics reveal a large number of single-parent families and unmarried individuals. Housing is primarily rental with little new construction in the area.



## **4. Plan Vision**

The overarching goals for our redevelopment proposal will be to increase natural linkages and green infrastructure within the existing community, and to establish green industry that can supply the local community with long-term employment. In order to achieve these significant investment goals and relationships, there will need to be meaningful partnerships with local leaders, the municipality, local institutions and businesses.

### **4.1 Guiding Principles**

On our journey to reach our team's vision goals, we have decided on the following guiding principles for the Old Industrial Block Redevelopment. We will embrace the semi-natural form that has been created from the removal of the old CNR tracks, and leverage the open space and potential links to the K&P Trail to develop a green corridor. We do realize there would be significant costs to renovating and reintegrating the Old Outer Station, so it will be left a ruin. This will celebrate and enhance local built heritage without a costly burden on the population local. Our design will seek to preserve and diversify local employment opportunities. By adding community gardens to the north side of our site, we can potentially create local jobs as well as a local food source. Maintenance and care of the local trails and shared gathering space can also become future jobs. Our design will also seek to promote neighbourhood focused community spaces. Sites such as a coffee shop that integrates a bus stop, or our public gathering and art space, all seek to create inclusive, third spaces. Through the design of our multi-modal pathway, we will establish a pedestrian oriented streetscape that brings even more Kingstonians to the area. Finally, we will develop a coherent and distinct neighbourhood character that fits into Kingston's larger urban fabric and respects the nature of the Swamp Ward, and Northern Kingston.

### **4.2 Objectives**

1. Employment opportunities
2. Preservation of the existing natural and built-environment
3. Increased linkages for roadways and paths
4. Green infrastructure and industry
5. Promotion of community engagement
6. Ensuring cultural heritage preservation while having consideration for development costs

### **4.3 Design Considerations**

Our group began with an extensive historical analysis in order to better inform us of the future. We then took extensive site visits, on multiple days to document and inventory buildings, and the natural setting. We came together as a group and worked through various sustainable design principles and concepts on the way towards a final layout. We've intentionally created a low-entry, low threshold plan that will allow the neighbourhood the ability to continue to grow organically, and to meet the needs of the local population. Our plan does not seek to impose rigid design rules, but rather a flexible, community based plan.

#### 4.4 Neighbourhood Character

In keeping with Guiding Principle 2.0, which is to “celebrate and enhance local built heritage”, we propose to maintain existing housing on the site while creating new mixed income units. Our proposal includes mirroring the existing Kingston Town Homes development on Maple Street to mimic the style and character of the existing neighbourhood (see Figure 8). Further, we propose to incorporate new row housing in the Maple Street area that includes a combination of unit sizes as well as a combination of affordable and market-rate units. Sustainability is a major goal and therefore social sustainability initiatives are included.

We aim to take great care in not only maintaining the existing neighbourhood character but enhancing sense of community and tying in elements of historic Kingston. We envision a building style that incorporates elements of downtown Kingston’s heritage such as use of local limestone and the reproduction of the aesthetic details of heritage homes (see Figure 61 and 62). This reproduction will also mean introducing diversity in housing type, not only with unit size and value but with outside appearance. Such features include building materials and architectural features – for example incorporating rear laneways and frontage onto the street (see Figure 78). With these efforts we hope to accord with the Urban Design Guidelines for Kingston such as incorporating a “variety of housing types”, creating “sustainable natural heritage” and “integrating and highlighting cultural heritage resources” (City of Kingston, 2015).

As much as the site’s neighbourhood character must be diverse, it must also be “coherent and distinct”, as our Guiding Principles suggest. The developments we propose for the site, along with the proposed community amenities and programs will give a strong sense of place to the area.

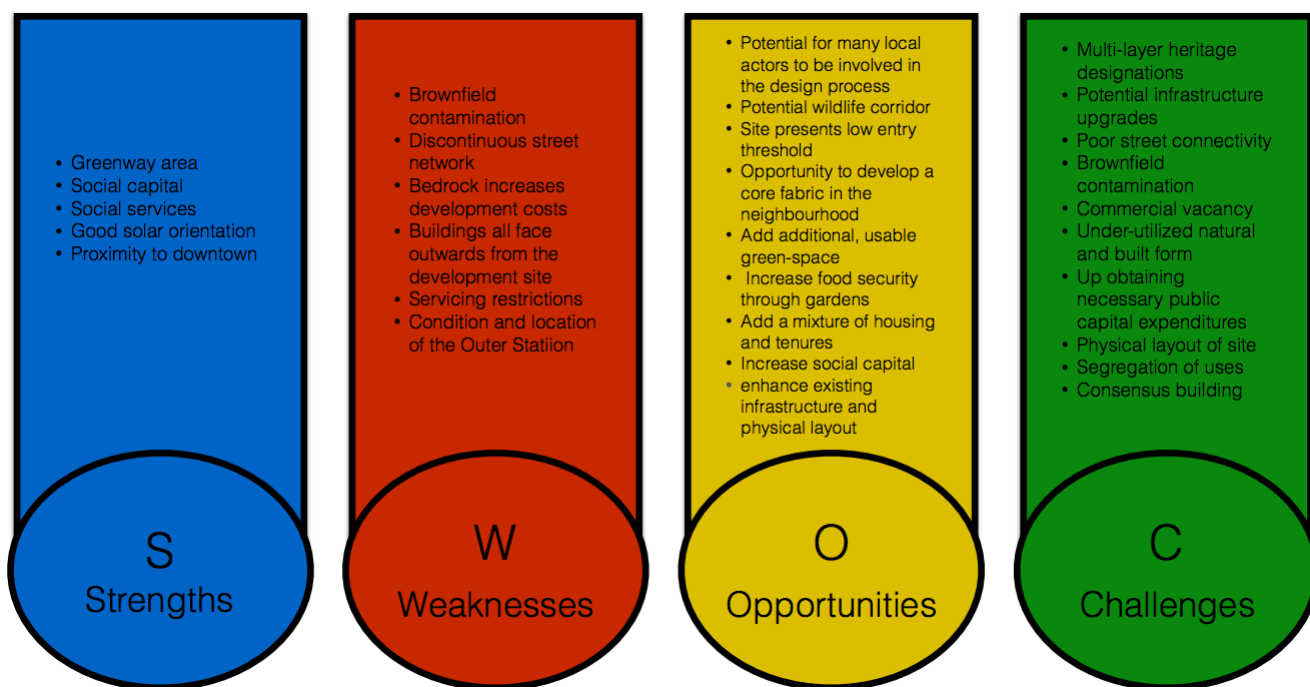


**Figure 8:** Existing townhomes on Maple St (left top) and possible designs for the new low-income housing (bottom).

Source: Google Maps; The Canadian Press, 2013; CAHN Communications, 2012



## 4.5 SWOC Analysis



**Figure 9.** SWOC analysis conducted by the group for the site

A SWOC analysis for the site was performed in order to better grasp the opportunities and challenges facing the site, and the potential for redevelopment. The above Figure X highlights some of the main points the team identified.

Strengths of the site include ample green spaces and natural features, good solar orientation, social capital and amenities, as well as the close proximity to Kingston's downtown core.

Some identified weaknesses of the site area include Brownfield contamination, the discontinuous street network, the built environment facing outward, servicing restrictions, as well as the condition of the Outer Station and surrounding Heritage properties.

Identified opportunities include the potential to increase and involve local actors in the redevelopment of the site area, add a true mix of housing stock including social dwellings, as well as the chance to create a core fabric for the neighbourhood.

Identified challenges for the site area include connectivity and physical layout of the site, consensus building among residents and stakeholders of desired development, and the task of obtaining necessary public capital investment to implement redevelopment plans.

#### **4.6 Ten Key Principles of Urban Design – Adapted from Von Hausen’s *Dynamic Urban Design***

##### **1. Context Determines Form:**

Regional: Kingston is a low-medium sized city. Our redevelopment proposal does not need to necessarily fix or address things, but rather focus on Kingston’s motto: ‘Where History meets Innovation.

Neighbourhood: The exiting built form and nature is to be maintained. There will be a repurposing of the trail, that focuses on the legacy of the community as a junction between two neighbourhoods and urban / rural divide. The proposal will also create further green linkages within the K and P trail system, that will also allow for increased permeability.

Site: Our vision is to take and respect the history of the site, while implementing design features that enhance community amenities with a park, recreation space and public art.

##### **2. Design Celebrates Place:**

Existing features will be left and enhanced with design.

Selective interventions.

Enhancing the human experience - how the existing landscape evokes emotion.

##### **3. Design recognizes natural features as critical form-makers:**

This corridor will also serve as a transportation spoke aimed at people as opposed to cars. Not only will the trail be extended to connect cyclists and pedestrians to a newly designed entrance off of Montreal Street, additional connections throughout the site will be proposed. Improving connectivity within the site, and with the surrounding neighbourhood, will hopefully reintegrate the area into the larger Kingston fabric.

##### **4. The design needs to fit the scale and location:**

We will be retaining the natural ‘banana shape’ of the former CN rail tracks. We will use ‘human scale’ in order to create an inclusive, intimate feel throughout the public space and incorporate minimal additions to the existing built footprint.

##### **5. Movement systems should move people, not cars:**

The natural “banana” shape created by the existing K&P trail provides a unique opportunity to incorporate green features into the redevelopment plan. Understanding the existing geographical context allows for a more natural, comfortable and aesthetically pleasing outcome to arise from the redevelopment. Using the trail as the central feature of the plan allows for the creation of a corridor that incorporates both landscaped and natural green spaces

##### **6. Multiple, flex, and mixed uses are keystones to sustainability:**

A mix of uses are the keystones to sustainability. We will also include a mix of amenities with the potential for the uses to increase. Social sustainability is introduced through the combination of the trail, community enterprise centre and community gardens. An art installation that is rotating and easily changeable is planned which should increase the amount of community stewardship.

#### **4.6 Ten Key Principles of Urban Design – Adapted from Von Hausen’s *Dynamic Urban Design* - Continued**

##### **7. Diversity needs to be planned for:**

We plan to include a diverse number of native plants species into the area. The various uses, both inside and out of the greenspace, will create a diversity of users. We are embracing the existing diversity and only planning to build on the footprints that exist,

##### **8. The public realm should be incorporated as a central component:**

Selective sight-lines and street furniture will make the area feel welcoming. Solar panels will power lights along pathway. An opportunity exists to link this greenspace to other community uses. A third place will be create along Montreal St and will draw users into the greenspace and ‘living ruins’ of the train station.

##### **9. The urban form should be compact and safe:**

The trail section of the project will feature solar powered LED lighting that will provide amble evening lighting, but also a conversation piece in regards to alternative energy. All the suggested interventions in the urban form, such as street furniture, pathway materials etc. will be appropriately sized, low cost of entry and all ages friendly.

##### **10. Community building is an integral part of the urban design process:**

As part of the context of this area in particularly, special attention should be paid to the community that already exists and how it can be augmented further. We’ve chosen to include community gardens, the art installation and the community enterprise centre as a way to bring the existing community together, and allow members from nearby communities to share the space.



### 5. Urban Design Plan

#### 5.1 Vision

The Urban Design Vision sets a series of guidelines that act as a foundation for detailed design in community development. The Vision deals with redevelopment as well as the embellishment and retention of existing built and natural form. The Urban Design Vision acts in conjunction with the City of Kingston's Design Guidelines and in support of the six plan guiding principles, as described in section 3.1.

The core components are as follows:

- Improve accessibility throughout the site by adding linkages connecting with the existing K&P Trail
- Create an inclusive public gathering square anchored by a community-based public art installation near the Intersection of Montreal and Cassidy
- Improve streetscape components through the addition of sustainable street furniture, pedestrian lighting, and the improvement of trail materials and signage
- Create a community garden in close proximity to the new neighbourhood development
- Encourage the development of multi-residential units up to a maximum of 3 storeys
- Encourage social inclusion by embellishing the public realm with vibrant public spaces and activities
- Re-naturalize the landscape through the utilization of a stormwater retention pond and native species
- Provide thoughtful consideration for commercial infill along Hickson Ave. to improve pedestrian experience
- Re-imagine public transit stop and integrate it with the community's main trail to promote active transit
- Reduce setbacks along John Counter to enhance the walkability and experience of the streetscape
- Maintain the train station as a cultural landscape and evaluate options to integrate community facilities

**Figure 10:** Images depicting vibrant mixed-use areas



Sources: Kraut, 2015; Kahn, 2016; Vallery Studio, 2014



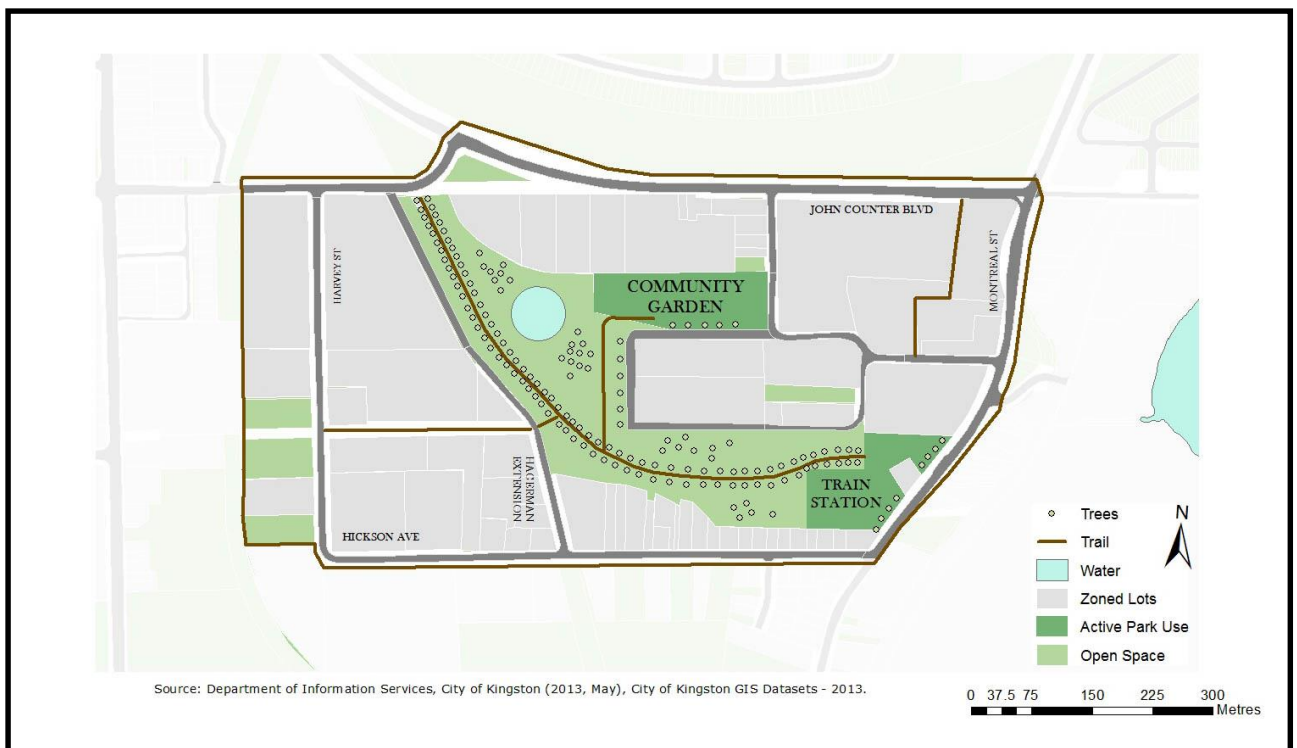
Figure 11: Site Plan rendering from the redeveloped Old Industrial Block

## 5.2 Precedent Overview

The following section will seek to demonstrate real world examples that address defined development issues currently facing the site area. The precedents will define character areas, the identifiable issues to be addressed, and provide solutions to be implemented within the over-arching design plan to achieve the green incentives suggested throughout the plan.

### 5.2.1 Open Space Precedents

In this section will we provide a series of examples and studies for defined natural and open space character areas. This will include analysis of topics including stormwater, community gardens, public art, naturalization and site remediation, and native species. Collectively, this section will work to define open space character areas within the site area, identify issues and areas of opportunities, and provide examples of potential green focused solutions.



**Figure 12:** Open space plan for the site  
Source: Morin, 2016



### 5.2.1.1 Stormwater Management

Stormwater management is the mitigation and reduction of stormwater runoff. By changing land use practices in the built and natural landscape, it is able to maintain the quality, quantity and rate of runoff as close to the predevelopment conditions of the areas as possible (RCL Consulting Ltd., 2004). As a means to promote sustainable development and integrate functional natural features into the built environment of the subject site, a variety of low impact development (LID) strategies will be employed within the newly developed site.

#### Objectives, Needs and Solutions

The use of stormwater management techniques is a needed addition to the site. Our design plan, although does maintain a large portion of the permeable grassy areas, does increase the overall impermeable surface covering found throughout the site by recommending paved pathways, minor street extensions and increased density. As a response to the increased urbanization of the area, we have proposed the creation of a stormwater pond in the north-western region, near Elliott Ave. and John Counter Blvd., as well as the use of bioswales along the newly paved and extended K&P Bike Trail.

An added benefit of creating a stormwater pond is its ability to maintain and celebrate the neighbourhood's unique character; which is one of the Guiding Principles of this design plan. The site was historically swamp and bush land; however, even after site reclamation the area has been colloquially known for years as the "Swamp Ward" (McKendry, 2015). Despite the City's concentrated efforts to rebrand the neighbourhood as North King's Town (City of Kingston, 2016), the memory of the Swamp Ward should not be eradicated. A naturalized and swampy stormwater pond would encapsulate this heritage, while also working with the redevelopment plan to reinvigorate this area of Kingston.



**Figure 13:** Examples of stormwater management practices appropriate for the site

Source: Kam Pawar Real Estate Team; LRI, LLC; Pinterest

### 5.2.1.1 Stormwater Management Continued

#### Precedents and Best Practices

The City of Kingston outlines three requirements for the creation of a stormwater management facility. Each of these elements has been adequately addressed and incorporated within our proposed design guidelines for each management technique. However, for context, a brief description of each of the three requirements is provided.

- i. **Maintain natural drainage networks and preserve environmentally sensitive areas** – We have no intention to work against the existing watercourse and plan to maintain the natural drainage network of the site. Working with gravity and not against it, the appropriate grading and orientation will be considered at each step of the implementation process.
- i. **Integrate stormwater management facilities as community features** – Each of the stormwater management techniques have been designed to maximize ecological, aesthetic and safety objectives. To accomplish this, special attention has been placed on designing management techniques that work in conjunction with one another, while integrating into the natural landscape and improving its natural beauty.
- ii. **Establish strong public exposure for stormwater management facilities** – As discussed in great detail, the stormwater pond (and additional techniques) will rely heavily upon dense plantings of native, non-invasive species that filter and hold water and act as habitats to local plants and animals. Also, by not using a physical fence around the stormwater pond and opting for vegetated barriers, we are complying with Kingston's desire to promote public awareness and exposure to stormwater management facilities while also created a defined edge. Additionally, through the use of bio-swales as part of the development of pathways and parking areas complies with these guidelines.  
(Planning, Building and Licensing Services, 2015)

Not only will the stormwater pond and bioswales play a vital role in flood and pollution control throughout the site, they also present an opportunity for community partnerships and participation in environmental engineering. In East Tampa, Florida, Engineers for a Sustainable World University of South Florida Chapter (ESW-USF) have been praised for their work in raising environmental awareness amongst students by using stormwater ponds as an initial focal point and by organized collaborations between the University and Young Middle Magnet (YMM), a middle school adjacent to a beautified pond. Outputs from this project include: a) curriculum development for YMM students; b) stormwater retention pond demonstration modules and community tour; c) baseline water quality data collection for three retention ponds in East Tampa and d) establishment of sustainable water monitoring program that links USF classes with YMM's seventh grade class (Thomas, 2009).

### 5.2.1.1 Stormwater Management Continued

#### Design Considerations

##### 1. Naturalized Stormwater Ponds

The wet pond will take on a more naturalized design to enhance an overall open space and green design, while also creating a habitat for migrant birds and native plant and animal species. Although the stormwater pond is a man made and “unnatural” feature within the landscape, through the use of native plantings, shrubbery and unmanicured surroundings, a pond can adequately mimic a natural water feature and integrate as naturally as possible into a landscape, especially when located within a vegetated or park surrounding.

The preferred approach to constructing a wet stormwater pond is to first consider the landscape as a component of the design and recognize that elements of the landscape are effective functional design tools that can also be employed to achieve the stormwater management objectives (Toronto Water Infrastructure Management, 2015). The landscaping design for stormwater ponds shall consider the following factors:

- i. **Stabilization of shoreline** – this will be achieved through the use of vegetation and landscaping, acting as a buffer to prevent bank erosion by increasing bank stability and providing shade
- ii. **Mitigation of effects on temperature and dissolved oxygen** – providing a lush tree canopy will be essential in creating the desired aesthetic look of the pond, while also mitigating undesirable increases in water temperature. Special attention will be paid to the planting of native deciduous and coniferous trees to ensure tree canopy year round.
- iii. **Deterrence of waterfowl, such as geese and ducks** – Once again, by implementing woody vegetation and minimizing the amount of mown grass, it will serve dual purpose; strengthening the naturalized appearance of the pond and deliver the most effective method of discouraging undesirable waterfowl.

Some examples of appropriate ponds are found in Figure X. These ponds integrate natural elements and promote a comforting environment that softens what could otherwise be an overt on-site human intervention.



**Figure 14:** Examples of naturalized stormwater ponds. Left: stormwater infrastructure at Headwaters Park in the Town of Richmond Hill, Ontario, and right: Monroe County, Rochester, New York.

Source: (Town of Richmond Hill; Monroe County Soil and Water Conservation District, 2015)



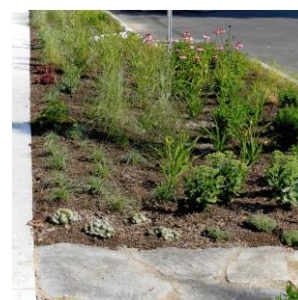
### 5.2.1.1 Stormwater Management Continued

- iv. **Barriers to public access and public safety** – An important component that cannot be overlooked. Although the pond is meant to seem as natural as possible, there are always safety considerations that should be taken. The stormwater pond will not be designed for swimming or other human usages and it is important to ensure a certain degree of separation. The planting of dense woody vegetation around the perimeter of the pond and use of proper signage is hoped to offer a clear dividing boundary between other areas of the open space and the pond. The use of a fence is not considered ideal, as this will block sightlines throughout the site and take away from the naturalized feeling the pond is intended to achieve.
- v. **Enhancement of linkages** – Although predominantly native plant species will be used, a diverse community of plants will be established all throughout the subject site and will be carried into the pond area. This will provide natural and visual linkages between the pond and the entire redeveloped area and work towards establishing a sense of place.
- vi. **Community benefits** – As mentioned, vegetation can be effective in enhancing views and contributing to the establishment of a unique character. It can also help to blend the pond into the surrounding park area and connect to the redeveloped K&P Trail system and proposed community garden (both discussed in subsequent sections of this report).  
(Toronto Water Infrastructure Management, 2015)

## 2. Bioswales

Are open-channel drainage ways to convey stormwater runoff. Bioswales will be located alongside the newly extended and paved K&P Trail, where space is available. These systems are easily integrated into existing ditch and swale systems to increase pollution treatment and functionality and are this ideal for the uneven terrain of the K&P Trail area (University of Florida - Program for Resource Efficient Communities, 2008).

The City of Kingston has already seen and acknowledged the aesthetic and environmental benefits that bioswales provide. The Alwington Avenue Bioswale Project were the recipients of a 2014 Livable City Design Merit Award, with the jury commenting on the “positive streetscape innovation and subtle, but important shift in thinking” this project provided for Kingston (Livable City, 2014). Similarly to the design considerations undertaken within the Alwington bioswales, those found throughout the site will help control, divert and filter rainwater, while adding to the beautification of the area and the entire city. The integration of bioswales along the pathways will demonstrate that streets beautification can be appropriate at all levels.



**Figure 15:** Alwington Avenue Bioswale Project in Kingston, Ontario.  
Source: (Livable City, 2014)

### 5.2.1.2 Community Gardens

Urban agriculture is the act of growing plants for a variety of purposes including for food or to encourage pollination (Vancouver, n.d.). The development of urban agriculture has many social benefits such as the promotion of community development, social interaction among residents and provides valuable educational opportunities (Vancouver, n.d.).

For the reasons noted above establishing urban agriculture as part of the urban design plan for the **Swamp Ward** is essential for meeting the project's vision as it will help strengthen community identity, promote community stewardship, and strengthen community service delivery in the area.

#### Objectives, Needs and Solutions

The urban agriculture objectives for this urban design plan include:

- To establish a large community garden within the central open space that is co-located with a Community Enterprise Centre to encourage unique community partnerships and expand community service opportunities; and
- To encourage urban agriculture and food production throughout the site; and
- To increase education and access to healthy food options

These objectives stem from community needs observed through preliminary research. The area has many characteristics of a food desert. Although there are two food providers in the area, Wholesale Club and Partners in Mission Foodbank, there is a clear lack of healthy food options. Urban agriculture will fill this gap. It will also allow for spinoff partnerships with community services, like the Foodbank, and strengthen the community's identity.



**Figure 16:** Raised planter boxes in community gardens  
Source: farangtalk, 2016



**Figure 17:** Additional raised planter boxes  
Source: Homesweet, n.d.



### 5.2.1.2 Community Gardens Continued

#### Precedents and Best Practices

The likely presence of contaminated soil resulting from previous uses such as the Tile Works and the railway poses considerable constraints on urban agriculture and community gardens within the site. However, there are several design solutions for community gardens that could mitigate possible contamination into produce and possible impacts on human health.

#### 1. Raised Garden Beds

Raised garden beds are currently encouraged through the City's community garden policy. Typically raised planting beds consist only of four walls and are either placed directly on top of the soil or on landscaping fabric. However, this is not the only style of raised planting beds. Raised garden beds can be built on legs. This design creates further separation from the ground and is more accessible for those with mobility issues. Kiscikânis community garden in Saskatoon, which is also located on a brownfield property, uses halved plastic barrels as planters (Severight-Dumais, 2015). The barrels are set on wood pallets which lie on top of woodchips (Severight-Dumais, 2015). Both of these solutions are cost effective and the infrastructure can be constructed by community members



**Figure 18:** Raised planting boxes on legs.  
Source: Ana White, 2012



**Figure 19:** Plastic Planters, Kiscikânis  
Source: Grebinski, 2015



**Figure 20:** Panoramic view of Saskatoon's Kiscikânis community garden. The Garden is a spinoff community use of the 20 Station West Community Enterprise Centre.  
Source: Severight-Dumais, 2015



### 5.2.1.2 Community Gardens Continued

#### 2. Hydroponics

A more cost intensive alternative for reducing location constraints on community gardens are hydroponics. Hydroponic gardening is a method of growing plants without the use of soil. A number of various hydroponic systems exist and can be purchased from many provincial retailers. Systems can also be constructed if knowledge exists within the community, as there are a number of blueprints online. These 'do-it-yourself' hydroponic systems can vary significantly in sophistication.

Figures XX (Top right) and XX (Bottom right) are examples of retail hydroponic systems, while Figures XX (Top left) and XX (Bottom left) are examples of 'do-it-yourself' hydroponic gardens. As is seen these systems can be placed in a variety of locations and implemented at a variety of scales. These systems are so versatile they can even be used on a property by property basis including, on patios, roofs, other shared communal space, or indoors.



**Figure 21:** A 'DIY' hydroponic system constructed out of PVC piping.  
Source: farmhydroponics, n.d.



**Figure 23:** Home made hydroponic system constructed from plastic bottles and PVC.  
Source: Home Hydro Systems, n.d.



**Figure 22:** High density hydroponic system developed by the Centre for Innovative Food Technology.  
Source: Our City in a Garden, 2009.



**Figure 24:** Pyramid garden hydroponic system.  
Source: Pyramid Garden, 2014)

### 5.2.1.1 Community Gardens Continued

#### Design Considerations

The Swamp Ward Community Garden is to be located on the site of the former tile works. This is the preferred location in the overall site design in order to maximize the potential of the existing greenspace. This is a central location which provides good access to the residential intensification which is occurring in the north-east of the site and it is also opposite to the proposed Community Enterprise Centre, allowing for the potential development of community centered programming and partnerships.

The design of the Swamp Ward Community Garden is to be based of the City of Kingston's Community Garden policy with a few noted differences, due to the constraints provided by the previous land use of the site. These design details are:

- Before a community garden is constructed, small scale site remediation is needed. Remediation will be done to remove notable remnants of previous land uses and to grade the site in order to make it useable as a community garden.
- A thin surface, such as wood chips or mulch, should be placed on top of the existing surface in order to provide a level of water run-off control and to limit dust from entering the raised flower beds.
- Planting, for the purposes of food production, may only occur on raised planting beds with legs, in hydroponic planting systems, or other garden beds that adequately separate the planting soil from existing soil.
- If hydroponic systems are planned, consider the erection of a green house
- The harvesting of rain water through the use of rain barrels to irrigate garden is encouraged.
- Consider supporting facilities such as water access, compost facilities, electrical outlets, potting benches, harvest tables, and lighting.



**Figure 25:** Community garden project by the American Community Gardening Association  
Source: American Community Gardening Association



5.2.1.2 Community Gardens Continued

Design Drawings



**Figure 26:** Hand drawing of community garden  
Source: Mushet, 2016



### 5.2.1.3 Public Art

As a part of place-making efforts, a public art amenity will be incorporated into the site. This is in keeping with this report's principles of including neighbourhood-focused community spaces and providing a distinct neighbourhood character. The installation will be located centrally to paths and adjacent to a local business and transit point, thus becoming an identifier of an important area.

The implementation of a public art amenity will subscribe to Kingston's Urban Design guidelines which specify a need for creating "communities that are distinct and identifiable" as well as looking to local examples to "take cues from the successful elements of these neighbourhoods" (City of Kingston, 2015). The public art element of the proposal is a part of an overarching goal to provide community members with a sense of ownership and pride of the area, through community involvement, place making as well as emphasizing and sparking discussion around the culture and history of the area.

#### Objectives, Needs and Solutions

The incorporation of a public art piece will address this report's objectives of strengthening community bonds and providing employment opportunities. Not only will local artists be employed for the project, but the final product will assist in attracting outside community members to the area to support local businesses and "generate economic revitalization" (Grodach, 2009).

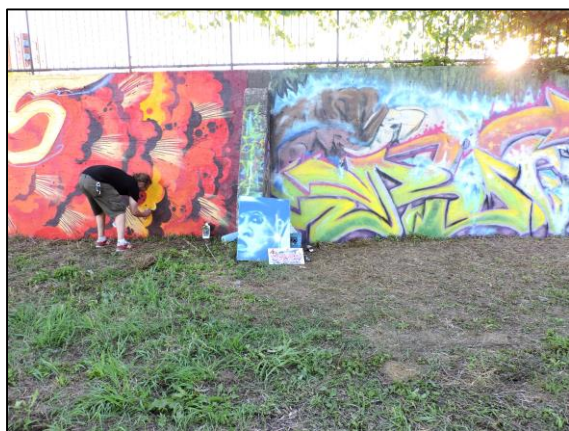
There is also a need for local stakeholder investment in such a project, and this would likely be addressed in the future. In doing so, the principles of Kingston's Public Art Master Plan will be closely followed. The project will bring attention to the area from communities city-wide, and foster a strong sense of place within the site and for its community (City of Kingston, 2014).



**Figure 27:** The Mural Project, Kingston.  
Source: Lennon, 2012.



**Figure 28:** Tett Community Art Project, Kingston.  
Source: Pratt-Campbell, 2014.



**Figure 29:** On the Wall Street Art Festival, Kingston.  
Source: Lennon, 2014.

### 5.2.1.3 Public Art Continued

#### Precedents and Best Practices

- Nanaimo, British Columbia published a Community Plan for Public Art (City of Nanaimo, 2010) which addresses the city's reputation for being Canada's 'culture capital'. The Plan discusses the social benefits of providing the public with equal opportunities to create and consume art, and outlines strategies for stakeholder involvement (City of Nanaimo, 2010). This plan is pertinent in that it is longer established than Kingston's Public Art Master Plan and has shown success. Nanaimo's attention to public art has put the city 'on the map' in terms of culture, employment and community engagement, which is proposed for the site in Kingston.
- The very recent, and still ongoing revitalization of Regent Park in Toronto incorporates the arts as a significant factor in fostering community engagement, sense of place and community pride (Gladki, 2014). One specific installation chosen as a precedent for the Kingston site is 'Faces of Regent Park' by Dan Bergeron – mixed media portraits of real individuals living in Regent Park (Mitani, 2015). This precedent was chosen for its directional reflection of the local community, suggesting a communicative approach to planning/revitalization.
- The final precedent selected for public art implementation is a local one. Kosso Eloul's 'Time' was constructed in 1973 in Kingston's Breakwater Park; a "forever unconnected two-piece metal arrangement" (Schliesmann, 2015). The sculpture is visible by walking path, road and water and has become iconic to the area. It is a wonderful example of how a public art piece fosters an identity for an area and sense of place for its visitors and community members.



**Figure 30 (Top Left):** "Solstice" by Elizabeth Wellburn, Deryk & Samuel Houston.  
Source: City of Nanaimo, 2015.

**Figure 31 (Bottom Left):** "Faces of Regent Park" by Dan Bergeron.  
Source: Edwards, 2015.

**Figure 32 (Above):** "Time" by Kosso Eloul.  
Source: Cailey, 2010.



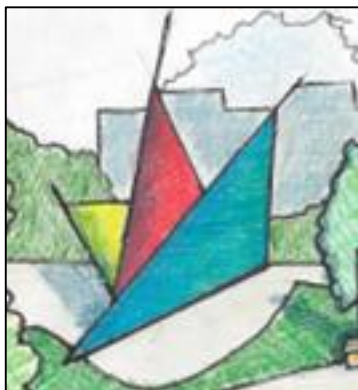
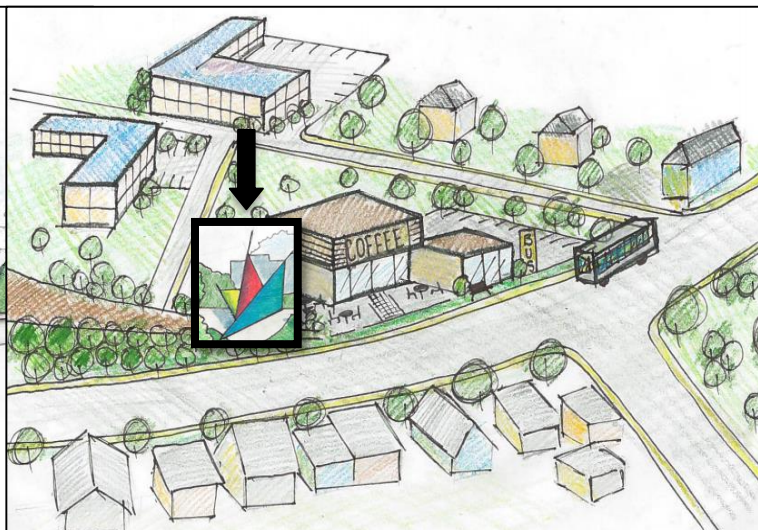
### 5.2.1.3 Public Art Continued

#### Design Consideration and Drawings

The site's public art amenity is proposed to be located along Montreal Street, adjacent to the proposed café and bus shelter/transit point, on the Easternmost edge of the site. This area is also located at the starting point (or ending point) of the K&P Trail, serving as a destination for users of the naturalized trail area as well as by sidewalk, vehicle and public transit. The area will include seating, lighting and shade for people to enjoy the area, and to foster encounter among community members and visitors alike.

Literature on public art suggests that such amenities “should be located in areas that already have a high volume of foot traffic and in either neighbourhood commercial areas or adjacent to compatible activity” (Grodach, 2009). The proposed site for public art is the centre of pedestrian linkages, being located at the mouth of the K&P trail and along the Montreal Street sidewalk. It is located adjacent to a proposed local business and bus stop, making the site a hub for a diverse range of activities and individuals.

The specific design of the piece itself will be left up to the artists and stakeholders but should somehow reflect the existing cultural history of the area (eg. railroad history and natural landscape) while speaking to the revitalization principles such as diversity and community engagement.



**Figure 33 (Top Left):** Proposed design of coffee shop, bus shelter and public art

**Figure 34 (Top Right):** Bird's eye view of proposed public art location

5.2.1.4 Naturalization and Native Species

As part of a concentrated effort to create a design plan that embraces the area’s natural form while also leveraging the existing open space, site naturalization is a key approach in this plan. Naturalization is a process of ecological restoration that involves returning an altered or degraded site to a more natural condition through the use of trees, shrubs and flowers that are native to the area (Ingram, 2001).

Objectives, Needs and Solutions

Although the central area of the site, that which surrounds the K&P Trail and The Old Grand Trunk Railway Station, is currently green open space, it is underutilized and its ad hoc development (or lack thereof) does not adequately provide areas for either recreational access or site beautification.

Naturalization, although an integral component of the design, will be implemented in strategic locations to i) add visual dimension and complexity to the area; ii) allow for different uses to occur throughout the site by allowing certain green areas to be landscaped; iii) establish a tree canopy that provides a year long wind barrier as well as aesthetic beauty; and iv) provide additional native species.

This design component also provides an opportunity to once again work with the local community and create community-based planting programs to not only help implement the naturalization portions of the plan, but also to promote ecological knowledge and provide skills learning for those who choose to participate

Urban Naturalization	Traditional Landscaping
Use of Native Species	Use of any species
Low maintenance	Varying maintenance levels
Self renewing	May have to replant
Forster relationships	Less of a relationship

Table 5: Comparing urban naturalization and traditional landscaping to highlight the benefits of naturalization within an open space  
Source: Ingram, 2001)





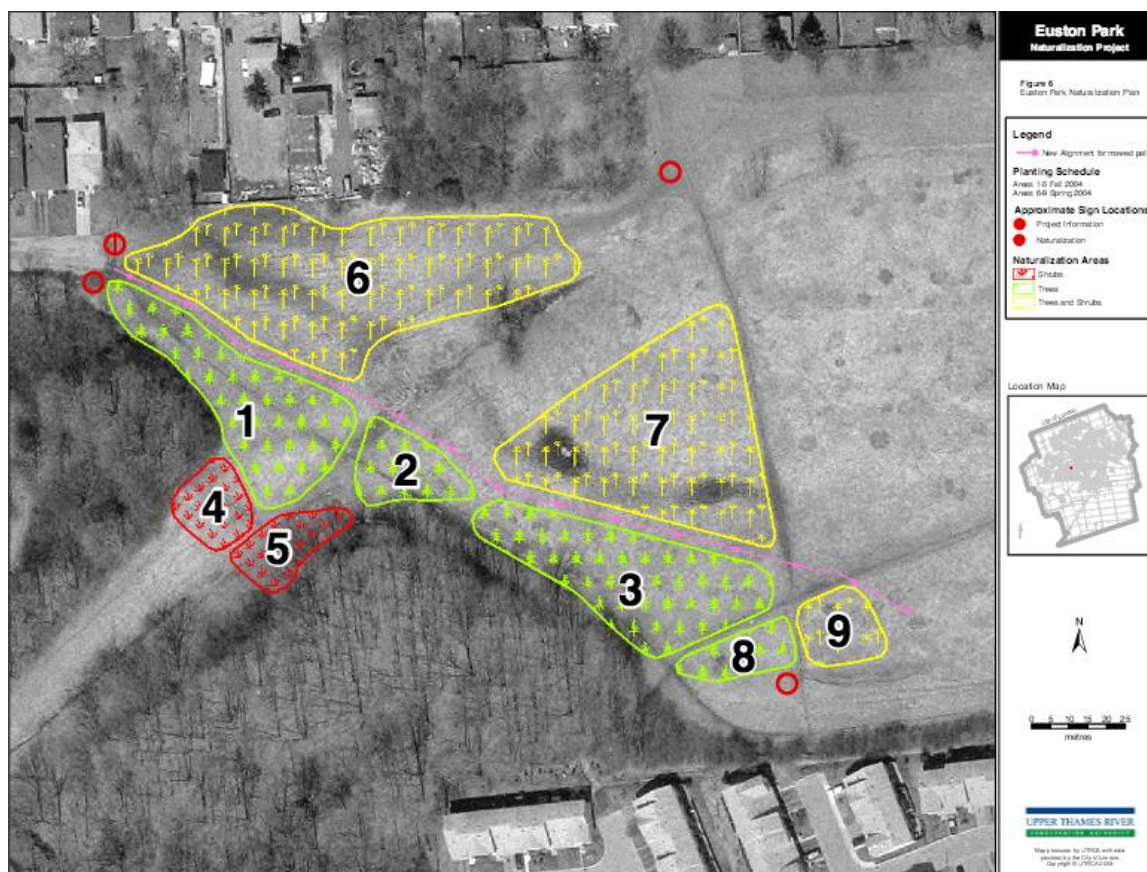
#### 5.2.1.4 Naturalization and Native Species Continued

##### Precedents and Best Practices

In 2003 the Friends of the Coves Subwatershed Inc., a community group in the City of London, Ontario, developed an education-based ecological enhancement project with a focus on increasing urban green cover (Friends of the Coves Subwatershed Inc., 2004). The resulting plan, *Euston Park Naturalization Plan*, is a great example of how a Brownfield and existing underutilized green open space can be greatly improved through the planting of native tree, shrubs and wildflower species.

The plan indicated that different type of planting stock should be used in each naturalization areas (trees, shrubs or both) to achieve the overall goal of the plan. The type of planting stock was selected based upon the following criteria:

- Local soil characteristics;
- The objective for achieving some diversity in the type of vegetation planted;
- The objective for increasing the area of tree cover adjacent to the ESA; and
- The need to protect sight lines from park access points for public safety.



**Figure 35:** Euston Park Naturalization Plan indicating different type of naturalization methods within different areas of the site

Source: Friends of the Coves Subwatershed Inc., 2004

#### 5.2.1.4 Naturalization and Native Species Continued

Implementation of the *Euston Park Plan* was led by Friends of the Coves Subwatershed Inc., however thanks to help from both the City of London and The Upper Thames River Conservation Authority (UTRCA), planting logistics were able to be carried out under the existing UTRCA Community Forestry Program. The purpose of the program is to “improve the environment through tree planting in partnership with the community” and also provides participation opportunities for school children (Friends of the Coves Subwatershed Inc., 2004). Kingston could learn a great deal from the successful partnerships that exist within other Canadian municipalities and we feel that our plan provide tremendous opportunities to foster and establish collaborative initiatives, like those seen in Euston Park. The Cataraqui Region already works closely with Kingston city staff and partnering with them once again to help implement naturalization planting throughout the site would not only help create a community fabric in the area, but also deliver a needed design element to the site.

Additionally, this case study highlights the many possibilities that naturalization can provide with a brownfield site. Similarly to our site here in Kingston, the *Euston Park Naturalization Plan* was faced with a number of environmental challenges and constraints due to the area being a former municipal landfill. Soil contamination is a large concern moving forward in our plan and similarly to the studies conducted in Euston Park, rigorous soil testing will be conducted to ensure proper planting methods and specie selection.

#### Design Considerations

The *City of Kingston Design Guidelines* provide extensive direction in regards to park planning, but not much specific discussion regarding naturalization as a design tool. This section is meant to correct that and add helpful suggestions for the possible naturalization of the site.

#### Physical

- i. *Plant Hardiness* – native species will be primarily used to allow for the growth of healthy and sustainable areas. For a list of some of the most applicable species that could be used, please refer to Appendix A.
- i. *Soil Texture* – soil testing will be conducted prior to any planning or planting and study findings will guide the subsequent stages of the naturalization implementation process.
- i. *Water and Drainage* – plantings within bioswales and around the stormwater pond will ensure proper site drainage
- i. *Wind* - a combination of coniferous and deciduous tress will be used throughout the site to ensure a year long tree canopy that is site and temperature appropriate
- i. *Erosion* – decreases water runoff because native trees consumer less water than many grasses and other vegetation
- i. *Light* – a lighter tree canopy will be introduced along the K&P Trail to ensure that there is adequate site lines into and throughout the site, while plantings along Maple St and Cassidy St will be removed to allow for a more open and manicured landscape to be established. Overall, trees will not be overcrowded, as the objective is to not create a forest but instead an accessible and open park.
- i. *Lay of the land*



### 5.2.1.4 Naturalization and Native Species Continued

#### Biological

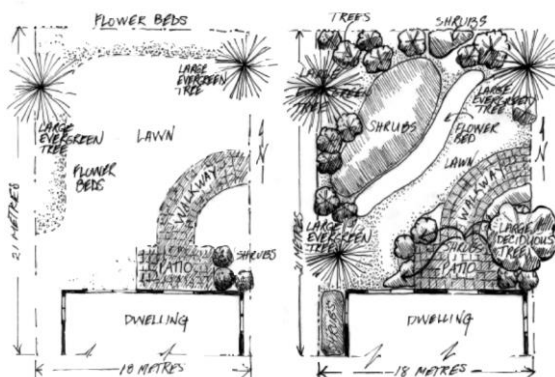
- i. *Seasonal variations* – a mix of native, non-native, coniferous and deciduous trees, shrubs, bushes and flowers will be planted throughout to ensure a year long ethical value, while also providing the necessary habitat requirements for local wildlife.\
- ii. *Current vegetation* – much of the plantings currently on-site will be manipulated. The area's green landscape will be completely revamped and many areas will be altered due to the strategic introduction of landscaped areas around the K&P Trail, near the new bus stop, around the new housing developments and adjacent community garden. Naturalized and more “bush” like areas will be concentrated to more northern areas of the site, and especially focused around the proposed stormwater pond.

#### Use

- i. *Pollution* - plants and trees provide needed carbon dioxide fixing from the atmosphere through photosynthesis
- ii. *Size and uses* – variation throughout the site depending on location and proposed area use
- iii. *Aesthetics* - quality-of-life factors include parks, air quality, water quality and greenways; all which urban forestry improves. As well, Trees and green spaces provide significant advantages in terms of psychological and physical well-being by decreasing stress and improving everyday life (Gatrell, 2002)
- iv. *Maintenance* – similarly to the Euston Park example previously discussed, there is great potential for government partnerships, educational program establishment, scientific monitoring set-up and community-lead organizations to exist and maintain the newly developed site. Community maintenance could be an amazing initiative in this neighbourhood, as it would promote community ownership and pride
- v. *Restoration* - providing a net gain in habitat for urban wildlife, increasing urban biodiversity and reducing habitat fragmentation



**Figure 36: Sketching process**  
Source: Outdoor Architecture



**Figure 37: Drawing of a Naturalized Garden**  
Source: <http://www.grca.on.ca/naturalize.pdf>



**Figure 38: Sketching process**  
Source: Outdoor Architecture

### 5.2.1.5 Urban Forests and Property Design

Kingston implemented the *Sustainable Kingston Plan* in 2010, guiding Kingston's vision of becoming Canada's Most Sustainable City. Although the Plan introduces many smart-growth and sustainable policies, there is room for improvement. In particular, the Plan is in need of stronger urban forestry principles that link urban forestry regulations with urban growth and sprawl via property design principles.

One of the more prominent components of the smart-growth movement has been urban forestry and related environmental concerns, such as green space (Gatrell, 2002). Urban forestry is about more than just trees; it involves the care and management of "trees, forests, green spaces and related abiotic, biotic and cultural components in and around cities and communities" (Deneke, 1993).

#### Objectives, Needs and Solutions

As Kingston's urban development intensifies, clear urban forestry regulations are needed to protect the city's environmental integrity and make it a truly sustainable city. It is the recommendation of this report that Kingston creates and implements property design principles that encourage tree preservation and inhibit tree destruction to ensure the continued integration of green spaces and healthy tree populations.

#### Precedents and Best Practices

Kingston can learn from cities that have successfully achieved healthy and bountiful tree populations, such as Gainesville and Ocala, Florida, both recognized as "Tree City USA" over ten times each. The key to the success of urban forestry policies in Gainesville and Ocala is the incorporation of urban forestry requirements into the city's by-laws, making them clear and enforceable (Gatrell, 2002). Kingston needs to mirror this approach and incorporate urban forestry policies like those found in Appendix A.



**5.2.1.5 Urban Forests and Property Design Continued**

<b>Rule</b>	<b>Gainesville</b>	<b>Ocala</b>
<i>Protection rules</i>		
Removal of Trees on Residential Property	Permit Required	Permit required (exemption for Residential parcels less than 3 acres)
Removal of Trees on Non-Residential Property	Permit Required	Permit Required
Replanting on Residential Property	Replacement Required	Replacement Required
Replanting on Non-Residential Property	Replacement Required	Replacement Required
<i>Design Rules</i>		
Size/Species List Classes	Small/Medium/Large	Shade/Ornamental
Native Species Requirement	Developers must plant 25% native trees	Not explicitly Required
Landscape Plans for Developments	Required	Required of non-exempted sites
Sq. Footage Requirements	Yes (1 tree per 2850 sq. ft.)	Yes (1 tree per 3000 sq. ft.)
Tree Installation Standards	Yes (planting, staking and watering regime)	No
<i>Other Issues</i>		
Full-Time City Arborist	Yes	No
Administrative Unit	Parks Division Tree Crew	Planning Department Staff
Disincentives	Fines	Fines

**Table 6:** Urban forestry policies - Gainesville and Ocala, Florida  
 Source: Gatrell, 2002



### 5.2.1.5 Urban Forests and Property Design Continued

#### Design Considerations

With Kingston's population projections for 2031 indicating an 83% population increase and an 82% increase in the total number of dwelling units, compounded by the continued decline in agricultural activity (City of Kingston, 2013), the preservation of green spaces and tree life needs to be addressed *now* for long term sustainable goals to be met. Clear directives, such as those in Table 1, that directly link tree-planting initiatives with urban development are needed. Without healthy urban forestry Kingston will never be Canada's Most Sustainable City. The benefits from urban forestry and trees are undeniable, as they contribute greatly to the economic, ecological and social health of a community.

Kingston does not have to completely adopt the urban forestry policies from Gainesville or Ocala, but instead can learn from their successes and create policies that are more appropriate for Kingston. Table 1 is simply outlining *examples* of the types of policies that need to be incorporated; ones that have clear objectives and are enforceable by the City. However, to create more site-specific urban forestry regulations, Kingston may need to do some research. One way to effectively understand the impacts of land use policies on the environment is by using a cellular automata (CA) model<sup>1</sup> known as the SLEUTH (Slope, Land use, Exclusion, Urban extent, Transportation, Hillshade) (Jantz, 2003).

SLEUTH uses remote sensing imaging to create map projections that indicate future growth patterns, assuming three different policy scenarios: (1) current trends – weak urban forestry regulations, (2) managed growth – urban forestry suggestions, and (3) ecologically sustainable growth – urban forestry by-laws (Jantz, 2003). The results would most likely show that managed growth and ecologically sustainable scenarios produce growth patterns that are more constrained, but cause significantly less environmental degradation. By using modeling systems, like SLEUTH, Kingston can visually understand what the land use implications and benefits are from different urban forestry interventions. This report urges for the implementation of urban forestry design guidelines in the development applications, as "public policies for managing growth and protecting [green spaces] are at the center of the issue of sustainable development, i.e. making growth and development economically, environmentally and socially sustainable" (Bengston, 2004, p. 273).



**Figure 39:**  
Planting considerations for urban trees  
Source: City of Albany, Oregon

#### 5.2.1.6 Path Networks

One of the many advantages to the Old Industrial Area is its open spaces that can be used for both pedestrian and cyclist usage. It is our objective to enhance these open spaces and create a more accessible, safe and aesthetically pleasing environment for residents and visitors. In addition, we seek to increase connectivity between the site, which is centred upon the former rail line pathway, and the K&P trail and other pathways in Kingston.

##### Objectives, Needs and Solutions

In its present state, the open space in the Old Industrial Area is uninviting, poorly connected and polluted. To better utilize the open space in, we have defined a number of objectives to achieve our goals. Broadly our goals are as follows:

- Promote accessibility within the neighbourhood and throughout Kingston
- Clean up the area and embellish the landscape
- Improve safety and make the area more attractive through lighting and street furniture

We must connect the pathway with the transportation hub along Montreal Street, which will create traffic to the area. We must also remove the numerous waste piles that sit in plain site along the pathway. In its present state, the pathway is thin and is often precarious to use due to mud buildup. The pathway should be rebuilt with compacted gravel and widened. It should be retrofitted with street lighting, furniture and its entrances should be made inviting through landscaping and proper signage. To enhance accessibility, the pathway should also be extended on the west to better connect Harvey Street and on the north to connect our proposed community garden and townhouses. With these objectives in mind, the pathway in the Old Industrial Area will be easily accessible to all corners of the neighbourhood as well as other areas of Kingston.



**Figure 40:** Parks trails for both pedestrians and cyclists will be implemented throughout the site  
Source: York Region

### 5.2.1.6 Path Networks Continued

#### Precedents and Best Practices

The Petit train du nord linear park is a multi-use pathway that extends 200 km from Saint-Jerome to Mont Laurier, north of Montreal, Quebec. The trail network was opened in 1996 and follows the former rail lines of the underutilized Canadian Pacific Line in the Laurentians. While not an urban trail per se, the Petit train du nord is an interesting precedent in that many of the historical train stations were retained, or new structures were created featuring heritage elements. In addition, the former train stations have been transformed into cafes, recreation centres and transportation hubs. These hubs serve as an entrance point to the trail network for citizens of its respective towns, and they also connect to other urban areas with additional trail networks.

Figure 41 showcases a typical section of the petit train du nord trail network. The pathway is adequately wide to provide for safe two-way traffic for both pedestrians and cyclists. To reduce initial capital costs, the trail was finished with sections of stone dust and gravel. Likewise we propose to use stone dust for our pathway.



**Figure 41:** Compact gravel pathway on the petit train du nord.

Source: Stephane Lapointe, 2014



**Figure 42:** Paved pathway along the Bloomingdale Trail.

Source: Victor Grigas, 2015



5.2.1.6 Path Networks Continued

Design Drawings



Figure 43: Hand drawing of the multi-use pathway  
Source: Morin, 2016

### 5.2.2 Path and Street Connection Precedents

Design goals included increasing natural linkages within the site area and to other areas of the city. Leveraging the preexisting path network, and enhancing the street connections and networks will aid in enhancing the physical layout of the site area. Additionally, expanding the path networks will help to increase use of the green and natural areas. Within the following section, precedent examples will be provided for green materials for paths and roadways, pedestrian networks, and street setback provisions for neighbourhood well-being.

#### 5.2.2.1 Pavers

Accommodating traffic volumes and withstanding climactic pressures are the primary design considerations of paving materials. While these are necessary considerations, projects from around the world have been increasingly experimenting with alternative paving treatments and creating surfaces with multiple functions. Most notably, design projects have combined stormwater management and placemaking infrastructure into their paving materials by utilizing permeable pavement and alternative pavers.

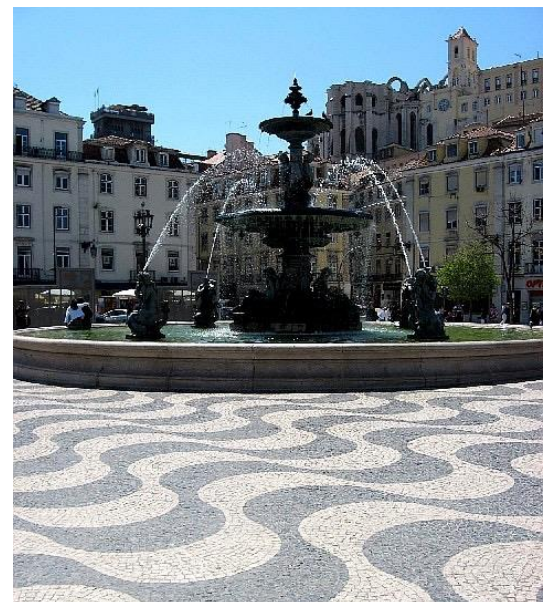
Incorporating a variety of paving materials throughout the site will help the project meet its vision and objectives. This will be accomplished through the addition of green infrastructure in the form of permeable pavement and through the use of unique paving treatments to strengthen the community's identity.

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**Figure 44:** Permeable pavement used in a parking lot. National Association of City Transportation Officials, n.d.b



**Figure 45:** Pavement treatment used as a placemaking tool. Source: Moreira Kenchiku Materials, n.d.



### 5.2.2.1 Pavers Continued

#### Permeable paving

Permeable paving materials can be implemented as a stormwater management feature. Using these surfaces in lieu of traditional pavement can turn paved surfaces into multi-functional infrastructure as they can control stormwater runoff quantity and quality. There are currently 4 main types of permeable pavement on the market: permeable interlocking concrete pavers; plastic or concrete grid systems; pervious concrete; and porous asphalt (Credit Valley Conservation and Toronto and Region Conservation; 2010). Site characteristics generally dictate if permeable pavers are appropriate for the site and the type that should be used.



**Figure 46:** Permeable Interlocking Concrete Pavers. Source: Nassau County Soil & Water Conservation District, n.d.



**Figure 47:** Plastic grid pavers; can also be filled with gravel. Concrete Grid Pavers are of a similar design. Source: Gerard, 2014



**Figure 48:** Porous Asphalt demonstrating its stormwater management capabilities. Source: Diaz, 2011.



**Figure 49:** Winter performance of porous asphalt. Source: Macdonald, 2011.

### 5.2.2.1 Pavers Continued

#### Alternative Paving Materials

As noted by the Project for Public Spaces, special paving materials can contribute to placemaking as they are able to communicate features such as a community's history, identity, and its local assets (PPS, n.d.). The strategic use of paving materials can demark area boundaries and direct community members to areas of interest. Permeable pavement can also be incorporate when using paving treatments for placemaking;

Certain land uses may also require unique paving treatments, such as multi-use pathways. Asphalt is generally the preferred surface for multi-use pathway as it can best accommodate cyclists and those with low mobility. In terms of this plan's design goals, stone dust is the preferred surface option as it is more permeable than asphalt and less energy intensive in its production. Both asphalt and stone dust surfaces can be fabricated from recycled materials.



**Figure 45** (Left) and **Figure 51** (Right): While not the definitive placemaker, paving designs can add a unique flare to a space and contribute to an areas identity. Source: As easy as riding a bike, 2011; Interpave, n.d.



**Figure 52** (Left) and **Figure 53** (Right): Multi-use pathways paved with stone dust. Sources: Kalen Images, 2012; Penarth News, 2013.



### 5.2.2.1 Pavers Continued

#### Design Considerations

##### **Paving Materials**

While permeable pavers is a good stormwater management alternative, they are only suitable to manage small rainfall events and should be used in tandem with other stormwater management best practices. Many considerations must be made when designing a surface with pervious pavement including: slope, traffic volumes, subgrade, surrounding land uses, soil, infiltration, and drainage characteristics and groundwater conditions. Ultimately, permeable pavement may not be suitable for all areas of the site and different pavement types should be considered throughout the site. With this in mind, guidelines for paving materials will general follow the City of Kingston's design standards, however, there are some specific suggestions for this urban design plan and are as follows:

- Generally, roadways are to be paved of asphalt, and sidewalks concrete.
- Multi-use pathways should be paved using stone dust, or if desired porous asphalt or permeable concrete.
- Permeable pavement should not be located on land uses that store or produce known pollutants
- Permeable paving is encouraged for parking lots and pathways in residential, commercial, and recreational uses.
- Appropriate technical studies such as groundwater vulnerability and traffic volume studies must be complete before the installation of permeable pavement.
- Special paving treatments should be considered in high visibility areas.
- Special paving treatment is encouraged for the third place, public art, and coffee shop area in the eastern edge of the site as well as for crosswalks throughout the site.



**Figure 54:** Citizens in a Portland community strengthen their neighbourhoods identity and demonstrate stewardship by painting asphalt.  
Source: Swart, 2012.

**Figure 58:** Conceptual plan of narrow sidewalks in a residential setting.  
NACTO, n.d.c

### 5.2.2.2 Street Extensions and Setbacks Continued

#### Parking

With increased victors to the area, considerations will be made to expand the parking area next to the old CNR station and add permanent bicycle parking structures.

Existing asphalt is to be removed, and recycled on site for other purposes, and crushed stone replacing the asphalt. The parking area will be extended slightly more north, and to the west to accommodate more cars. It is recommended that steps be taken to consider providing much more bicycle parking near the CNR station.

Due to the creation of new homes along Maple street and Cassidy street, additional parking is needed to accommodate new families in the area. In the residential parking areas, where possible, there will be rear access lanes with individual garages. This sort of intervention will have regard to the City of Kingston's Urban Design Guidelines, subsection 4.1.i: 'Consider incorporating rear lanes to eliminate the need for street facing garages'. Furthermore, consideration will be made from the guidelines to incorporate subsection 5.4.d: 'attaching rear lane single car garages ... to provide a consolidated appearance'. There will be consideration taken to look at other parking options, before providing a 1:1 garage to unit parking ratio. These laneways will include 7.3m widths dedicated for vehicles, with 2m edges on both sides for pedestrians, as well as the option to park a vehicle in front of each garage horizontally (Steiner, Butler, 2006).

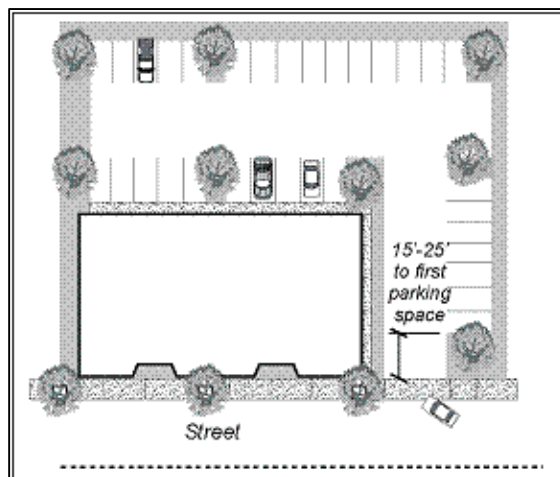
If rear laneways are not possible, there is also the option of adding rear surface parking spaces for the residential areas. As per the City of Kingston Residential Design Guidelines, options will be explored to not provide a 1:1 parking spot to unit ratio through side street parking and care share options. Careful consideration will also be taken with landscaping, as well as providing a safe access route for pedestrians with adequate, energy efficient lighting. If built, these lots will be located in the rear of residential units and will be accessible using small access roads that will be located between the residential units.



**Figure 59:** Rear lane parking in the City of Toronto. Canadian Contractor, 2016



**Figure 60:** Examples of rear lane parking and access roads in Vancouver. Land Fab Design, 2016



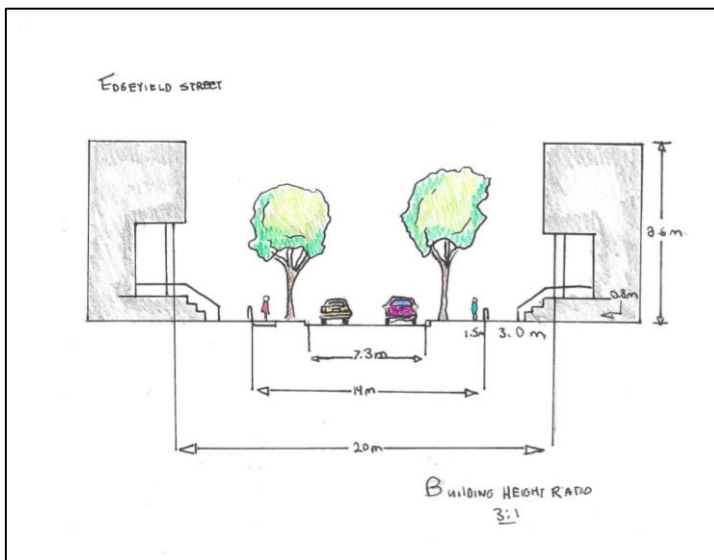
**Figure 61:** Conceptual plan of rear residential parking at grade. City of Satarosa, 2015

### 5.2.2.2 Street Extensions and Setbacks Continued

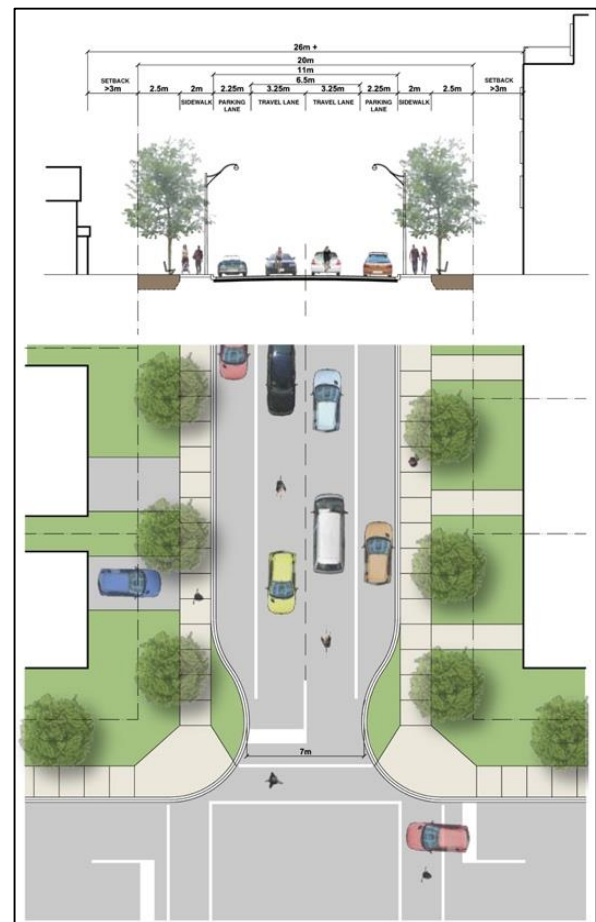
#### Streets and Sidewalks - Ottawa Residential Street Guidelines

Throughout our design, we would like to prioritize accessibility and movement to the pedestrian. This is not to say that vehicles will not be able to access the area, but lanes will be narrowed in order to provide traffic calming measures, spaces for bikes, as well as potential on street parking.

The City of Ottawa Residential Street Guidelines (2008) provide a safe, and easily implemented model for our reimaged Maple and Cassidy Streets. Narrow setbacks will be given for the residential units, as well as generous sidewalk space for pedestrians and planters and trees. As conceptualized in the image below, bump outs will be added to local streets to provide even further traffic calming.



**Figure 62:** Conceptual drawing of a local street.  
Kennedy, 2016



**Figure 63:** Conceptual drawing of a local street.  
City of Ottawa, 2008

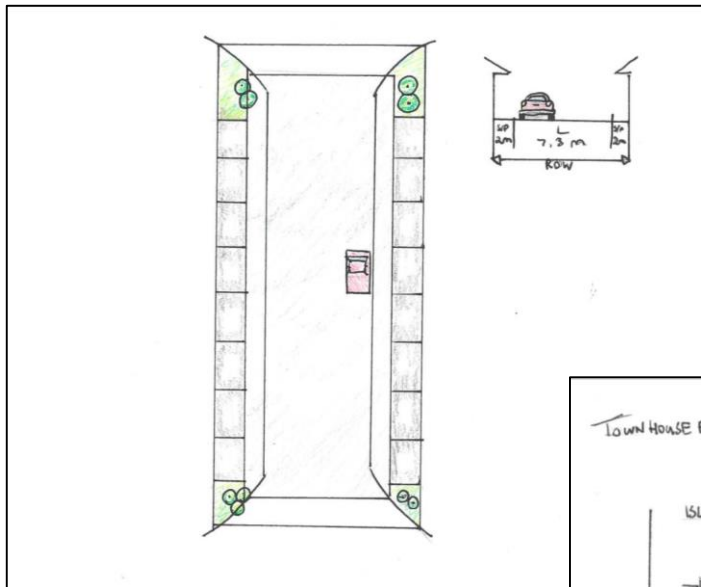


### 5.2.2.2 Street Extensions and Setbacks Continued

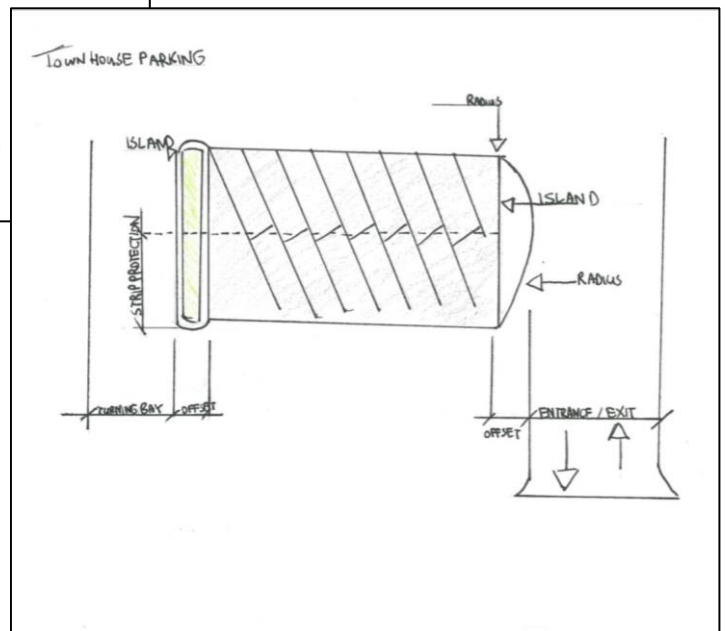
#### Parking

Parking always creates somewhat of a significant challenge, especially in places with thick bedrock such as Kingston. In keeping with the City of Kingston Urban Design Guidelines, surface parking is discouraged, and alternative measures taken where possible.

Parking precedents were taken from Steiner and Butler's Urban Design guideline to propose various options for our site for increased flexibility with designs. In keeping with the City of Kingston's Urban Design Guidelines, rear lane way parking was conceptualized to provide a 1:1 ratio for parking to unit numbers. This arrangement also allows for all services to be integrated below grade and hidden in the rear lane. If this configuration is not possible, surface parking can be integrated into the rear areas of the grow homes.



**Figure 64:** Conceptual drawing of rear laneway parking for residential units.  
Kennedy, 2016



**Figure 65:** Conceptual drawing of rear surface parking for residential units.  
Kennedy, 2016

### 5.2.2.2 Street Extensions and Setbacks Continued

#### Setbacks

Setbacks are the distance any sort of building is placed from a road, sidewalk or any other place. The primary function of setbacks is to provide additional space for other things that need protection, for example, pedestrians. Throughout the last 60 years, setbacks have become increasingly larger in order to protect buildings and people from vehicles.

Today, there has been a shift to return to shorter setbacks, that allow for once again, placing servicing at the rear and buildings as well as more impervious surfaces to the rear.

#### Objectives, Recognized Needs and Solutions

In order to foster a sense of eyes on the street and connectivity, the residential grow homes will feature setbacks of 4.5m as per the City of Kingston Residential Design Guidelines. 3.0m will be reserved for the front entryway, with 1.5m reserved for the encroachment zone (see figure xx).

Current conditions along John Counter Boulevard include setbacks that are too deep to offer any connection between the street and uses. In order to improve the pedestrian experience along larger arterials, roads such as John Counter Boulevard should be changed to 5.0m setbacks, with parking moved to the rear.



**Figure 66:** Examples of shallow setbacks, Kingston Ontario. Source: Kingston Wig Standard, n.d.



**Figure 67:** Wide industrial setbacks as seen on Harvey Street  
Source: Morin, 2016



**Figure 68:** Conceptual example of residential setbacks of multistory residential.  
Source: City of Philadelphia, 2016



**Figure 69:** Example of deeper setbacks.  
Source: Mumbul, n.d.

### 5.2.2.2 Street Extensions and Setbacks

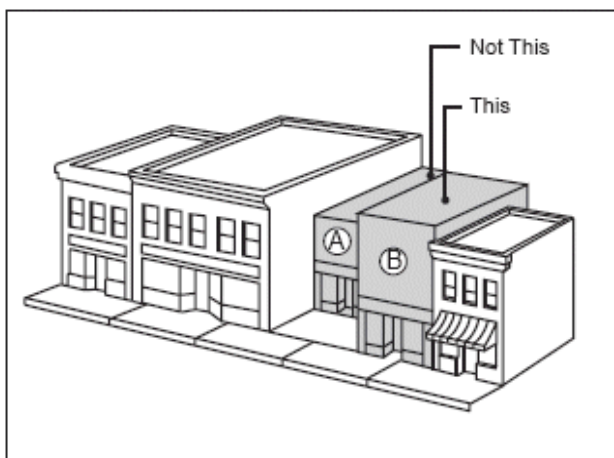
#### Precedents and Best Practices

##### *1. Commercial Setbacks in Reykjavík, Iceland and Roskilde, Denmark*

The Population of Reykjavík at 119,000 people, and population of Roskilde at 50,000 people offer comparable examples that relate well to the City of Kingston in both size of city, mix of building types, as well as climatic features.

Both Reykjavík and Roskilde offer great examples of narrow setbacks, mixed with a variety of different building ages and types, all within a commercial setting. Although these areas tend to feature more traffic calming, and narrower streets than John Counter Boulevard, traffic amendments could be done to slow the flow of vehicular traffic to protect pedestrians, and create a more pedestrian friendly environment.

When comparing the two areas, many of the commercial areas within the downtown regions feature small 1.0m set backs that include only sidewalk. This allows for direct interaction between people on the street and businesses. These sorts of adjustments made to selected commercial areas in our redevelopment strategy would offer pedestrians a much more pleasant walking experience along the sidewalks, as well as a potential business stimulator, to entice more people off the streets into local businesses.



**Figure 72:** Conceptual plan of what we want for commercial buildings (b) on site, and not (a).  
Source: City of Edmonton, n.d.



**Figure 70:** Narrow setbacks in Reykjavík, Iceland  
Source: Kennedy, 2012



**Figure 71:** Narrow setbacks on main road, Reykjavík, Iceland  
Source: Ezra, 2013



**Figure 73:** Narrow setbacks in downtown Roskilde, Denmark  
Source: Kennedy, 2012



### 5.2.2.2 Street Extensions and Setbacks Continued

#### **2. Residential Streets in Kingston, Ontario**

Most of the houses currently on site, feature fairly large setbacks that are vestiges from both farming, and modernist design principles that have been used in the area over time. In order to encourage pedestrian dialogues between the buildings and streets, residential setbacks on the grow homes

Great examples of narrow residential setbacks can be found throughout the City of Kingston. In the Sydenham Heritage District, many of these homes feature a traditional model of 4.5m setbacks, that include a 2.0m private area in the porch, followed by a 1.0m area for the front steps, and 1.5m reserved for the sidewalks, as described in the City of Kingston Design Guidelines for Residential Lots. This sort of arrangement offers a dual benefit to the private homeowners, as well as pedestrians. The private homeowner is able to gain a sense perspective on the world, all the while providing a sense of security and presence to the pedestrians walking along the street. In addition, the pedestrian is given an appropriate scale of building and potential interaction with the buildings as well as the people in them.



**Figure 74:** Tight setbacks as found in the historic Sydenham District, Kingston.  
Source: Gumprecht, 2015



**Figure 75:** Very narrow setbacks as found in Kingston.  
Source: Homes & Land, 2015



### 5.2.2.2 Street Extensions and Setbacks Continued

#### Design Drawings and Details

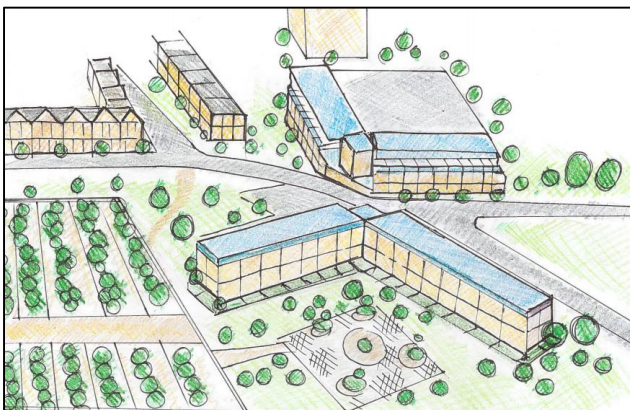
For our plan, we would like to encourage the development of all future residential homes to recreate some of the similar setbacks found in older districts of Kingston. As older commercial enterprises are phased out around the area, we would like future commercial development to feature 5m setbacks from the roads.

- 4.5m setbacks to be included in the grow home area around Maple and Cassidy Streets.
- 5.0m setbacks to be included along commercial areas such as John Counter Boulevard.
- Encourage the use of trees and boxes in a 1.5m area in front of the grow homes.



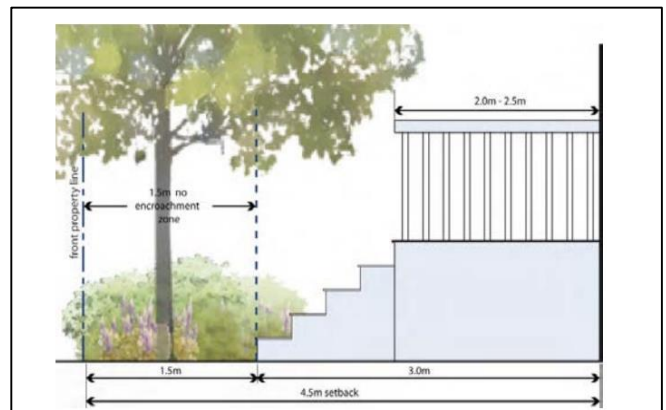
**Figure 76:** Conceptual drawing of growhomes and 4.5m setbacks along Maple Street.

Source: Mushet, 2016



**Figure 77:** Conceptual drawing of growhomes and 4.5m setbacks along Maple and Cassidy Streets.

Source: Mushet, 2016



**Figure 78:** Conceptual drawing 4.5 m residential setbacks.

Source: City of Kingston, 2015

### 5.2.3 Housing

Design plans for housing worked to take into consideration the existing character of the community, and address housing needs through inclusion of low-entry building type and form. In order to respect the natural areas and open space, and to provide affordable housing units within the site area, the team elected to propose the inclusion of grow and row homes as housing options. These housing types allow for flexibility over time in a single parcel, and can be affordable alternatives to single-detached homes.

#### 5.2.3.1 Grow and Row Home

Our team has considered a number of options for the addition of new housing units onto the site. Keeping in mind the industrial nature of large swaths of the area as well as the existing green space, our housing plan is designed for an incremental increase in the local population that does not eliminate jobs or parkland.

Increasing residential density is vital for meeting the guiding principles of the urban design plan. New housing will support the community's industrial and commercial base, strengthen the area's identity, and enhance existing built heritage.



**Figure 79:** Grow homes in Michigan.  
Source: Pakulski, 2005



**Figure 80:** Grow Homes are a flexible and receptive to the needs of their owners. The unit on the left is the unfinished shell which a homeowner purchases and the unit on the right is a unit that has been finished and partitioned to suite the owner's needs.  
Source: Groupe Renaissance, n.d.



### 5.2.3.1 Grow and Row Homes Continued

#### Objectives, Needs and Solutions

There are three objectives for new residential development within the site. Housing should be:

- Affordable;
- Environmentally sustainable; and
- In a form that is consistent with local character.

These objectives stem from community needs established in the preliminary site analysis as well as the team's vision for the site. The neighbourhood's socio-demographics indicate a very low-income character making affordability particularly important. There are also several heritage structures within the site, which housing design should be mindful of in order to enhance the legacy of existing buildings.

As our design vision calls for maximizing the environmental function of the site, new housing should be constructed in a sustainable fashion. This will be accomplished by maximizing solar exposure when siting buildings, and introducing technological interventions such as grey water treatment, a localized, off-grid power supply, and stormwater management features.

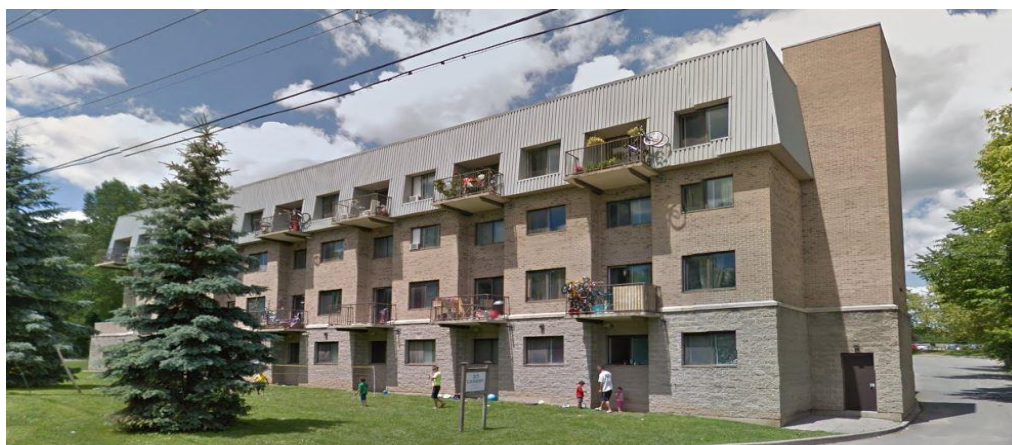
Housing will be located in and around the intersection of Maple and Cassidy Streets. We consider this a logical starting point to organically grow the area as a residential neighbourhood with complete streetscapes.



**Figure 81:** Existing Single Detached Housing Stock along Hickson Ave. Source: Morin, 2016



**Figure 82:** Existing high rise residential building along John Counter Blvd. Source: Prime Corp, n.d.



**Figure 83:** Existing mid-rise residential building along Maple St. Source: Google Maps, 2016

### 5.2.3.1 Grow and Row Homes Continued

#### Precedents and Best Practices

##### 1. Cooperative Housing

Cooperative housing is often used in conjunction with rent-geared-to-income housing and can also feature income mixing. A “cooperative” would be made up of all the residents in the complex who would collectively govern and maintain the complex. The cooperative is a non-profit which would charge only enough to cover costs. When coupled with government subsidies, there could be units that only pay a portion of the charge alongside units of higher-income residents that pay the full charge. The advantages of co-ops include self-governance, lack of an external landlord and higher maintenance standards due to residents having a vested interest in the property even if they are renters. Co-op housing can come in any multi-unit form and can be combined with other forms of affordable housing on this list. This adaptability could make it well-suited to the site. There are 17 providers of rent-geared-to-income housing in Kingston with several local precedents for cooperative housing.

##### 2. Pre-fabricated Modular Construction

Simply constructing homes are an alternative to subsidised housing. This housing type should be constructed at efficient densities and from inexpensive materials so that they can be sold or rented at low rates without losing private builders money. This strategy can be particularly effective in the face of governments that are reluctant to fund subsidised units. Nehemiah Spring Creek complex in Brooklyn, NY is an example of such a project. The complex consists of cheaply-constructed pre-fabricated modular townhomes built in a neighbourhood severely affected by urban blight. These were built by a non-profit developer, but low-cost homes could also be built for-profit, particularly when coupled with a mixed-income approach. This strategy can also be used in conjunction with the public sector which can, for instance, offer tax rebates or subsidize land purchases for developers building affordable units.

##### 3. Grow Homes

Grow Homes are an affordable housing type developed by the McGill’s School of Architecture’s Avi Friedan and Witold Rybczynski (CMHC, n.d.). These three storey townhouses are built with a structural core, but a flexible interior space. Generally, the first floor is finished upon purchase including a kitchen, bathroom and living space, while the remaining floors are open and unfinished. Grow Homes are a flexible housing type as they allow owners to adapt their homes as their finances change. Unfinished areas can be adapted to suite the needs of homeowners and additions are generally more cost effective than traditional housing types as the outer shell anticipates future growth. Since most of the house comes unfinished, Grow Homes cost less up front, which lowers the entry point into the housing markets making them ideal for first time buyers.

Both Grow Homes and the pre-fabricated model used in Brooklyn can be used for large and small-scale projects and need not involve tumultuous redevelopment that displaces current residents. However, the low land values found in North Kingston means that existing units are already inexpensive. New housing could be pricier than old homes meaning that this type of development could actually hurt the neighbourhood’s affordability, particularly if it spurs other market-based housing developments



### 5.2.3.1 Grow and Row Homes



**Figure 84:** The construction process of the Nehemiah Spring Creek complex in Brooklyn NY. Source: Capsys Corp, 2014.



**Figure 85 (Left) and Figure 86 (Above):** Example of Grow Homes in Montreal, QC and Cornwall, ON. Grow Homes are flexible inside and out. Exterior design details, as in the example from Montreal on the left, can be added at a later time.  
Source: Wong, 2011; Groupe Renaissance, n.d.

### 5.2.3.1 Grow and Row Homes

#### Design Details

Our plan includes infill housing in the north and north-west portion of the site. Design details for the proposed housing are as follows:

- Housing infill is recommend in a variety of forms and locations.
  - Mid-rise townhouse format and will form an L-shape at the southwestern corner of the Maple/Cassidy intersection to match the existing townhomes. This housing will be oriented to the street and provide a pedestrian-friendly experience.
  - Rowhousing, in a similar style to existing buildings, is recommend in the proposed residential street extension in the Maple St and Cassidy St area. Adding residential units in this area will complete the “neighbourhood” feel and create a closed loop that is conducive to connectivity while maintaining pedestrian and cyclist safety.
  - Residential density will be incrementally increased through the promotion of infill development at lower densities on unutilized land. Primarily, this will include the southernmost portion of Cassidy St as well as the northern end of Maple St, both of which feature scattered detached housing. Infill in these areas will maintain the lower-density character and be zoned for single family detached houses with the potential for duplex-style housing on Maple St.
- It is strongly recommended that new housing be built in either the Grow Home technique, the pre-fabricated modular technique, or any other construction technique that emphasizes affordability and sustainability, while not sacrificing quality.
- It is strongly recommended that any housing that is built remain affordable. Multiple options for affordable housing should be considered, although the preferable option is likely a partnership with a non-profit developer to bring low-cost housing to the area, potentially bundled with subsidised and/or cooperative housing, dependent on government funding and support.
- Residential development should be oriented to maximize solar exposure.
- Sustainability should be promoted through low-impact development techniques, several of which have been noted throughout the report and include:
  - Stormwater best management practices (Section 5.2.1.1)
  - Permeable pavement (Section 5.2.2.1)
  - District/Solar power (Section 5.2.4.1)
  - Greywater recycling (Section 5.2.4.2)
- Additional design details should follow those specified in the City of Kingston’s *Design Guideliens for Communities*.

### 5.2.4 Green Infrastructure

Green infrastructure was viewed as a viable feature to the site development plans, which could serve sustainable goals, and provide further environmental consideration for the development. The following section works to provide examples of green infrastructure types, and how they have been implemented in other developments.

#### 5.2.4.1 District Heating and Renewable Energy

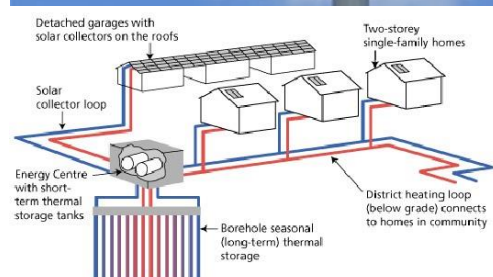
Our team proposes the creation of a district heating system in order to promote resiliency and sustainability within the community. The district system will heat and cool area homes, businesses, and industry through the use of renewable energy, thereby reducing the communities fossil fuel consumption. A number of small scale interventions are also recommended throughout the site to supplement the district plant.

Introducing these green technologies into the area supports the plan's vision in many ways. It promotes the area's identity by solidifying the community as the City's sustainability leader. It introduces alternative green infrastructure and reduces pressures on the electrical grid. Finally, district and renewable energy interventions could result in local employment growth in the manufacturing, installation, and servicing sectors. A natural transition to these businesses could occur as the area is home to several trades' people and industrial manufacturing and servicing operations.

#### Objectives, Needs, and Solution

Three objectives established to reduce the neighbourhood dependency on fossil fuels are:

- To establish a district heating and cooling plant, which will be powered through renewable sources and provide energy first to residential and commercial properties, and if successful be expanded to include industrial land uses;
- To power area lighting through solar technologies; and
- To encourage the use of electric vehicles through the provision of vehicle charging stations.



**Figure 87:** There is an extraordinary opportunity to incorporate green energy solutions into the area. Sources: Solar Electric Power Company, 2012; DLSC, 2010; Terratek, n.d.



### 5.2.4.1 District Heating Continued

#### Precedents and Best Practices

##### 1. Drake Landing Solar Community

Located south of Calgary, in the Town of Okotoks, Drake Landing is a planned community with a unique solar thermal energy storage system (DLSC, 2010). The system captures energy through solar panels. Thermal energy is exchanged from a glycol solution to water within the community's energy centre which and is stored in underground facilities. The heated water is then distributed to homes during the winter months through a district heating network. The thermal solar system has been operating successfully for over eight years. The district system supplies the community's 52 single detached homes with over 90% of their heating needs and reduces green house emissions by 5 tonnes per home per year.

##### 2. Solar Colwood

A suburb of Victoria, Colwood BC developed a community-level energy project entitled Solar Colwood (Natural Resource Canada, 2016). Through a 2.1 million dollar contribution from the solar energy fund Colwood offered a number of green energy incentives for residents and businesses for the installation of solar hot water systems, ductless split heat pumps, electric vehicle charging stations, solar photovoltaics, and smart home monitoring systems. The project was very successful resulting in further investment from additional government departments and crown corporations. In total 82 private solar hot war systems and 120 ductless heat pumps have been installed. Overall, Solar Colwood has resulted in an energy savings of 4.96 million Kwh/year, a greenhouse gas reduction of 651 tonnes of CO<sub>2</sub>E and a total cost savings of \$525,552.

These two projects represent green energy solutions at the community and property level. Both projects were successful, but achieved this success through different methods; one through master planning, the other through incentives. It should be noted that the success of these projects relied on heavy government subsidies and would not have been successful without it. While both these examples illustrate solar energy, other forms of renewable energy should not be ruled out for this site.



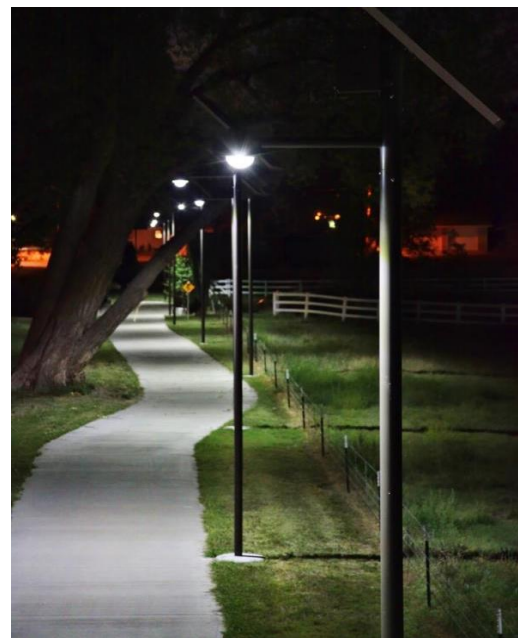
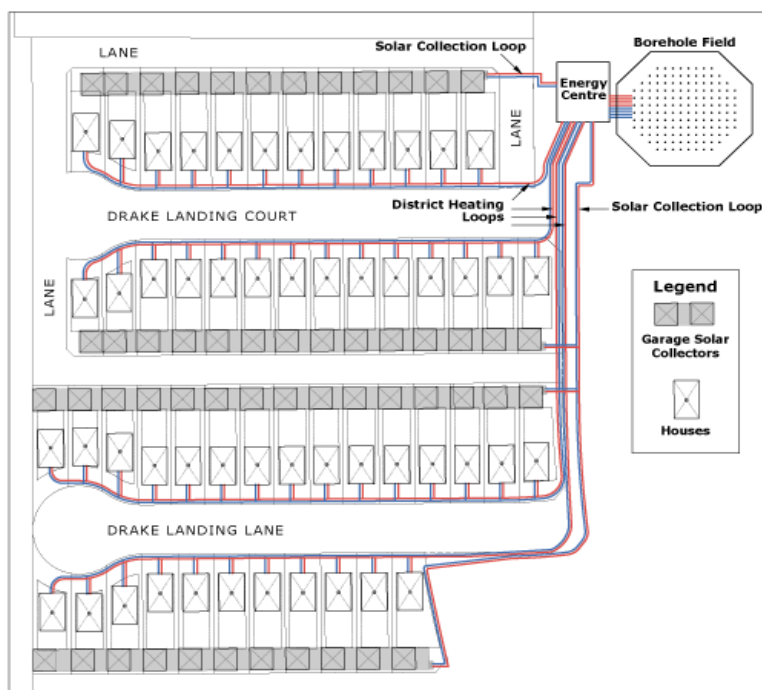
**Figure 88:** Drake Landing Solar Community. Garages are line with solar panels for the district heating system.  
Source DLSC, 2010)

### 5.2.4.1 District Heating Continued

#### Design Details

The design plan makes a number of recommendations to limit the area's carbon footprint and reliance on fossil fuels. These are accomplished through both community wide and site specific recommendations.

- A district heating plant is recommended for the site. The system should be powered through a renewable energy source. The solar thermal system used in Drake Landing is a desirable option, however, geothermal technologies should also be considered.
- It is recommended that the city should facilitate the administration of provincial and national renewable energy incentive programs.
- Public lighting, especially along the path network, should be solar powered.
- It is recommended that charging stations for electric vehicles should be installed throughout the site. Two possible locations include the parking lot adjacent to the old train station and the parking lot for the commercial plaza on the corner of Montreal St and John Counter Blvd. Charging Stations are also encouraged in residential properties.



**Figure 89** (Top Left): Site Plan for Drake Landing Solar Community's District Heating System. Source: DLSC, 2010. **Figure 90** (Top Right): Solar lighting being used along a multi-use path. Source: LED Times, 2014 **Figure 91** (Bottom Left): A solar panel used for heating hot water tanks and a charging station for an electrical vehicle. Both were installed through the Solar Colwood incentive program. Source: Terratek, n.d.; Colwood, n.d.)

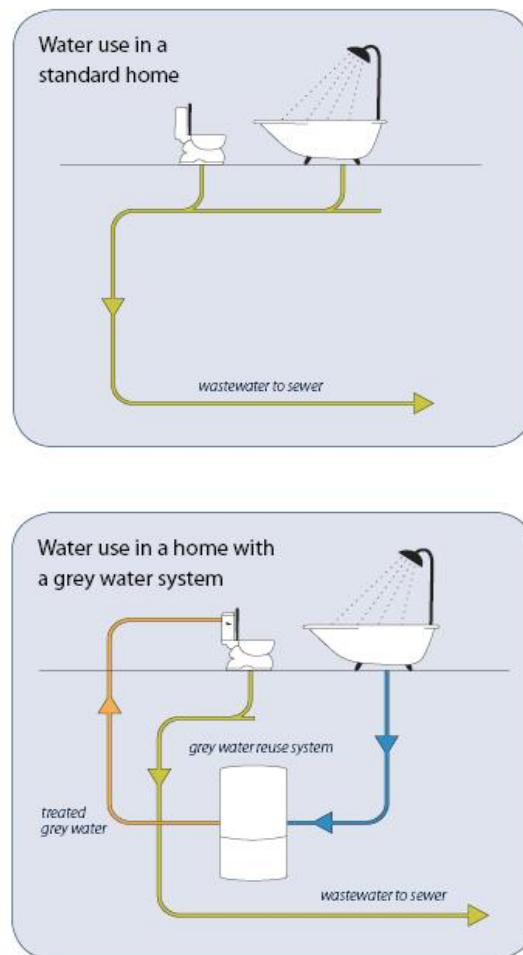


#### 5.2.4.2 Grey Water

Greywater is any household wastewater that does not include wastewater from toilets. Around 50-80% of household wastewater is greywater and comes from places such as kitchen sinks, dishwashers, bathroom sinks, tubs and showers. The safest way to handle greywater is to introduce it directly to the biologically active topsoil layer, where soil bacteria can quickly break it down, rendering the nutrients available to plants. This biological water purification is much more effective than any engineered treatment and protects the quality of groundwater and surface waters (Ludwig, 2006).

The Ontario Building Code (OBC) now permits using greywater to flush toilets and urinals, for priming traps, and for irrigation purposes. Greywater is drained to a holding or filter tank where it may be treated and afterwards supplied as flushing water for toilets and to supply irrigation water (City of Kingston).

In addition to conserving water, devices are currently available that capture heat from residential greywater through a process called drainwater heat recovery. Instead of municipal water flowing directly into a water-heating device, incoming cold water first flows through a heat exchanger where it is pre-warmed by heat from greywater. Typical household devices receiving greywater from a shower can recover up to 60% of the heat that would otherwise go to waste. In residential applications, a system would cost around \$500-\$1,000 to install, however, the system is able to save 25-40% on hot water heating. This type of system is capable of a return on investment in about 2 to 6 years (City of Kingston).



**Figure 92:** Water use in a standard home compared to that with a greywater reuse system

Source: City of Guelph, 2015



#### 5.2.4.2 Grey Water Continued

##### Objectives, Needs and Solutions

This design guideline report is dedicated to the creation of sustainable development that presents alternative solutions to common urban problems. This is especially pertinent when considering the introduction of new row houses throughout the site. This development presents an opportunity to implement green infrastructure initiatives that save future residents money on their utility and water bills, an important consideration considering the low-income make up of the neighbourhood, while also establishing ecologically beneficial infrastructure.

There are a range of policies and incentives that exist within the City of Kingston that support the principles of the Leadership in Energy and Environmental Design (LEED) program and the City actively encourages the use of greywater infrastructure, where applicable, as an effective green alternative to typical wastewater treatment processes. Although there is a noticeable lack of sustainable practices in the City's zoning by-laws, the City does have a sustainable vision for the future development of Kingston. Implementing greywater and/or heat recovery infrastructure directly aligns with the *Sustainable Kingston Plan* and help the city meet a number of their sustainability goals, such as (Sustainable Kingston Corporation):

- Minimize discharge of untreated sanitary sewage to natural water bodies;
- Reduce the capita treated water consumption for non-potable uses from all users (residential, industrial, commercial and institutional)

##### Precedents and Best Practices

The most general principle of grey water system design is that *there are no general principles*. All appropriate greywater reuse is extremely context specific (Ludwig, 2006). Reuse or treatment, new construction or retrofit, soil and climate conditions, legal considerations; each of these variables in particular have the potential to change the design completely. To help with the design of a site appropriate greywater system, a check list can be found at the Oasis with Greywater: Integrated Design for Water Conservation website at <http://oasisdesign.net/greywater/misinfo/>.

While there are no solutions that can be applied universally, there are a variety of guidelines that will dictate the resulting design of a greywater system. Guidelines such as the Ontario Building Code and the *2010 Canadian Guidelines for Domestic Reclaimed Water for Use in Toilet and Urinal Flushing* document released by Health Canada.

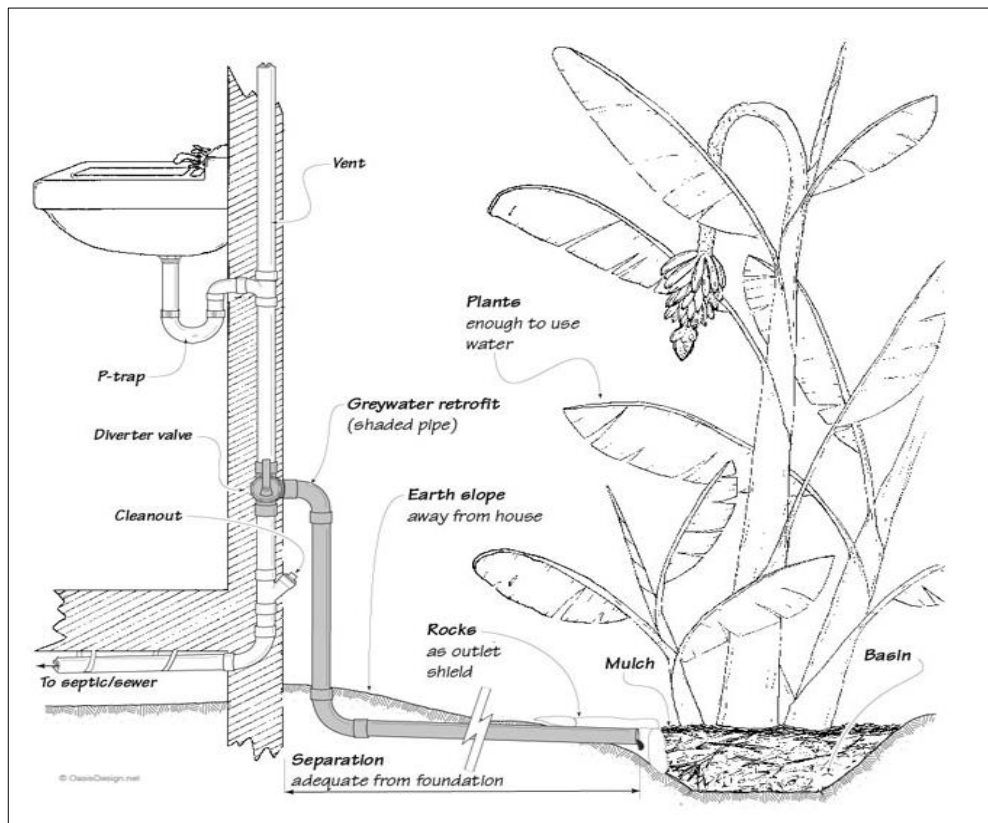
### 5.2.4.2 Grey Water Continued

#### Design Details:

The design of the system is based on the percolation time of the soil, as well as the amount of water that will flow into the system. The Ontario Building Code sets the “maximum daily design flow to 1,000 litres per day for greywater system; if the daily design flow is greater than this, a Class 4 system must be installed” (Kingston, Frontenace and Lennox & Addington (KFL&A) Public Health, 2014).

Things to consider when designing a site appropriate greywater system, as outlined by the Ontario Building Code

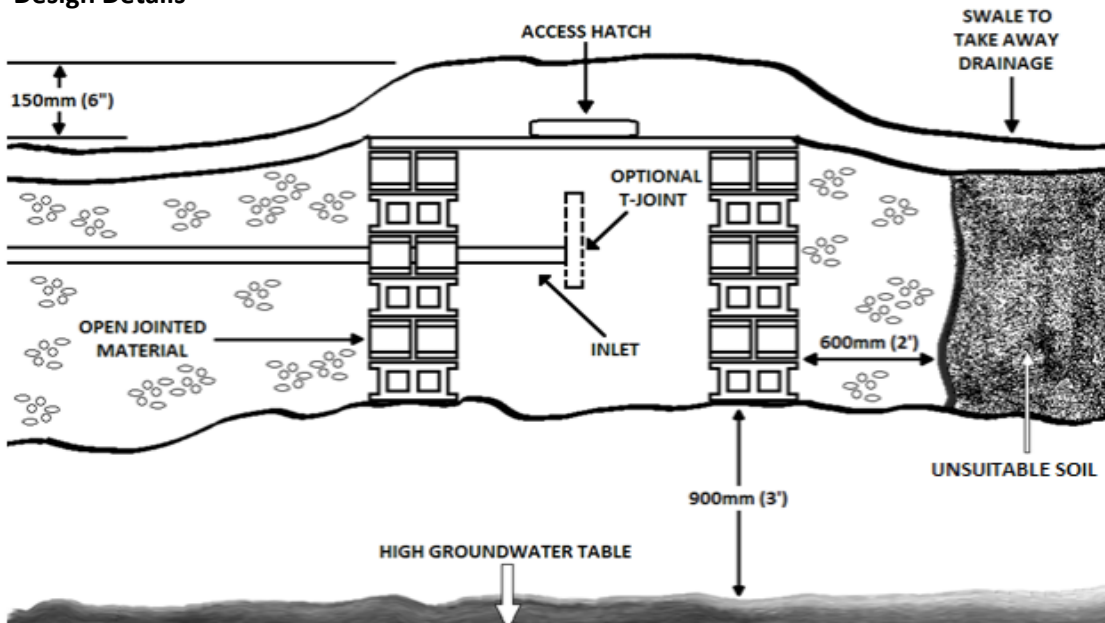
- *Sidewall area* is calculated by determining the *loading rate* of the soil and the *daily design flow*
- Leaching pit must be located at least 5 metres from any structure
- The percolation time of the soil used to construct the leaching pit will determine the *load rate* of the *sidewall area*; for example coarse sand has a lower percolation time than silty or clay soils
- The daily design flow depends on whether the fixtures receive pressurized water or not, such as from a water tower or plumbing



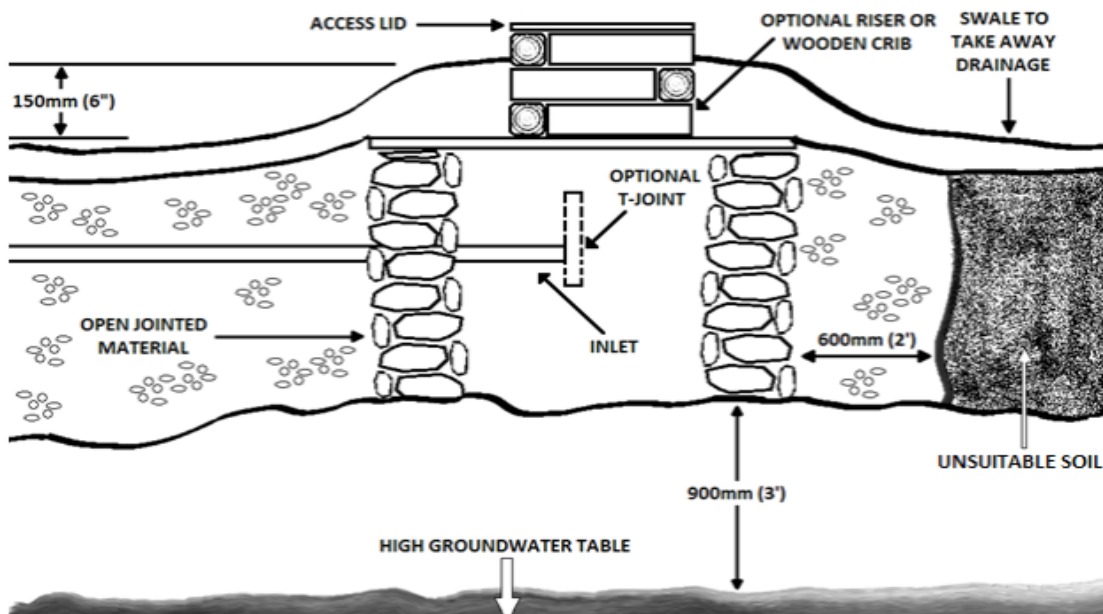
**Figure 93:** Possible drain to mulch basin/drain out back design for new row housing built on-site. Source: (Ludwig, 2006)

### 5.2.4.2 Grey Water Continued

#### Design Details



**Figure 94:** Example diagram of a leaching pit constructed with *concrete blocks*  
Source: (Kingston, Frontenac and Lennox & Addington (KFL&A) Public Health, 2014)



**Figure 95:** Example diagram of a leaching pit constructed with *large rocks*  
Source: (Kingston, Frontenac and Lennox & Addington (KFL&A) Public Health, 2014)



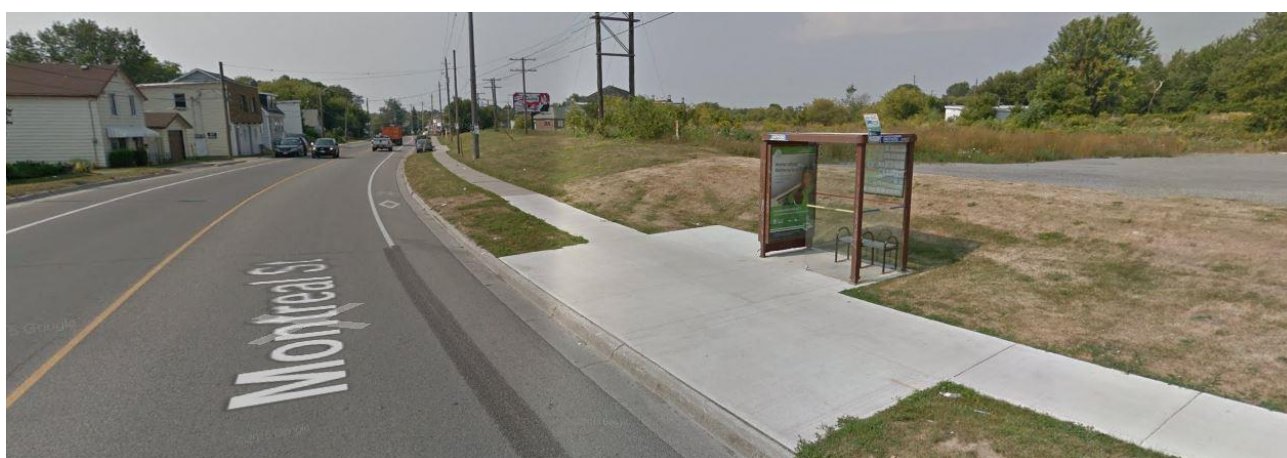
### 5.2.4.3 Bus Stop and Coffee Shop

In its present state, the Old Industrial Area is an outward facing community, and many visitors overlook the open space in the centre of the neighbourhood due to there being no attraction to draw them in. We seek to create an inviting and accessible space that is effective throughout the year by constructing a hub that both serves as a cafe and bus stop. Located adjacent to the Old Industrial pathway as well as the public art square, this hub will replace the existing bus stop along Montreal street

The current bus stop on the west side of Montreal street is not located near amenities, attractions or a walkable streetscape. The neighbourhood's sole cafe, which acts as a makeshift community centre, is located on the edge of the community's boundary and is autocentric. To improve public transportation connectivity and enhance the local character of the neighbourhood, we have defined a number of objectives to achieve our goals.

- Create an inviting hub to improve transportation accessibility to the neighbourhood
- Create a new local cafe that can serve as a community centre
- Create a space that serves to introduce visitors to the public art square and pathway

The hub should be moved to a strategic location along Montreal street and beside the surface-level parking for the old train station. The old train station extension, which is dilapidated, dangerous and aesthetically displeasing, should be demolished to make way for this transportation hub. The hub should incorporate elements and materials celebrating the site's industrial history, such as brick facades. It should also be constructed in a manner so as to minimize costs while also taking into consideration the local climate. It should be made inviting as well as accessible to pedestrians, cyclists and busses. To discourage displacement within the community and also to encourage a 'local character', the cafe should be both affordable and unique.



**Figure 96:** Opportunity exists to develop along the western side of Montreal St, create a more inviting streetscape, and introduce a third space to welcome visitors into the open space and train station ruins.  
Source: Google Maps, 2016.

### 5.2.4.3 Bus Stop and Coffee Shop Continued

#### Precedents and Best Practices

##### Station du depot, Sherbrooke

Sherbrooke is a city in southeastern Quebec with a similar population size to Kingston, as well as a similar industrial and historical character. In 1890, a passenger train station was constructed in the city's downtown to connect the city with Montreal and other hubs in the region. In the late twentieth century, the station fell into a state of disrepair. In the year 2000, the City of Sherbrooke rebuilt the station incorporating both contemporary elements and original historical features. The station now acts as a hub for inter and intra city transportation and also features a cafe that is both local and distinct.

Figure 96 demonstrates the architectural character of Sherbrooke's historic CN rail station as well as the cafe that occupies its tail-end section. In addition to an interior seating area, the cafe features landscaped vegetation and a terrace that could be easily winterized with blankets and adequate heating. The hub is an excellent precedent to our site because it both celebrates its historical character and creates a safe and inviting space for visitors.

##### Gustavo Penna's modular bus stop, Belo Horizonte, Brazil

Designed by Brazilian architect Gustavo Penna, this bus stop is modular, made of aluminum composite material and features a contemporary style. The structure offers views of the surrounding area given its glass facade and is also award winning for its principles of sustainability. It is energy efficient due to its internal ventilation and lighting, and also arrives pre-built, making it both easy to implement and low cost. The station was designed with accessibility in mind, specifically for cyclists and residents with disabilities. The station is also adequately large so that a cafe could be included within its structure.

Figure 98 showcases the sleek and contemporary design of the modular bus stop. The structure contains an element of openness and is also visually appealing. Though quite different from the precedent in Sherbrooke, this example would serve as a symbol of our vision for sustainability and the community's future.



**Figure 97:** The train station in Sherbrooke showcasing the cafe. Source: (Tourism Quebec, n.d.)



**Figure 98:** Modular bus stop prototype in Brazil. Source: (Inhabitat, 2015)

### 5.2.4.3 Bus Stop and Coffee Shop Continued

#### Design Drawings



**Figure 99:** Drawing of the third space hub centred on Montreal St  
Source: Mushet, 2016



5.3 Design Detail Overview

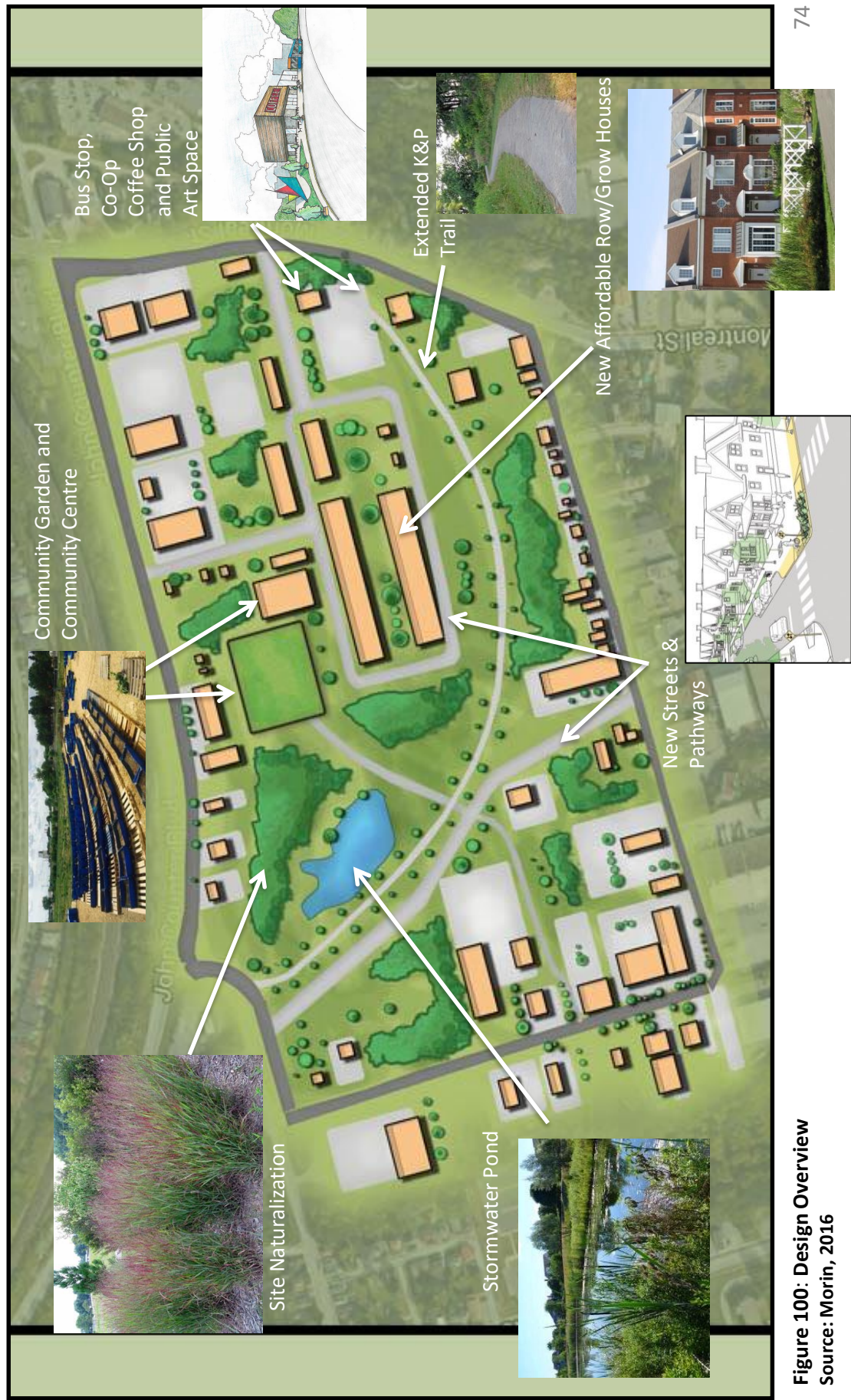


Figure 100: Design Overview  
Source: Morin, 2016

### **Postscript**

When all is said and done, the redevelopment site presented the green team with a true planning enigma. The Old Outer Station area presents the City of Kingston, as well as many other stakeholders with a challenge of brownfield clean up, multilayered historic regulations, and changing economy and workforce.

When evaluating the site, our team decided very early that this site could only benefit in the short-medium time frame by very little intervention. We felt that due to costs constraints that are quite common in municipalities across Canada, that too much intervention would not work. Our team supports the original short-term plan created, that includes only trail additions, community gathering space, a community garden, and re-designed bus stop. These sorts of minimal interventions would allow the City of Kingston to create a community-designed interim use, while taking the time to evaluate potential long term uses for the site.

This plan is intended as a long-term vision for the site and should be treated as such.

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Plant Type	Description	Native to Kingston Area (Y/N)
Aster Woods Light Blue	Densely packed clusters of light blue flowers are produced in abundance atop dwarf plants that require no staking. Excellent mildew and rust resistance	Y
Allium Senescens	Tolerates a wide range of soils and is drought tolerant. Although this allium is a true bulb not a rhizome, plants form dense clumps which are easily divided in either spring or autumn,	N
Carex Glauc Blue Zinger	Excellent and versatile shade groundcover for a dry or moist spot. Cool season, evergreen in warm climate, more clump forming than C. flacca. Drought tolerant once established.	Y
Switchgrass “Shenandoah” Panicum Virgatum	Foliage emerges bluish-green, but rapidly turns burgundy-red (by late June).	Y
Coreopsis Moonbeam	Forms a spreading clump of very delicate, ferny foliage. Loads of starry creamy-yellow daisies, from early summer into late fall. Tolerant of hot, dry sites, once established.	Y
Coneflower Echinacea Magnus	Purple petals surrounding a maroon-red cone. Small fragrant blooms, but loads of them keep coming over many weeks. Blooms mid summer – early fall,	Y
Geranium Biokava	Masses of pink centered white flowers from late spring to mid summer for up to 4 weeks. Tolerant of both wet and dry conditions, sun or shade.	Y
Hemerocallis ‘Joan Senior’	White flowers with yellow-green throats. Blooms in midseason.	N
Little Blue Stem	Native prairie grass has a wide range of colours, which are various shades of blues and green. Drought tolerant and lovely in mass plantings.	Y
Black Oak	Grows up to 20m and requires moist to dry air. Intolerant of shade and requires full sun and is adaptable to different soils.	Y
Eastern White Pine	Grows up to 20-35m tall. Tolerates different moisture levels and can grow in any soil type, but does prefer sand or sandy loam. Tolerates partial shade when younger.	Y
Pine Oak	Grows up to 20m tall. Prefers moist sites, but does tolerate seasonal flooding. Prefers full sun, can tolerate partial shade and prefers rich, acidic	Y

Source: (Stone & Maple; Government of Ontario)

Sustainable Urban Design Project Performance Measurements – Van Hausen (2013)				
Category/Themes	Complete Community Sustainable Design Goals	Performance Comparisons (Super Green)	Targets (Business as Usual)	Your Project Goals
<b>1. Carbon, Transport, Land Use</b>	<b>Live, Work and Play in Close Proximity</b>			
Compact mixed use	Create services close to home that are within walking distance	100 percent of residents within 1,500 feet (450 m) of basic services	50 percent or fewer residents within 1,500 feet (450 m) of basic services	Greater than 50 percent of residents within 1,500 feet (450 m) of basic services
Walkable	Increase density of pedestrian activity and orientation in community	50 percent public part of street for pedestrians	40 percent public part of street for pedestrians	Pedestrians will be given 1.5-2.0m sidewalks, and local roads will be limited to 7.0m ROWs.
Connected to surrounding land uses and services	Increase pedestrian and bikeway connections to adjoining facilities and developments	Comprehensive trail and pathway connections	Few trail and pathway connections	Dual Trails with single-modal designation on site. Small trails that connect main trail to residential and commercial areas
Jobs/Housing Balance	Increase on-site jobs to reduce off-site community and increase local community identity	350 square feet (32,5 m. sq.) per job; 1,500 jobs: portion of housing units should be live/work	No jobs locally; no housing units live/work except home businesses	Potential local jobs through various community programs on site.
Reduced Car Dependency	Increase alternative transit, pedestrian and bicycle network use	1,300 feet (400 m) to transit stop	2,625 feet (800 m) to transit stop	656 feet (200 m) to transit stop
Green Streets	Create a safe, clean, and healthy environment that encourages non car use	Greenways and trails connected to streets	Separate trails or greenways and walkways	The trails and pathways network will be connected to local and collector streets
Parking	Reduce or share parking footprint	1 space per residential unit; 4.5 space per 1,000 square feet (93 m. sq.) commercial (shared)	2 spaces per residential unit; 4.5 spaces per 1,000 square feet (93 m. sq.) commercial	1 space per residential unit or less where applicable; 4.5 spaces per 1,000 square feet (93 m. sq.) commercial

2. Materials, Waste, Energy	No Waste Increase Energy Efficiency			
Alternative Energy	Reduce use of fossil fuels and increase use of renewable energy sources	10 percent of the energy produced on-site; 90 percent of energy from renewable energy (includes hydroelectric)	0 percent of the energy produced on-site; 50 percent from renewable energy	Potential amount of energy produced on site from small solar farm and panels on lighting. Goal of more than 50 percent from renewable sources
Green Building Standard	Reduce use of fossil fuels and storm runoff, and increase design standards that encourage use of renewable energy sources	75 percent of buildings have good solar orientation; plants on 25 percent of roof area	50 percent of buildings have good solar orientation; plants on 0 percent of roof area	Special attention will be given to solar orientation and consideration to plants on roofing area
Sanitary Process	Reduce off-site impacts of black water and grey water	25 percent of sewage treated on-site	No sewage treated on-site	Consideration will be given to sewage being treated on site in the future
Solid Waste Management	Reduce, reuse, and recycle waste on-site	Reduce solid waste by 44 lb (200 kg) per person per year	Same solid waste recycling	Not within immediate scope of project
3. Water, Food, Natural Habitat	Protect and Improve Natural Ecosystems			
Stormwater Management	Increase water quality and reduce off-site impacts of runoff	100 percent recharge/clean; no more than 50 percent impermeable	Less than 50 percent recharge/clean; no more than 80 percent impermeable	Greater than 50 percent recharge/clean and less than 50 percent impermeable
Habitat Enhancement	Improve wildlife habitat on and through the site	60 percent of green space has habitat value	10 percent of green space has habitat value	Greater than 60 percent of green space has habitat value
Community Garden	Increase local sources of food for sale and consumption	12.5 percent of produce grown on-site	No produce grown on-site	Community Gardens to be added on-site
Maximize Public Green	Expand natural open space and parks in every part of the site	2.75 acres (1.1 ha) of sustaining space per 1,000 population	Variable environmental reserve and 10 percent municipal reserve	Former CNR track curve will be dedicated open space



<b>4. Well-Being, Equity, Culture</b>	<b>Create a healthy, inclusive, diverse and culturally rich community</b>			
Housing Choice	Increase the diversity of housing for all ages	Diversity of housing, including seniors, entry level, and nonmarket housing that is more affordable	Single-family housing as the dominant housing form with some multifamily units	Diversity of housing through grow homes that includes various sizes and tenures
Commercial Development	Provide a balance of retail and office jobs locally	1 square foot (0.093 m.sq) of commercial for every 15 square feet (1.4 m.sq.) of residential	Commercial and residential development separate and not connected	Not within immediate scope of project
Community Facilities	Provide places to interact, educate and socialize on-site and connect to other off-site facilities	30,000 sq.foot (2,787 m.sq) community center; daycare facilities	10,000 to 20,000 sq.ft. (929 to 1,858 m.sq.) community center	Community gathering spaces will be added as well as community gardening facilities. There is potential for expansion in future phasing
Strong Sense of Place/Culture	Provide a wide range of public spaces and places on-site to encourage local activity, programming and events	Wide variety of spaces, plazas, and places to interact	Limited spaces and places	Large public gathering area as well as various smaller gathering area throughout the site. The coffee shop integrated in the bus stop will also offer another informal gathering space.
<b>Long-Term Sustainability Goal: Social, Ecological and Economic Balance, Net Gain and Efficiency from the Next Generation</b>				