



ECOROOF STUDY AREA SITE SELECTION

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INTRODUCTION

The purpose of the ecoroof initiative project is to assess the impacts a critical mass of ecoroofs could have on climate resiliency in the Edmonton context and, (if feasible) develop a policy program to incentivize increased implementation of ecoroofs.

The Miistakis Institute and the City of Edmonton staff will identify a neighbourhood in which research findings can be applied at a theoretical level.

The research team determined the most effective study site would be a neighbourhood that would benefit the most from the implementation of ecoroofs. Ecoroofs have demonstrated the following benefits to urban areas: storm water management; increase in biodiversity and habitat; reduction of the urban heat island effect; improved air quality; higher quality of life and human health benefits; and, provision of green space to residence where green space is lacking. Therefore, a neighbourhood that has low permeability, low biodiversity/open space, high population density, and multifamily, commercial and/or industrial zoning would be the ideal study area.

Please note, this is a cursory analysis of data available to the research team. Further refinement will be required once a study site is selected.

IDENTIFICATION OF STUDY AREA: METHODOLOGY

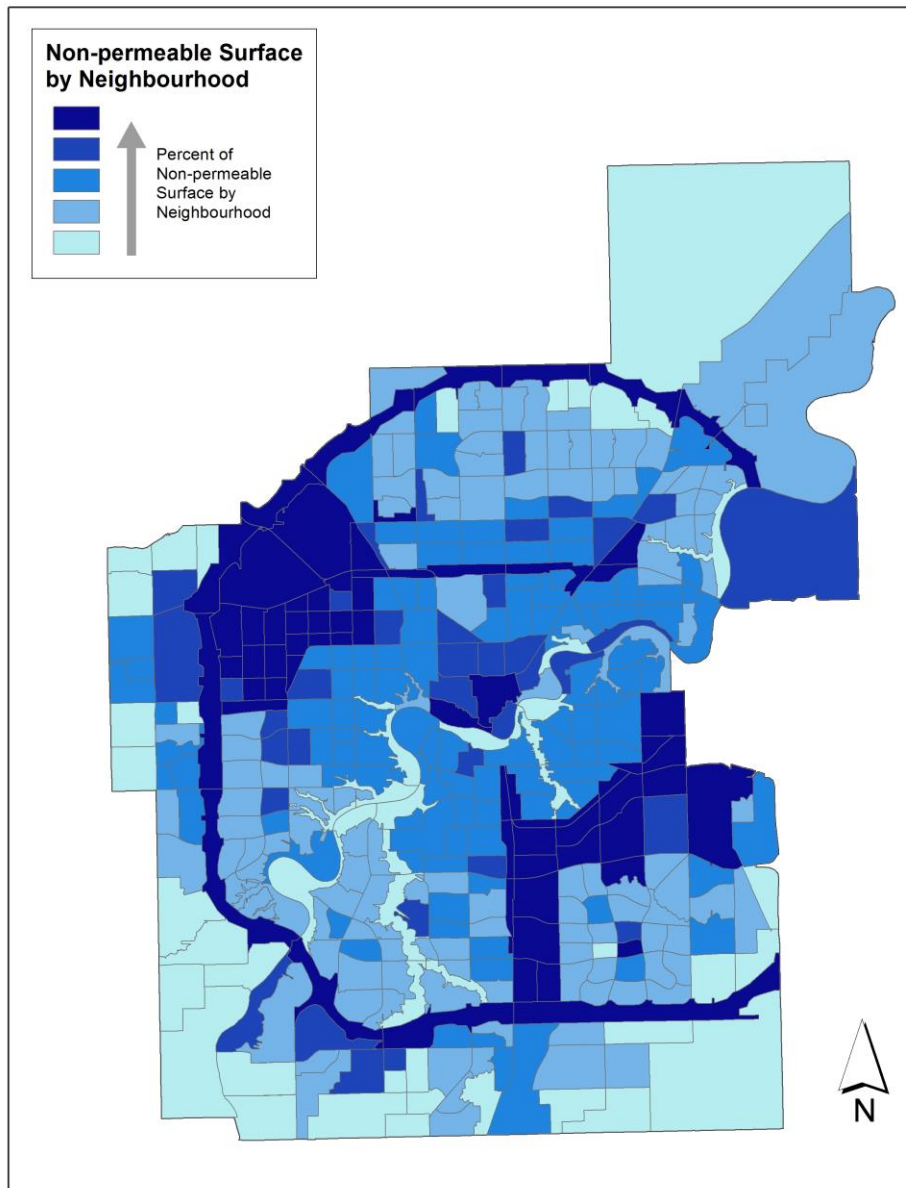
Base Layer

To start the process of selecting a study site, the following items were identified:

- a. Neighbourhood boundaries
- b. Estimated surface permeability
 - i. A ranking system was established where:
Most permeable surfaces = 1
Least permeable surfaces = 3
 - ii. All surfaces ranked 3 were mapped and include:
 - i. City of Edmonton roads. The data is in polyline format (as line features, not area) so they were buffered to identify the non-permeable surface area.
 - ii. Land use. Uses such as parks, open space, environmental reserve were given a ranking of 1; and uses like parking lots, commercial, institutional, arenas were given a ranking of 3. Uses that generally have a building footprint with playing fields or a high percentage of landscaped area were ranked 2.
 - iii. The non-permeable area was then divided by neighbourhood area to determine the percentage of non-permeable area by neighbourhood.

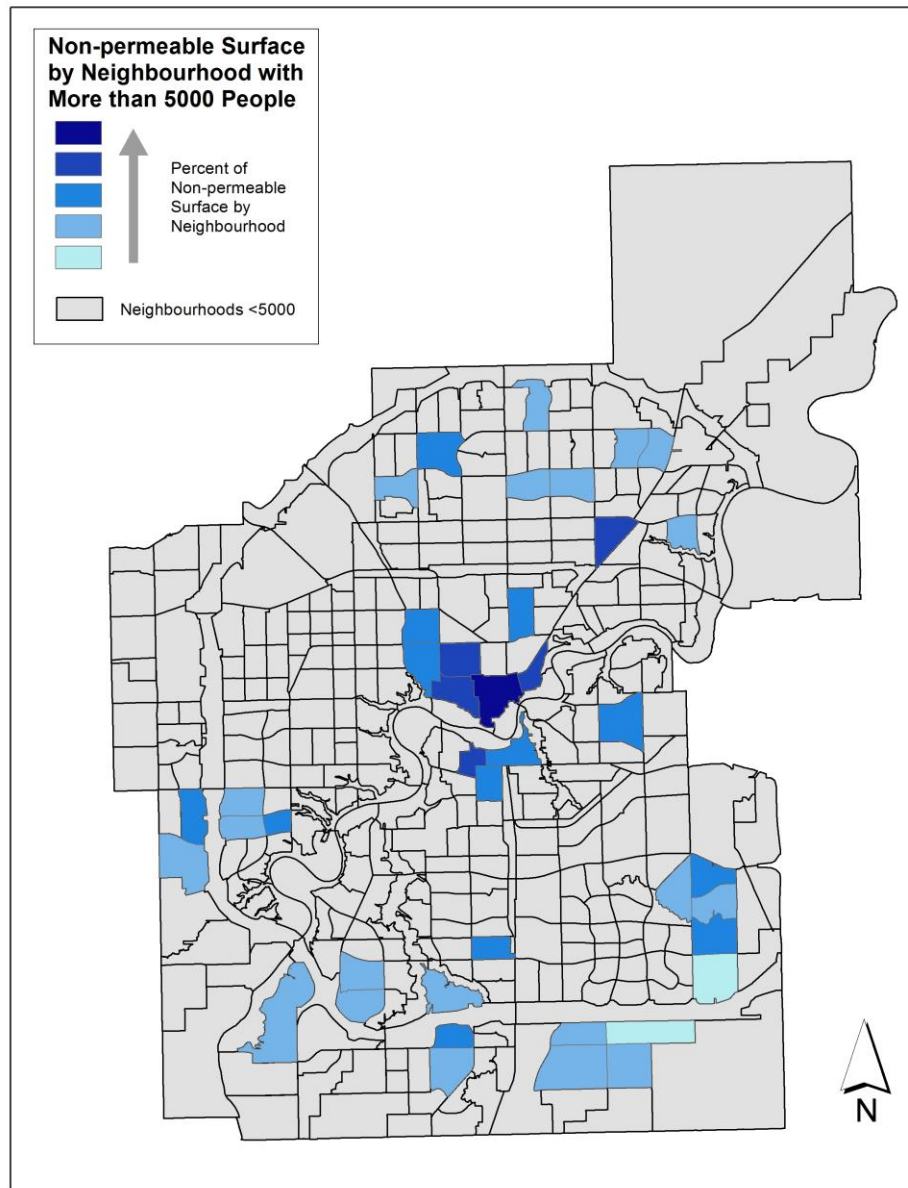
Figure 1 shows the percentage of non-permeable surface area by neighbourhood. This is a rough analysis of non-permeable surface and results in industrial areas and major road right of ways ranking high while residential neighbourhoods show a variety of permeability throughout the city.

Figure 1: Non-permeable surface area by neighbourhood



To narrow down choices for potential site selection, the permeability data is calculated for neighbourhoods with a population greater than 5000 to highlight neighbourhoods to evaluate further. See figure 2 below.

Figure 2: Non-permeable surface area with population >5000 by neighbourhood



The application of population over 5000 and permeability area analysis highlighted the Downtown neighbourhood. The research team decided to include two neighbourhoods adjacent to Downtown (Oliver and Queen Mary Park) in the next steps to expand the analysis and provide options for consideration.

Ecoroof Potential

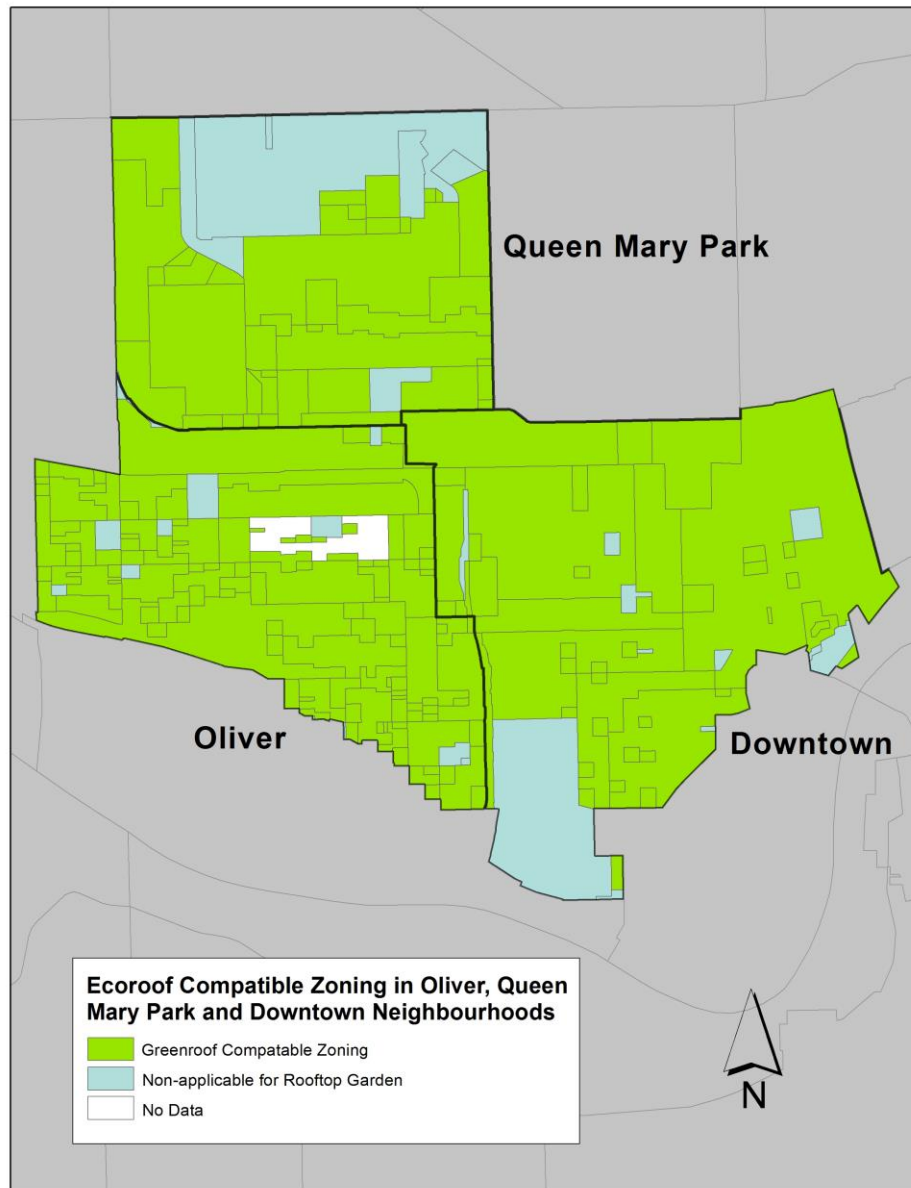
The next step was to understand roof area potential for ecoroof implementation in the three neighbourhoods. To investigate the highest roof area potential, the following criteria were used:

- a. Zoning provides an indication of existing and potential building typology. The research team looked for building typologies that may best support ecoroof

installation and used zoning to determine whether the parcel be included or excluded for ecoroof potential:

- i. Flat roofs most commonly support ecoroofs.
 - ii. Existing multi-family, apartment and office towers are potentially well-suited to support the additional weight of eco-roofs without extensive reinforcement.
 - iii. Typically, existing warehouse structures are not well-suited to support the additional weight of ecoroofs.
 - iv. New builds can be designed and engineered to support an ecoroof.
Vacant parcels with ecoroof supportive zoning were also included in the analysis.
- b. Zoning typologies deemed to have buildings that could support an ecoroof include: AED, AN, CB1, CB2, CB3, CCA, CNC, CO, CSC, DC1, DC2, HA, HDR, IB, IC, IM, JAM, RA7, RA8, RA9, RF2, RF3, RF4, RF5, RF6, RMD, RMU, UI, US, UVC, UW (See the zoning spreadsheet in Appendix A for details).

Figure 3 Zoning for Oliver, Queen Mary Park and Downtown Neighbourhoods



Rooflines were also mapped for each of the three neighbourhoods to gain an understanding of existing roof area.

Figure 4 Rooftops Oliver Neighbourhood

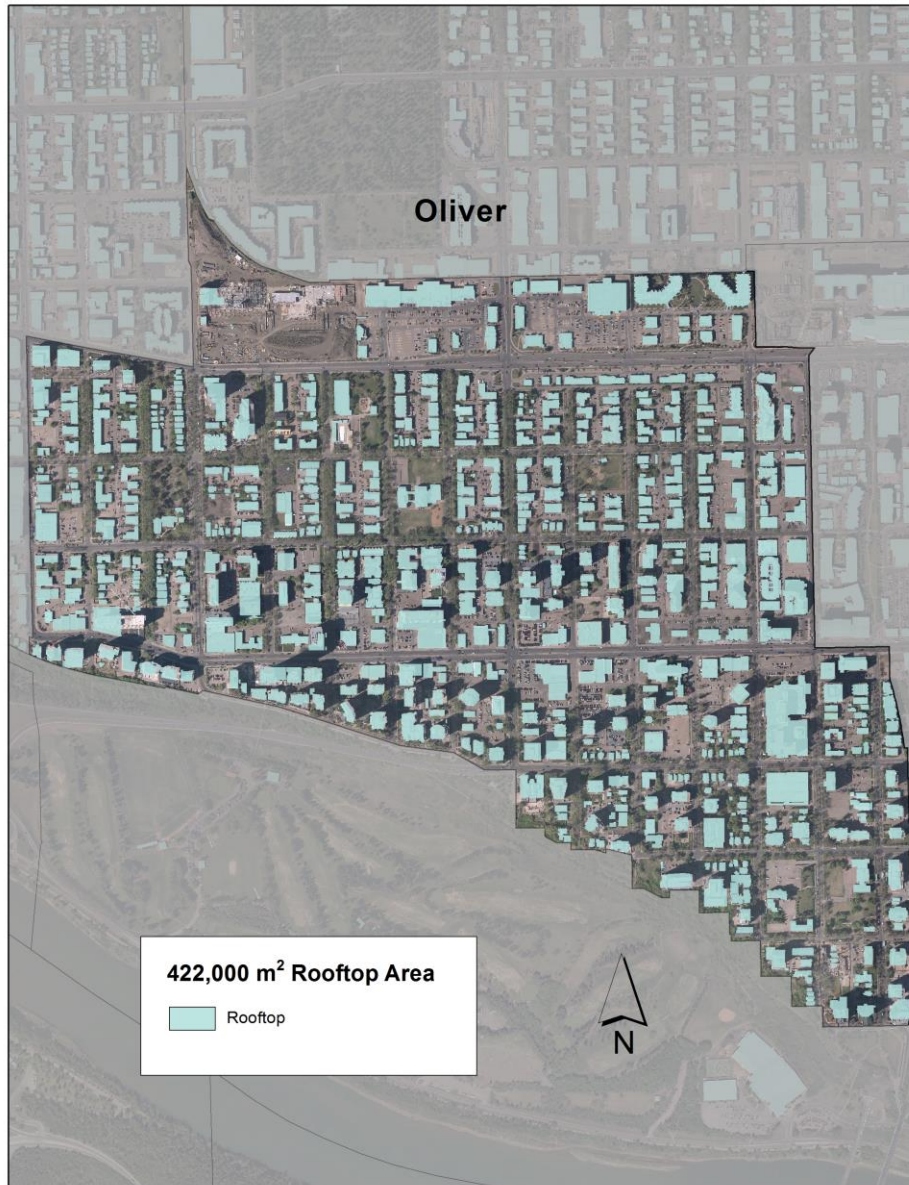


Figure 5 Rooftops Queen Mary Park Neighbourhood



Figure 6 Rooftops Downtown Neighbourhood



Data Summary

<i>Neighbourhood</i>	<i>Area</i>	<i>Population</i>	<i>Non-permeable Surface Percentage</i>	<i>Rooftop Area</i>
Oliver	1.7km ²	18,123	56%	422,000 m ²
Queen Mary Park	1.8km ²	6,946	41%	357,000 m ²
Downtown	2.3km ²	12,768	64%	694,000 m ²

For Discussion

- Connectivity to the surrounding context was not part of this analysis for study site selection.
- Building energy savings has higher potential in buildings with close wall/roof ratios. This was not included in the analysis.
- Vacant and undeveloped parcels were not identified but do have high potential for ecoroof installation.
- Are the zoning codes used appropriate? Are we missing any? Has something been included that shouldn't be?

Site Selection Recommendation

The Downtown neighbourhood has the highest rooftop area, highest percentage of non-permeable surface, and contains supportive ecoroof zoning across the area. Oliver has the highest population, a high area of non-permeable surface, and supportive ecoroof zoning across the area.

It is recommended either the Downtown or Oliver neighbourhood is considered for the study area.