

APPENDIX H. 01A. ACCESS TO SUNLIGHT ON PARKS AND OPEN SPACES - TESTING

EXISTING CONDITIONS*

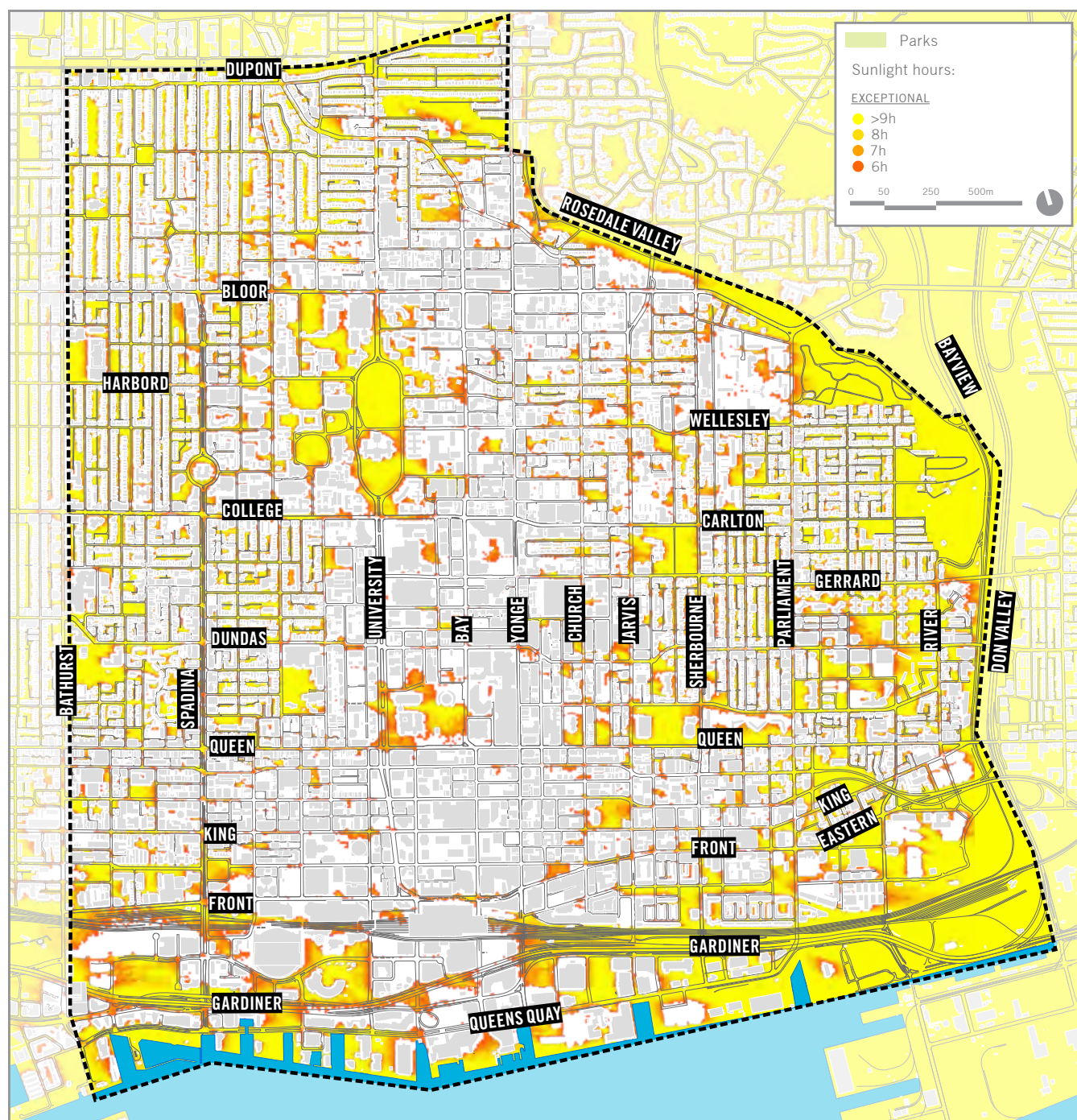


Figure A11. Areas with high sunlight on September 21st - extrapolation from cumulative hour analysis (testing by Perkins+Will)

* Existing condition sunlight access mapping is based on modelling provided by City, including existing and approved buildings as of 2016.

EXISTING CONDITIONS*

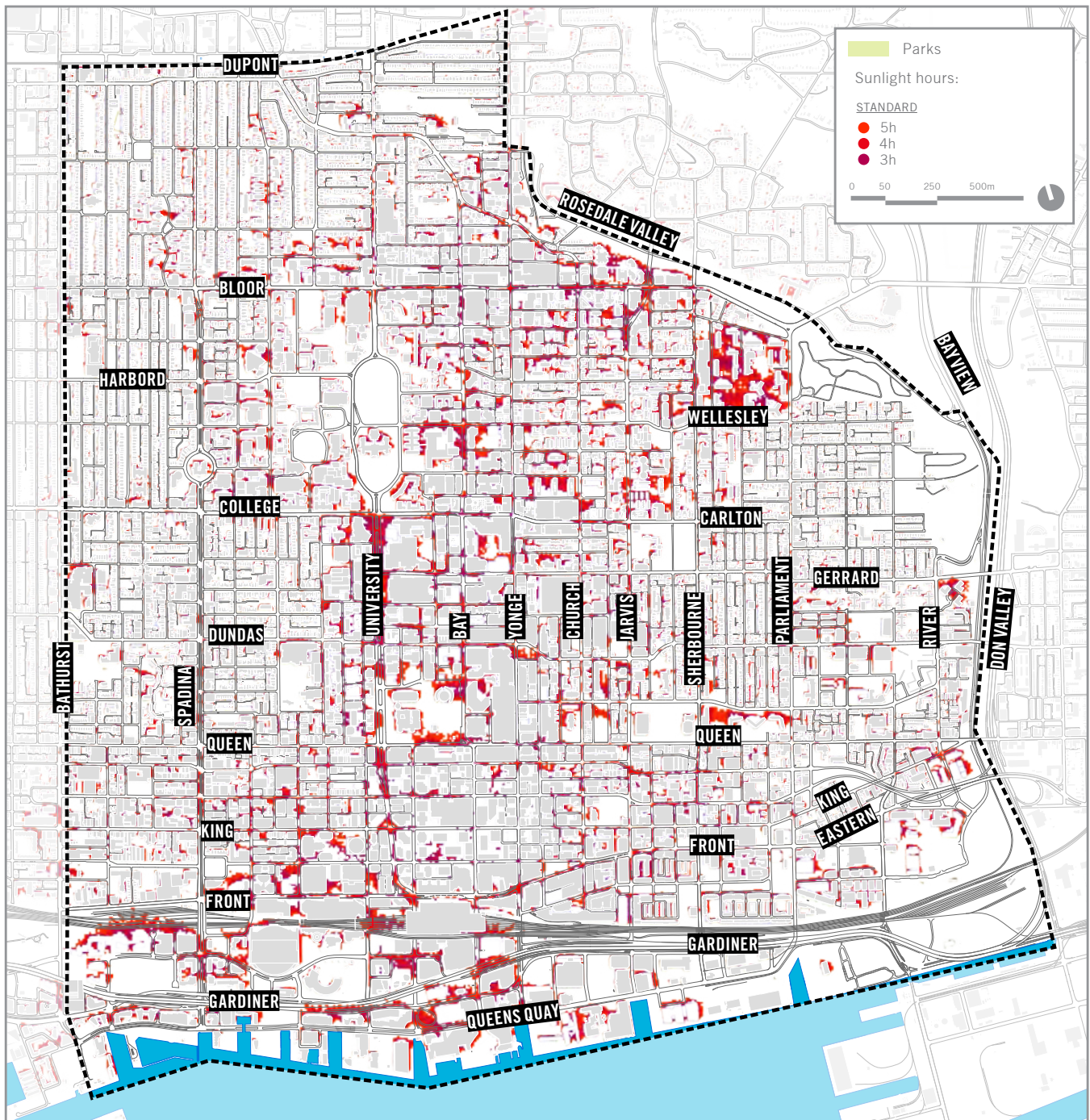


Figure A12. Areas with medium sunlight on September 21st - extrapolation from cumulative hour analysis (testing by Perkins+Will)

* Existing condition sunlight access mapping is based on modelling provided by City, including existing and approved buildings as of 2016.

EXISTING CONDITIONS*

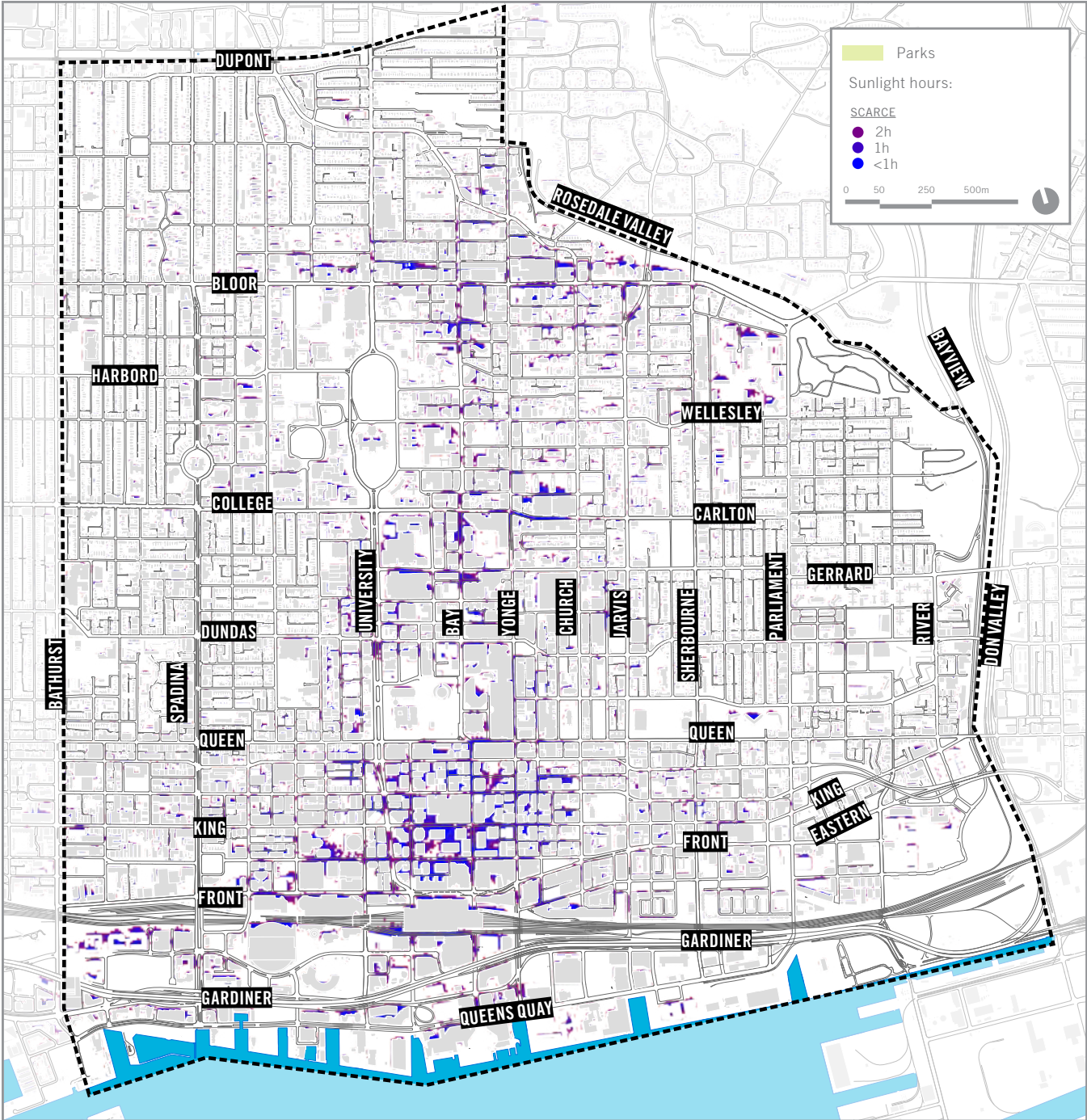


Figure A13. Areas with low sunlight on September 21st - extrapolation from cumulative hour analysis (testing by Perkins+Will)

* Existing condition sunlight access mapping is based on modelling provided by City, including existing and approved buildings as of 2016.

Methodology

Given that the existing policies used in Toronto for the protection of sunlight onto open spaces are usually expressed as no-net-new-shadow requirement, testing was designed to use this same evaluation criteria. Other alternatives considered included number of hours of sunlight and “sun access factor”, however a no-net-new-shadow approach was still preferred. Beyond the question of continuity in policy, no-net-new-shadow methodology proved simpler to implement than number of hours of sunlight, and to better future-proof for any reconfiguration of the open space than a sun access factor.

No-net-new-shadows means that new buildings are not allowed to cast shadows in sunny areas of a designated space, at a defined time and date; only existing buildings that have been approved, but not yet built, sufficiently distanced from the designated space, or concealed under the shadow cast by a larger existing building would be permitted.

Therefore, the first step of the testing process was to produce a solar analysis of the space being studied, for the full lapse of time that the space is intended to be protected. While cumulative hour analyses are a great tool for understanding the sunlight conditions of an area at first glance, they cannot be used for shadow diagnosis as they do not offer a conclusive definition of shadows at any particular time. Instead, sequential singular analyses are necessary that cover the required time lapse. In order to simplify the calculations, the time lapse was divided in one-hour increments: for September 21st, the analysis was run at 10:18 a.m, 11:18 a.m, 12:18 p.m, 1:18 p.m, 2:18 p.m, 3:18 p.m and 4:18¹ p.m. The conditions between those check points could be easily deduced by extrapolation at any time.

Once the singular analyses had been produced, each of them were processed individually to differentiate between shadowed and unshadowed areas. For an unshadowed area to remain that way, it is necessary that no building interrupts the space between the sunlit surface and the sun - which in geometrical terms means that no new object should intercept with the volume defined by the extrusion of the sunlight surface in the direction of the sun vector in that moment of the day. These volumes, referred to as solar cones, were generated for each hour, and represent the no-build zone necessary to maintain all existing sunlight at a specific time. When inquiring on the building limitations for an extended period of time, consecutive solar cones may be merged to generate the no-build zone for such period of time. Custom parametric design tools were developed to automate the process.

Given the absolute, binary nature of the no-net-new-shadow approach - a shadow is either cast or not - the means to calibrate the tool is by adjusting the number of hours when new shadows are not allowed. This is already in place in the Downtown Tall Building Supplementary Guidelines, where all open spaces Downtown are protected for 2 hours, and only signature open spaces are protected for 6 hours.

In line with this idea, the testing process considered three scenarios or thresholds to be tested: 2-hour protection (12:18-2:18pm), 4-hour protection (11:18am-3:18pm), and 6-hour protection (10:18am-4:18pm) - measured on September 21st. Each scenario produced a different solar cone that represented the no-build zone necessary to protect from any new shadow during such period of time. The threshold values were set initially from an agnostic standpoint, with no specific initial assessment tied to the quality of either value, other than the obvious: more sunlight should be preferable when possible. In order to evaluate what is possible and reasonable in the context of Downtown, the resulting no-build zones were evaluated against their impact on the development potential of the area surrounding a designated space. For this evaluation, a downtown-wide forecast model was built to represent the development potential of the downtown in the next 25 years. The forecast model was built based on

¹ The discrepancy in the definition of protection times between different documents account for whether the time frames are expressed in solar time or standard time.

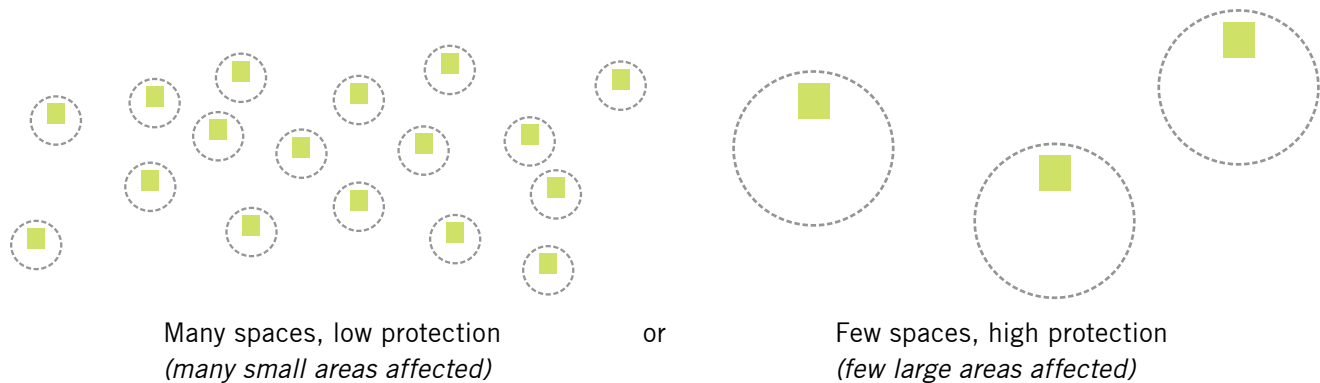
the planned context for each area, including recently approved development applications, and through applying existing City direction for the scale of buildings, with the City's input on sites that could illustrate potential development, but not necessarily desirable for development.

Geography

As part of the analysis for protecting solar access for parks and open spaces, existing policies and guidelines were relied on as a starting point. The spaces identified as *Signature Parks* or *Open Spaces* in the *Downtown Tall Buildings: Vision and Supplementary Guidelines*, as well as other spaces identified in Secondary Plans or SASPs were used as a foundation for this work.

Although the whole of the public realm should enjoy a comfortable micro-climate, specifically through access to sunlight, in the context of Downtown's built form, this ambition must be balanced with the ability to accommodate growth.

There are different ways to approach the balancing of growth with access to sunlight:



1. The first option is generally compatible with urban areas of a consistent mid-rise form, such as Paris or the outer neighbourhoods in the Greater London Area, where sunlight can be accommodated almost everywhere based on the overall scale. This approach may work in some areas of Toronto, but it is not feasible in many areas of the Downtown where there are clusters of tall buildings.
2. The second option is to identify specific spaces within the Downtown, as has been done in past Official Plans and other planning documents. This approach produces sun reservoirs, where certain spaces Downtown can remain (or become) destinations for their exceptional sunlight.

The second approach can be better accommodated and aligned with the growth that is planned for in the Downtown. As well, it is consistent with the approach taken over the years in Toronto's planning framework. Consequently, it was selected as the preferred approach. The testing then focused on studying whether additional open spaces could be elevated to the category of Signature Open Spaces, and as such increase the number of sun reservoirs across the Downtown.

Given this approach, the rationale for identifying certain spaces as "sun reservoirs", and protecting their already high access to sunlight, must establish the selection criteria for spaces. These criteria are not absolute, and cannot be applied with the same level of accuracy in all instances, however, they do establish an approach that can be used to retain the liveability of existing spaces, as well as identify new spaces as they are secured:

- A. **Size:** There are over 130 parks (owned and operated by City's Parks, Forestry and Recreation) Downtown, and more open spaces that are important public realm elements. Some of these parks are a few hundred square metres, parkettes or small spaces between buildings, while the largest are in excess of 100,000 square metres (e.g. Riverdale Park West, Queen's Park). Regardless of size, every park and open space Downtown serves a function and should be comfortable and useable. Downtown residents have amongst the lowest rates of parkland per person in the city, meaning every square metre counts. However, the larger the space, the easier it should be to protect for sun, given the distance to development. The larger open spaces were included on this list because of this criteria, but that does not indicate that smaller spaces should not necessarily enjoy the same protection. Ultimately, there are a number of relatively small parks and open spaces on the list due to other considerations.
- B. **Civic or cultural significance:** Within the Downtown, there are a number of parks and open spaces that have impacted the shape of the neighbourhood around them or have a cultural or historic importance to the history or development of Toronto. Berczy Park is an example of this type of space. It is a relatively small park (approximately 3,600 square metres), but is an important feature of the St. Lawrence neighbourhood, and its shape, orientation and design allow for the historic buildings of St. Lawrence to be featured. These parks and open spaces may serve both the local population, as well as be a city-wide draw (Nathan Philips Square, for example). The role of the park or open space should be another factor in considering protection for sunlight.
- C. **Existing sunlight access:** Despite the number and scale of buildings Downtown, many parks and open spaces currently enjoy good sunlight access throughout most of the day between March and September. Given the relatively good sunlight access in many Downtown parks and open spaces, and the realities of 1) the low rates of parkland per person and, 2) the lack of large sites available for new parks and open spaces – it is important to protect those parks and open spaces that currently have good sunlight access to retain the liveability of those spaces. This also provides direction for securing and designing new parks and open spaces to ensure that they are located on a site where they can receive the most sunlight.
- D. **Surrounding Context:** Another consideration in reviewing sunlight protection in Downtown's parks and open spaces is to understand the context of the urban fabric around them. In Downtown's low-rise Neighbourhoods, parks like Jean Sibelius Square for example, enjoy good sunlight access by virtue of their surrounding existing and planned low-rise built form context, and will continue to have good sunlight access because there is no planning framework for growth in Neighbourhoods. In areas where there is growth anticipated beyond a mid-rise scale, the parks and open spaces were looked at in the context of potential growth around them – in the immediate surroundings and within several block radius – based on the land use designation and built form context. This review identified where tall buildings are appropriate, but where tall buildings may impact the protection of sunlight. Given the limited number of parks and open spaces Downtown, the intensity of use of these spaces and the limited number of spaces where there is high sunlight access now, the retention of sunlight should prevail as a factor that mitigates height.
- E. **Location within a Park District:** As part of the overall TOcore Study, the Downtown Parks and Public Realm Plan (PPR) has been undertaken concurrent with this Building for Liveability study. The PPR Plan contains a series of new and innovative ideas that provide a framework of strategies to re-imagine, transform and grow the public realm. One of these is the establishment of "Park Districts". The Park Districts are focal points for community life that will be designed to create and enhance local legible distinct identity and connect to cycling and pedestrian networks. As part of the review of the sunlight access on parks and open spaces,

location within a Park District and their contribution to a larger network of parks and open space was part of the consideration. There is at least one park or open space that has been identified for protection of sunlight access within each of the Park Districts.

Given the above considerations, all of Downtown’s parks and open spaces were looked at in the context of these parameters, as demonstrated on the next pages:

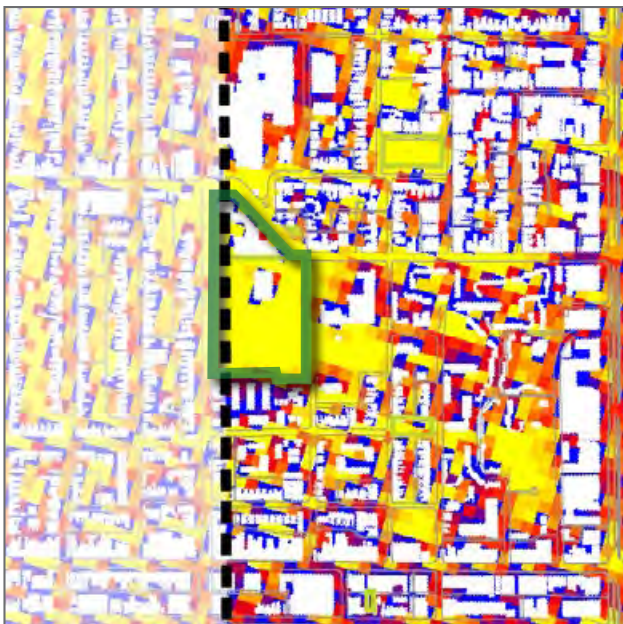
Morphology

Lastly, it is essential to describe how the protection boundaries for the designated spaces are defined. For public open spaces, several options were considered in terms of expanding the area of protection beyond the net space itself to include adjacent sidewalks, setback areas, POPS, etc. However, given the complexity of rationalizing and implementing such intent, the decision was to model and test the open space boundaries as rendered in the ‘Parks and Recreation Facilities’ dataset in the City’s open data catalogue, and determine where the adjacent open spaces may be necessary as part of the utility of the space.

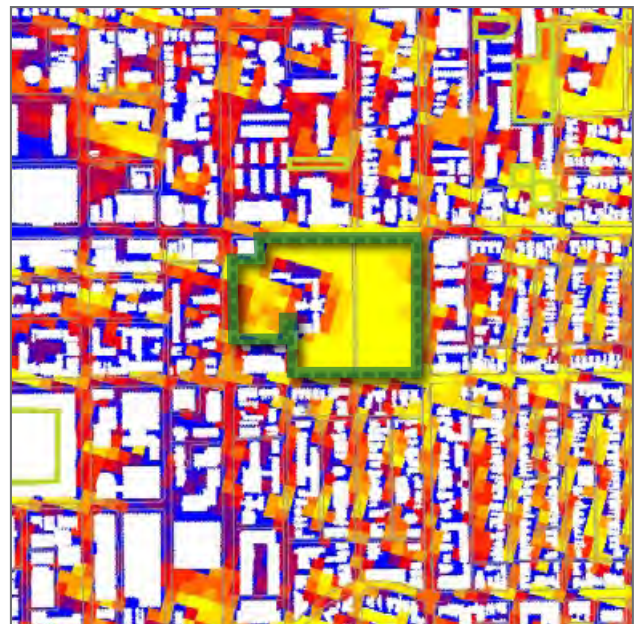
In the case of schools and school yards, the testing considered the full school parcel. The reasoning behind this decision was that most schools had a relatively underbuilt parcel, including surface parking, and it is reasonable to expect that some of this space could be converted into playgrounds with the potential improvements to the site. These boundaries could potentially be revised in the context of a site-specific study, through consultation with the school board and by developing a further understanding of the future plans for each individual site.



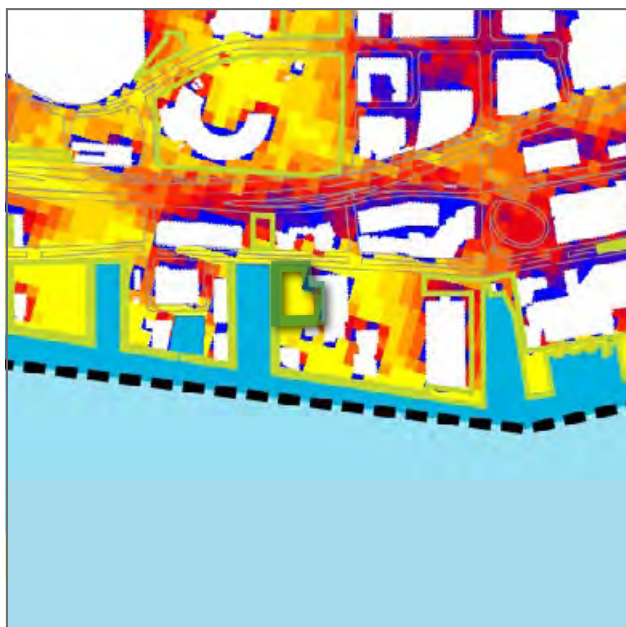
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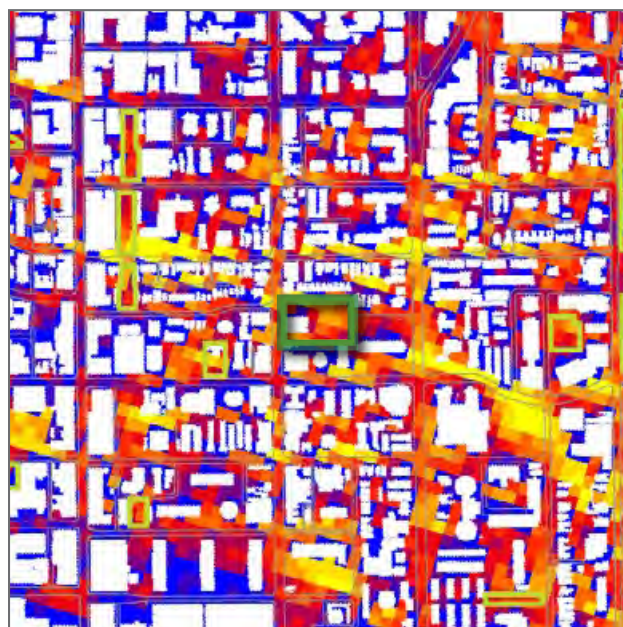
2. Allan Gardens



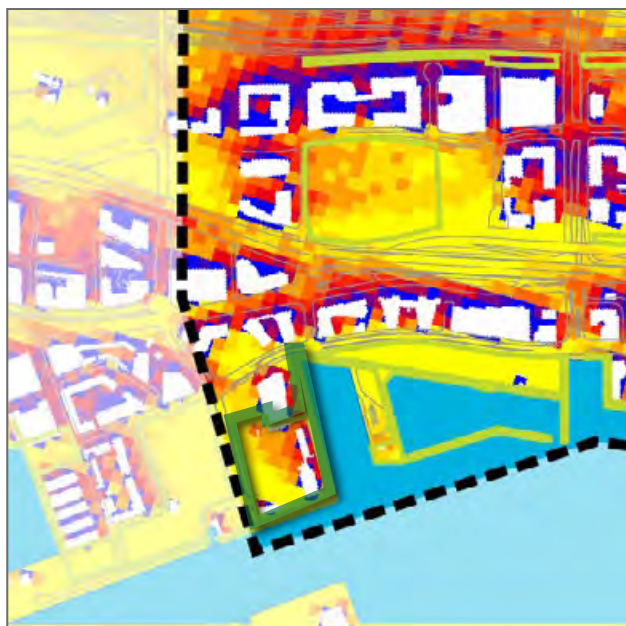
3. Ann Tindal Park



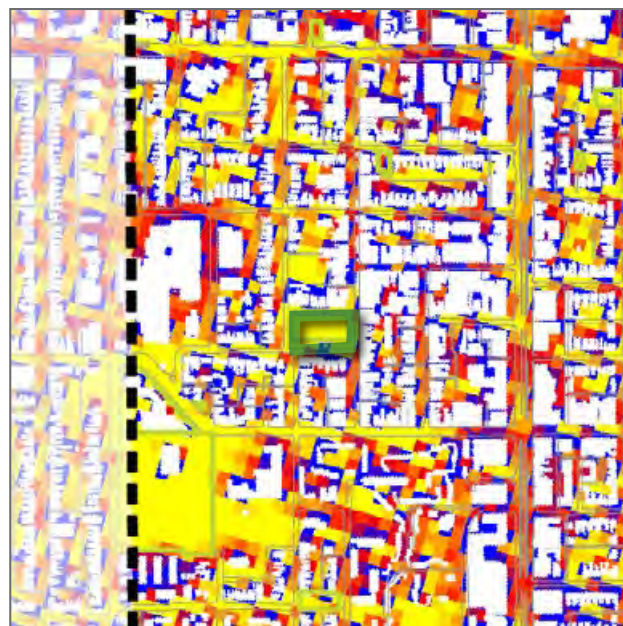
4. Barbara Hall Park



5. Bathurst Quay



6. Bellevue Square Park



LEGEND



park
boundary



Sunlight hours:

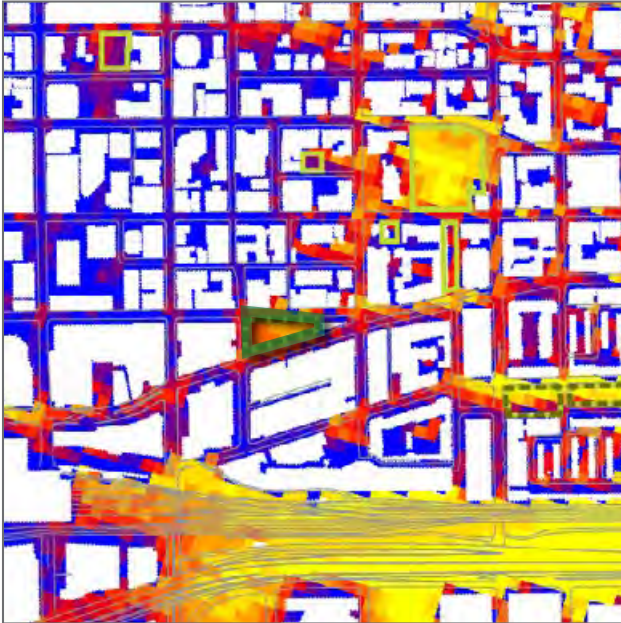
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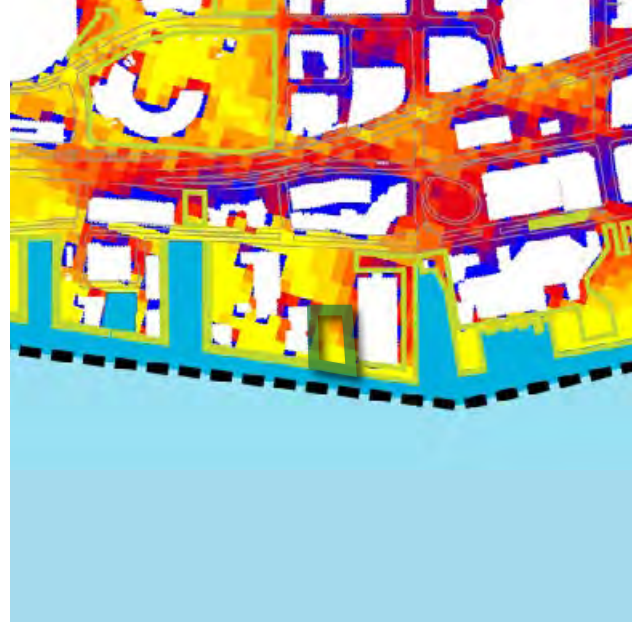
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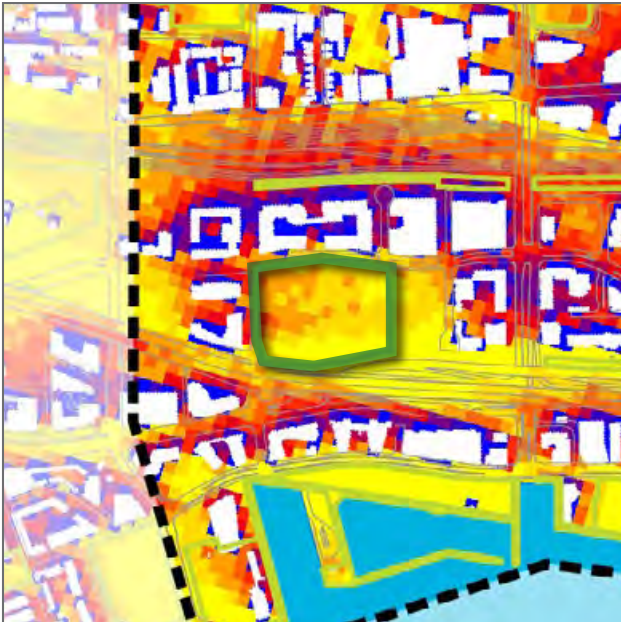
7. Berczy Park



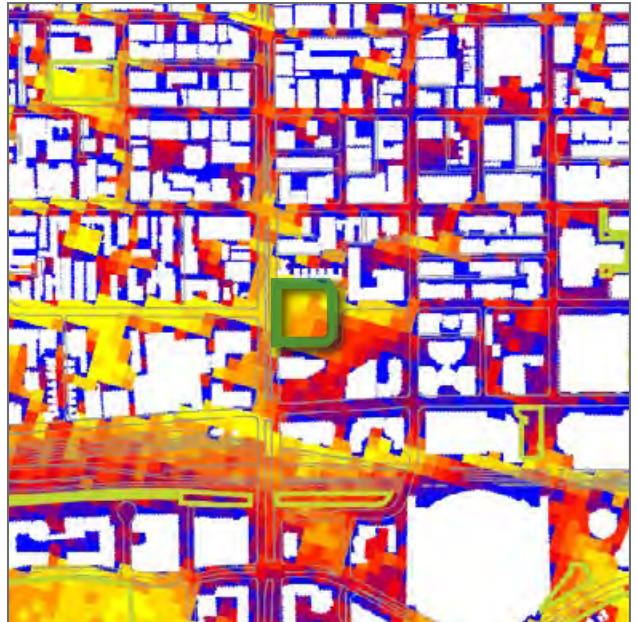
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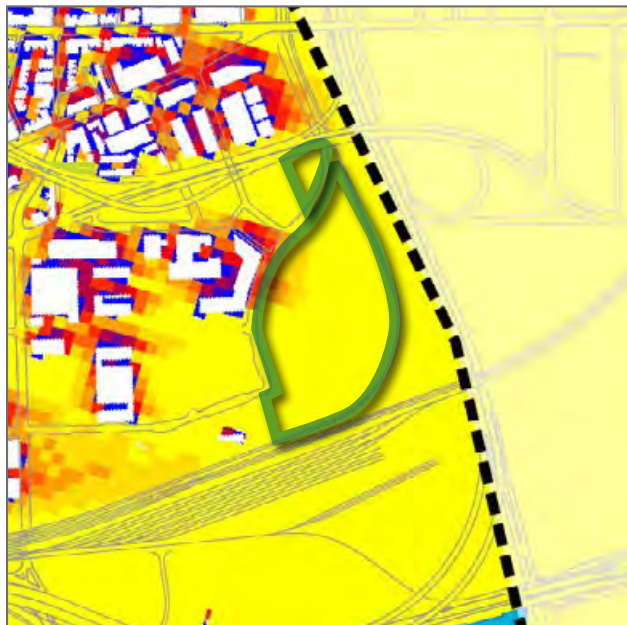
9. Canoe Landing



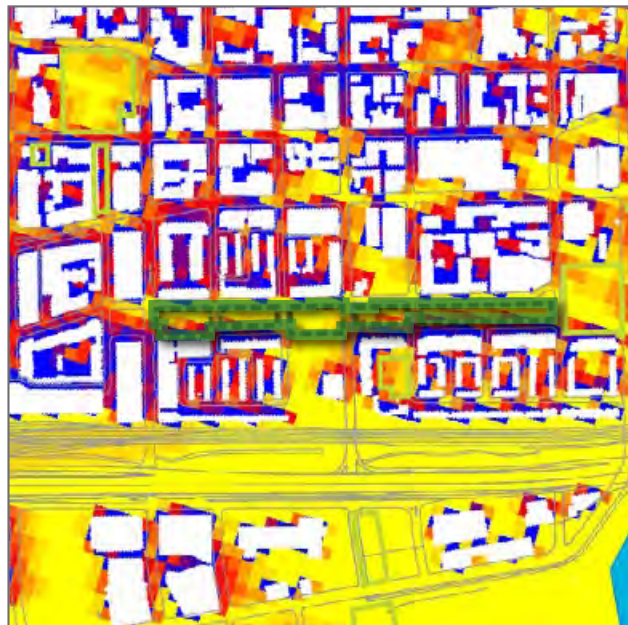
10. Clarence Square



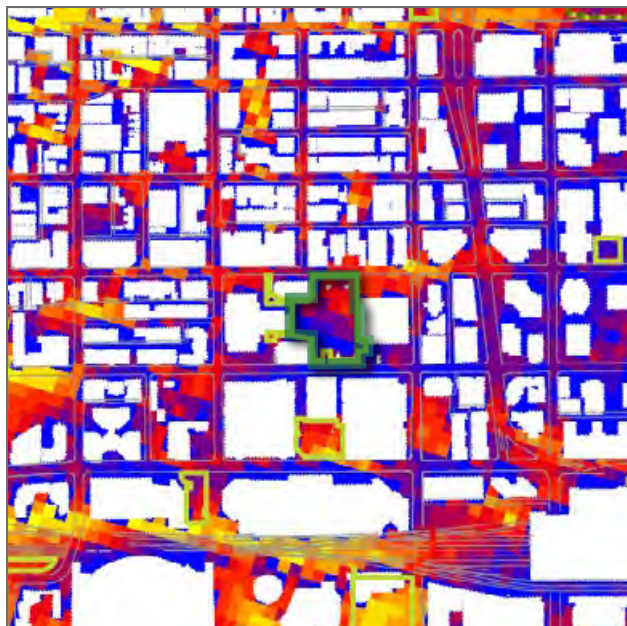
11. Corktown Common



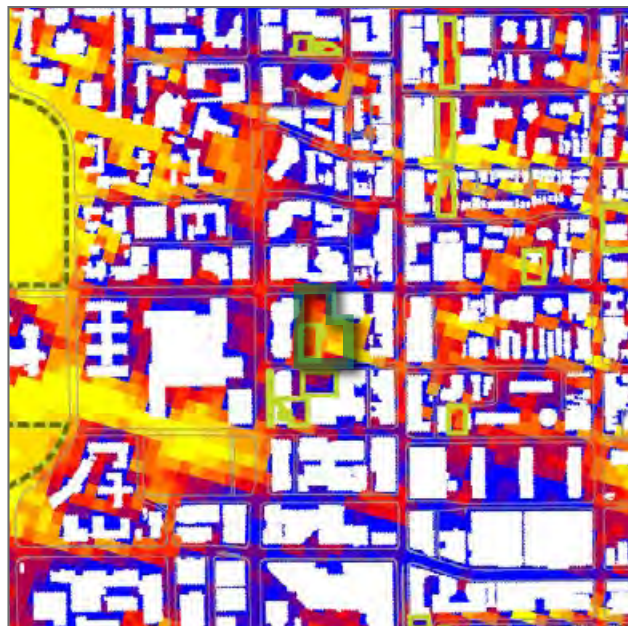
12. David Crombie Park



13. David Pecaut Square



14. Dr Lillian McGregor Park



LEGEND



park
boundary



Sunlight hours:

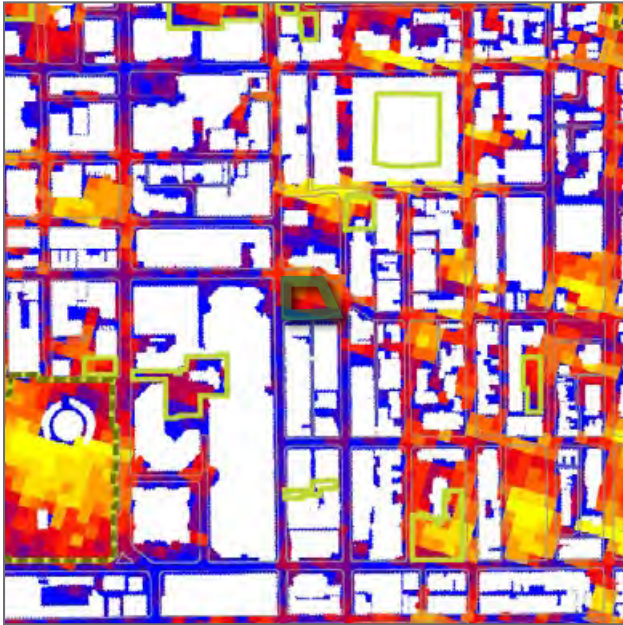
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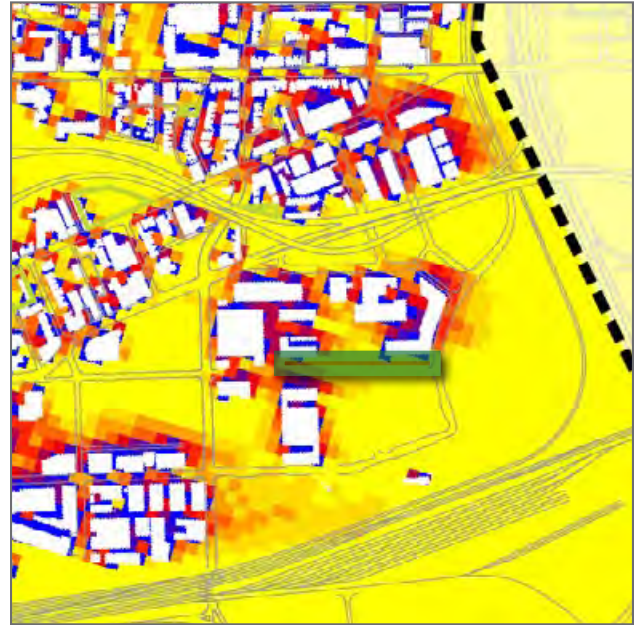
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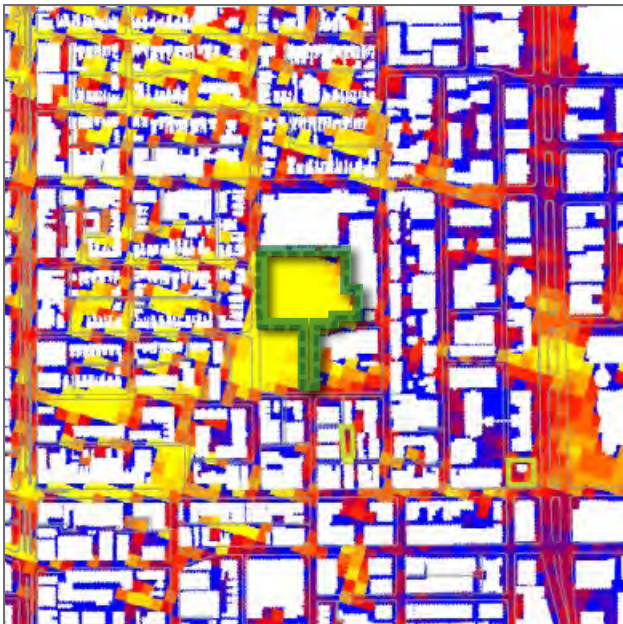
15. Dundas Square



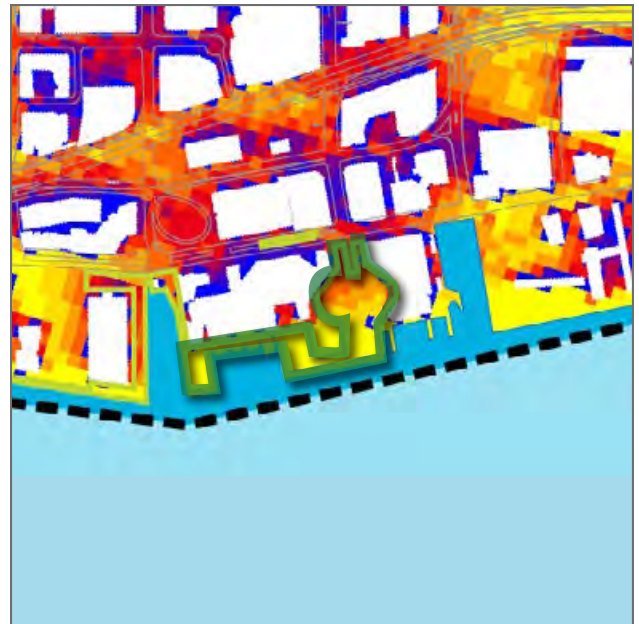
16. Front Street Promenade in West Don Lands



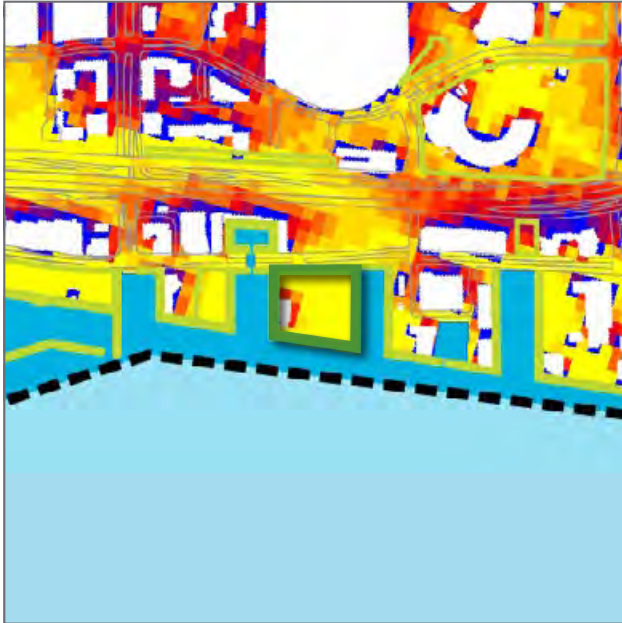
17. Grange Park



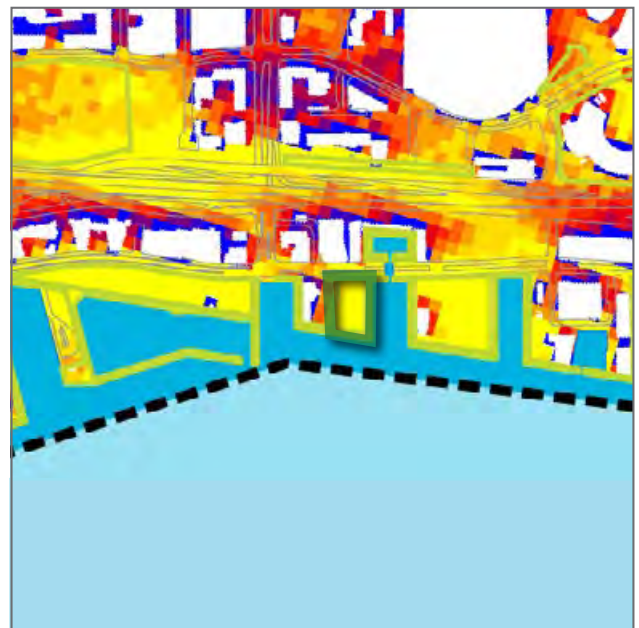
18. Harbour Square Park



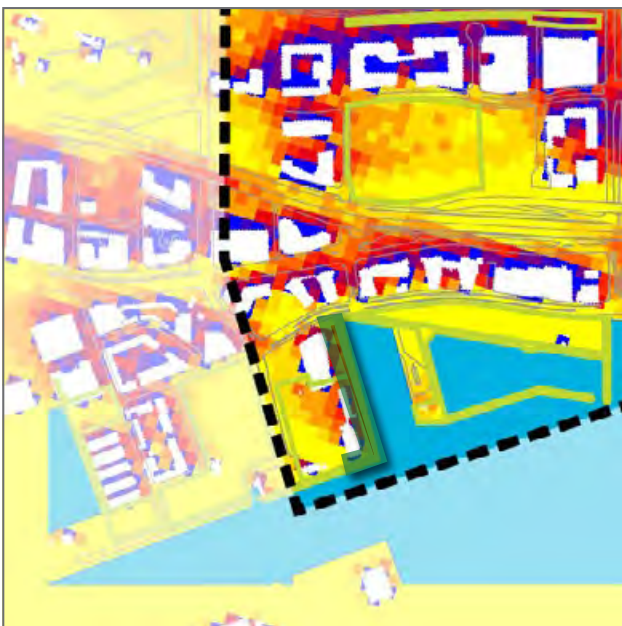
19. HTO Park



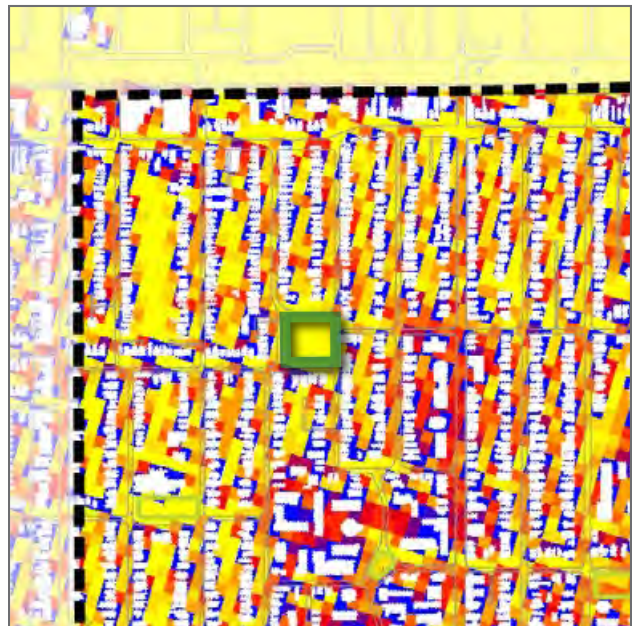
20. HTO Park West



21. Ireland Park



22. Jean Sibelius Park



LEGEND

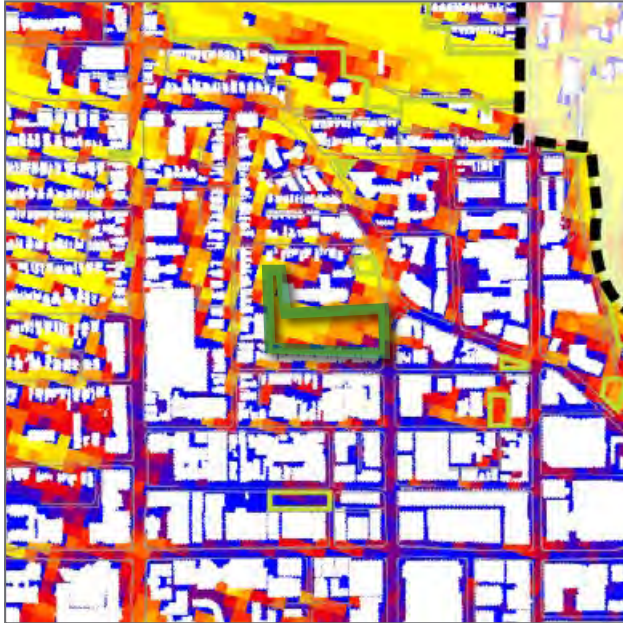


park
boundary

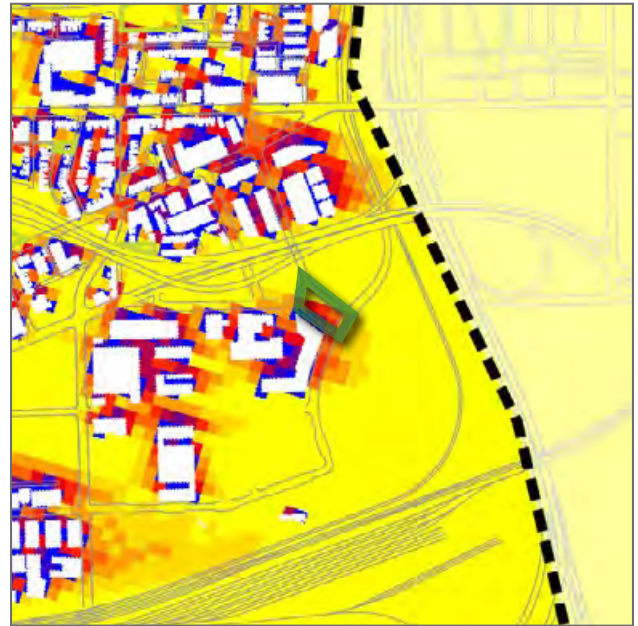


Sunlight hours:
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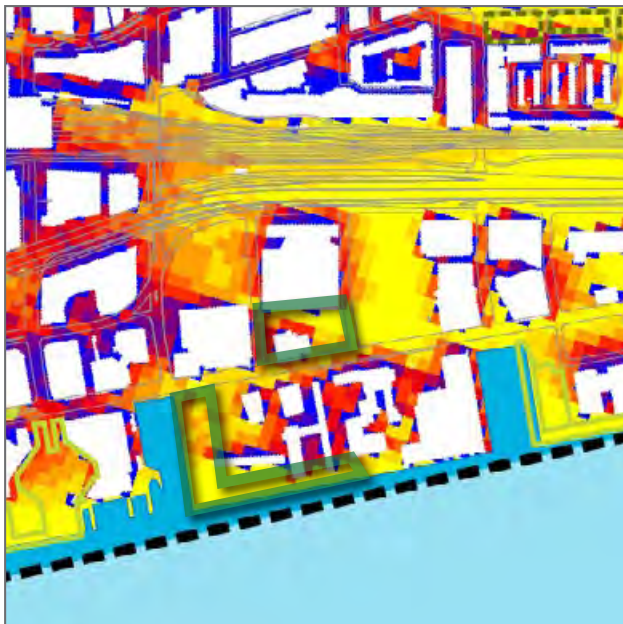
23. Jesse Ketchum Park



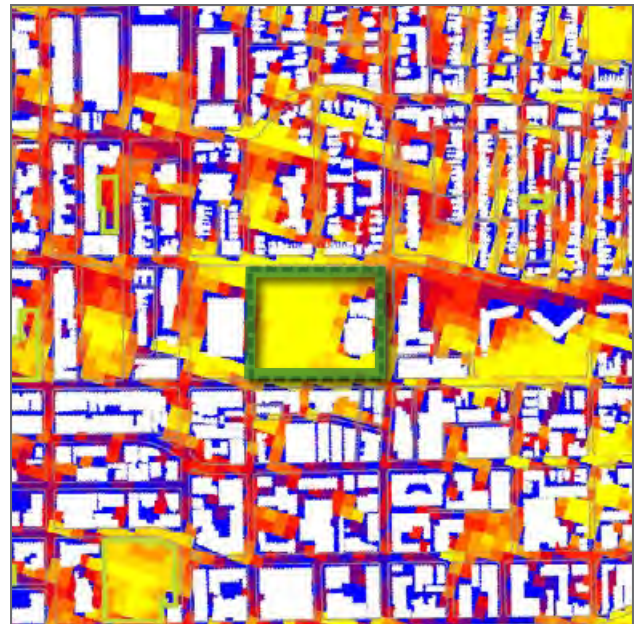
24. Lawren Harris Square



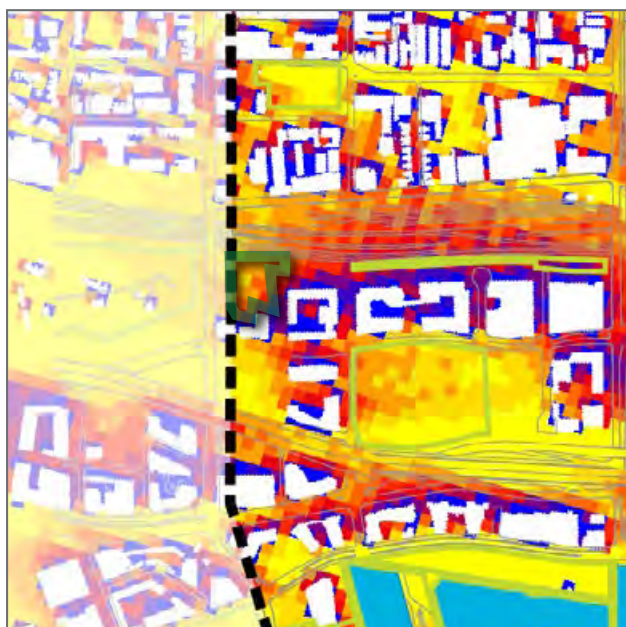
25. Lower Yonge Public Promenade and Lower Yonge Park



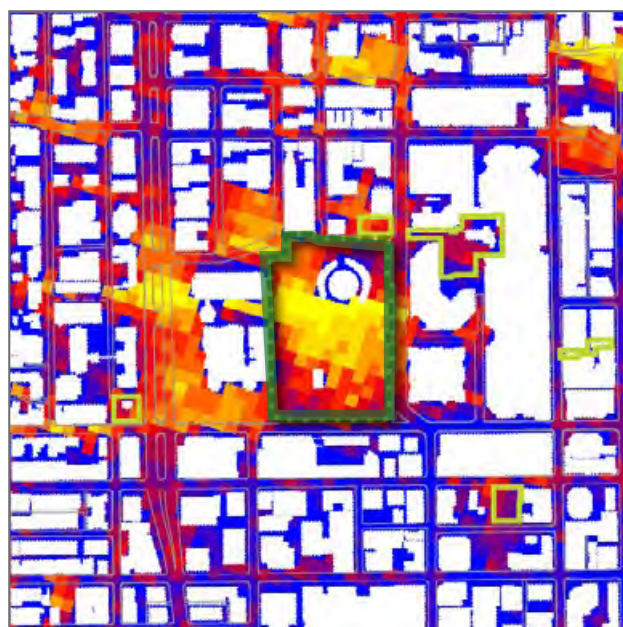
26. Moss Park



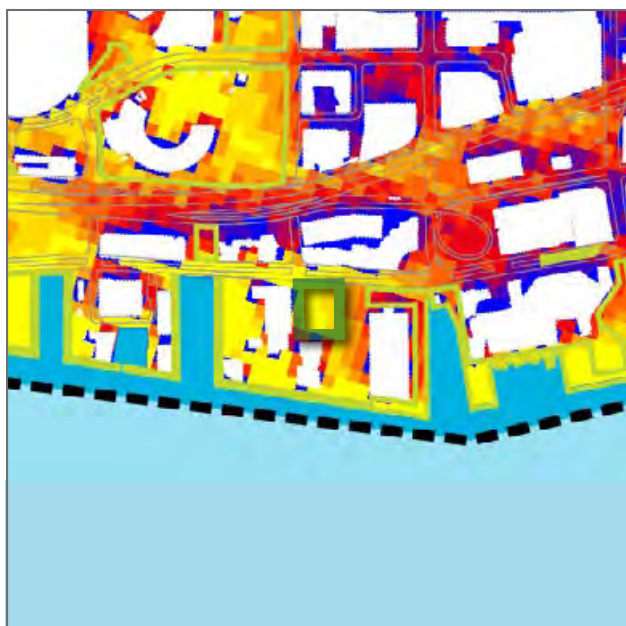
27. Mouth Of The Creek



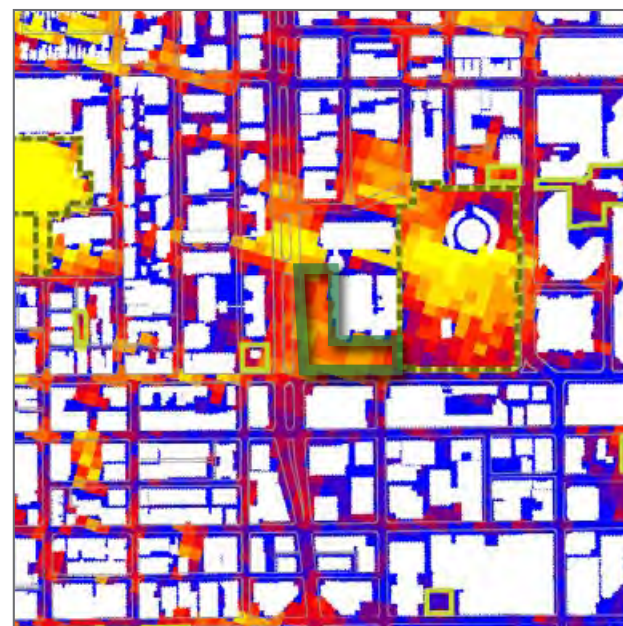
28. Nathan Phillips Square



29. Ontario Square



30. Osgoode Hall Gardens



LEGEND



park
boundary



Sunlight hours:

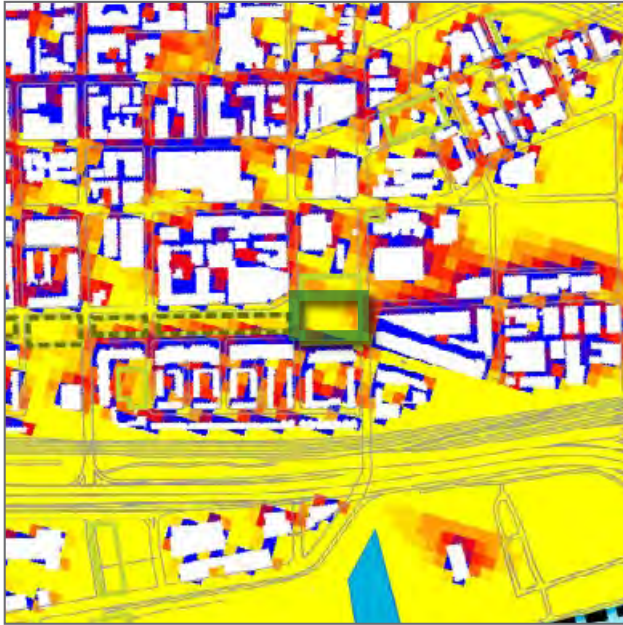
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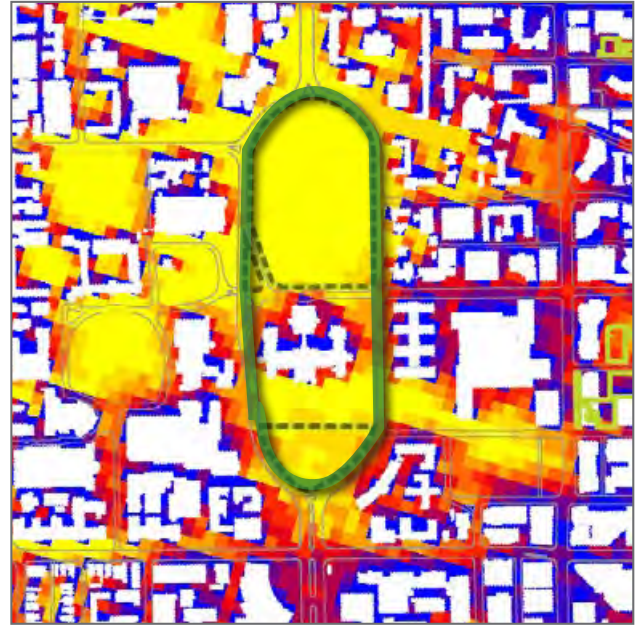
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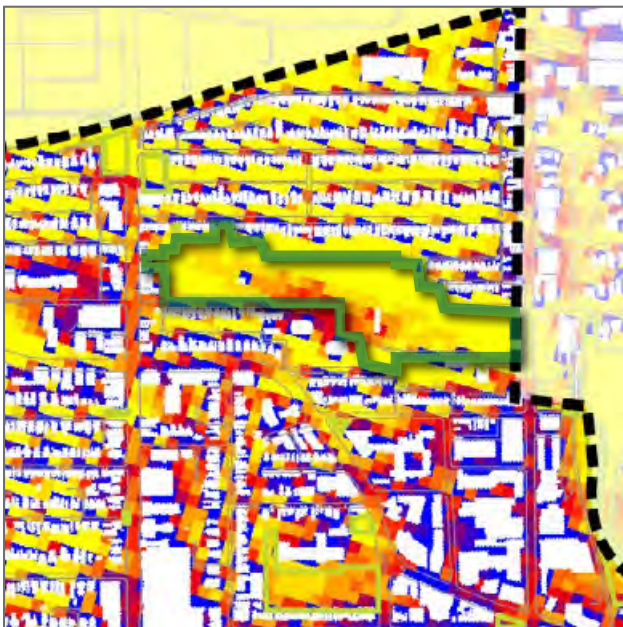
31. Parliament Square Park



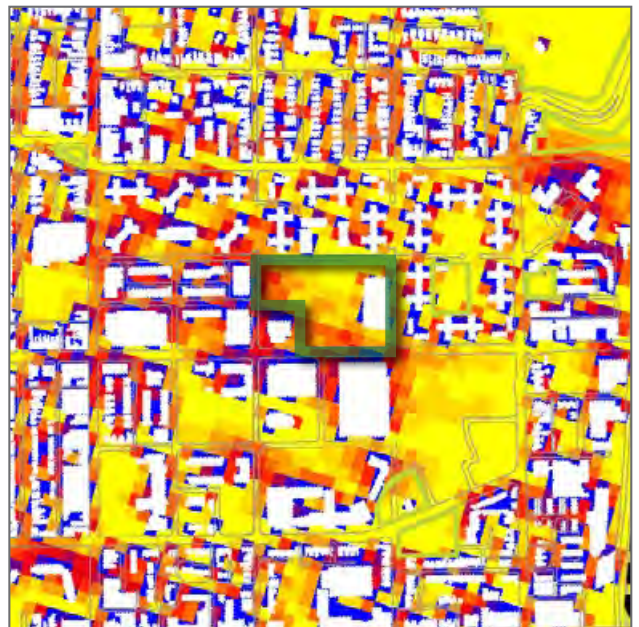
32. Queen's Park



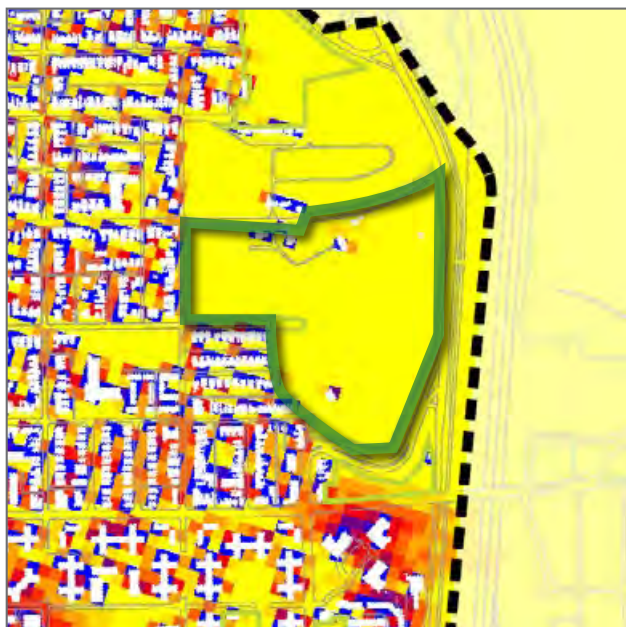
33. Ramsden Park



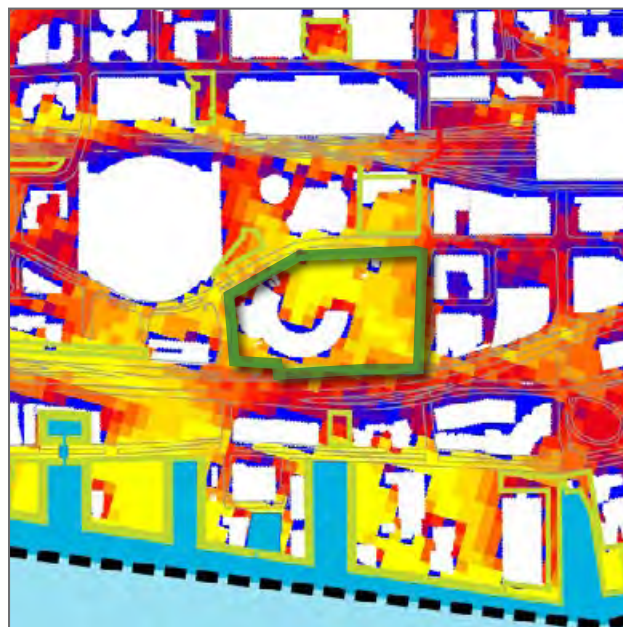
34. Regent Park



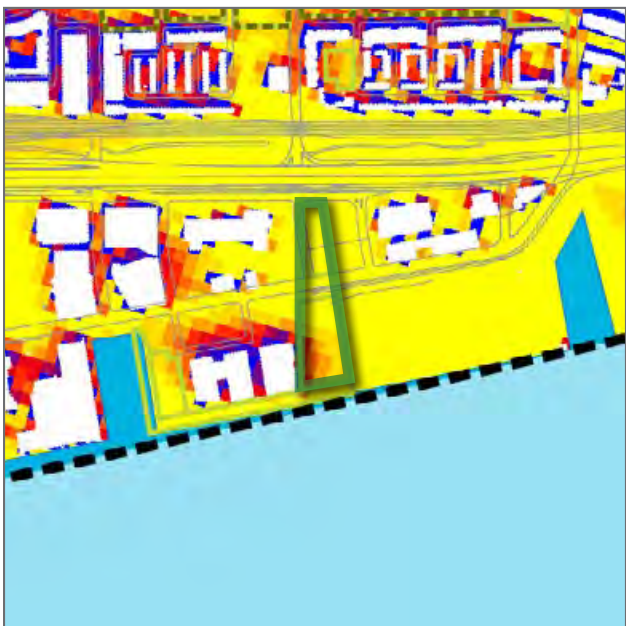
35. Riverdale Park West



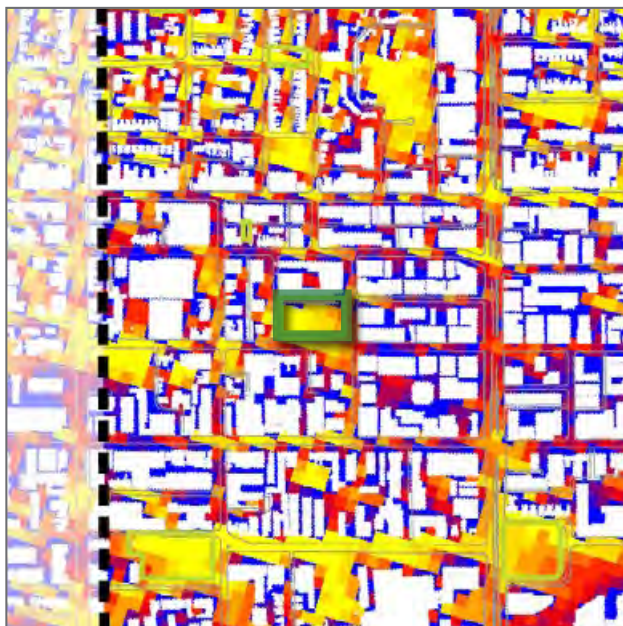
36. Roundhouse Park



37. Sherbourne Common



38. St Andrew's Playground



LEGEND



park
boundary



Sunlight hours:

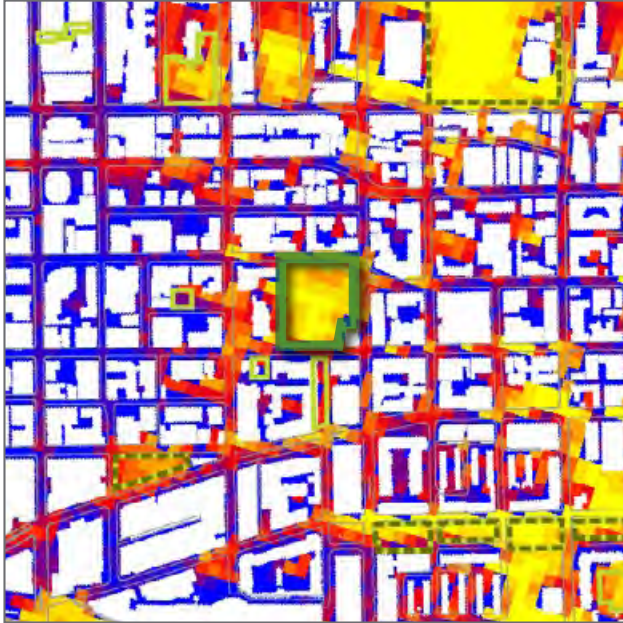
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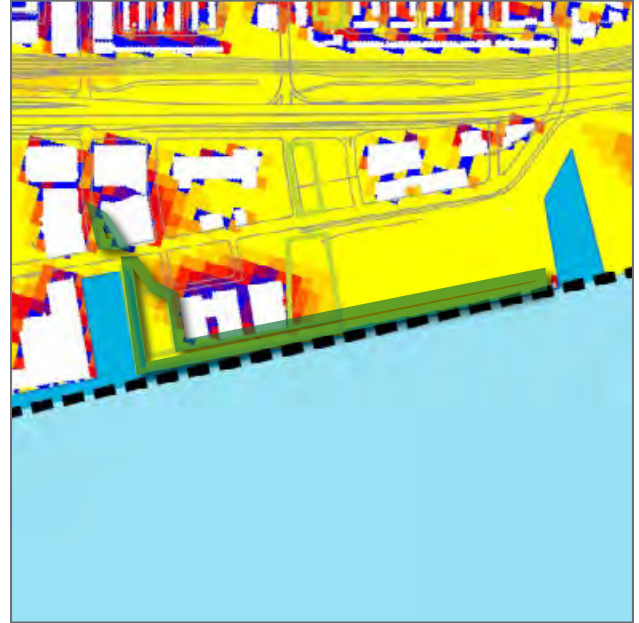
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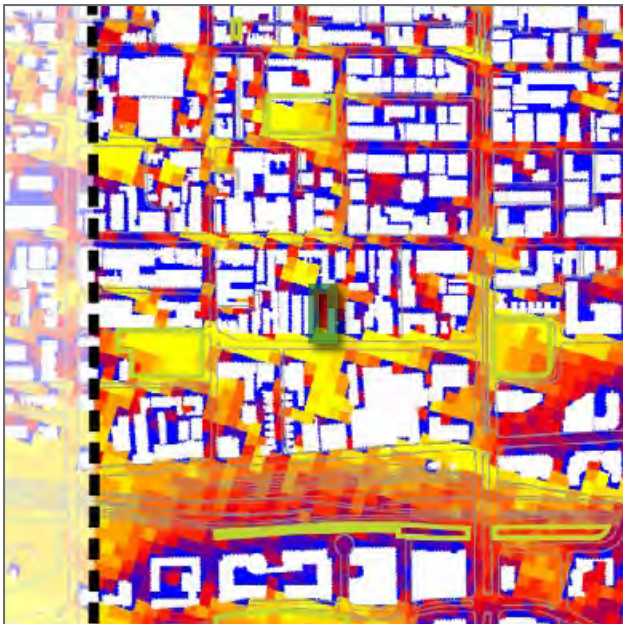
39. St. James Park



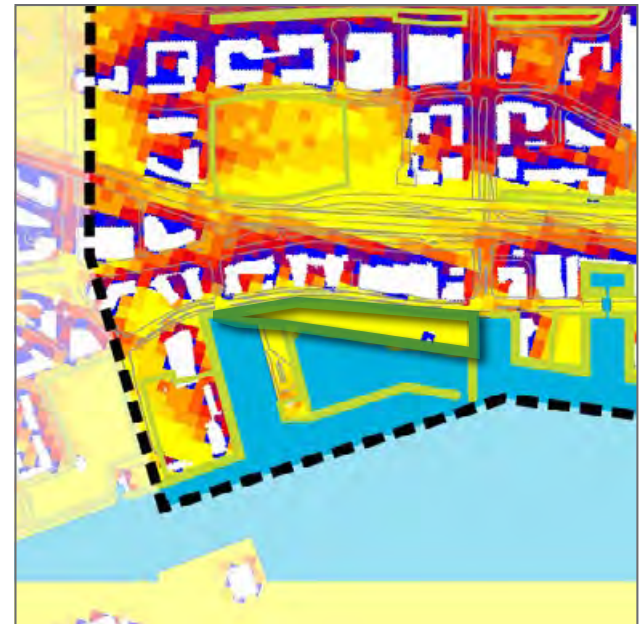
40. Sugar Beach



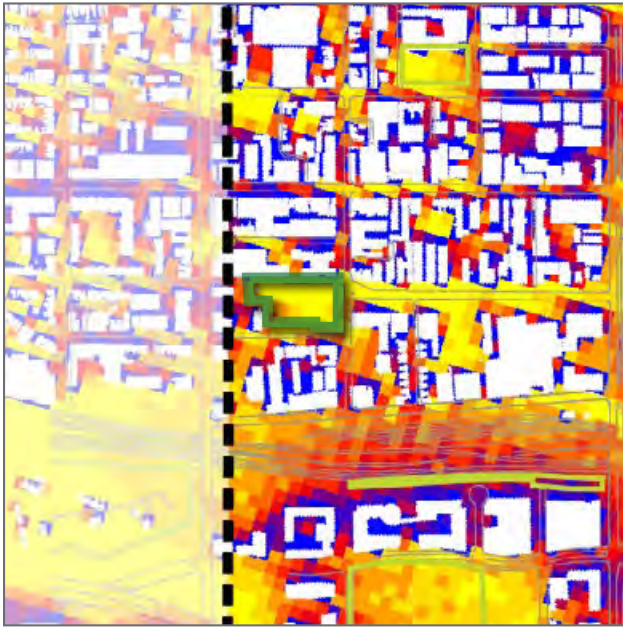
41. The Well



42. Toronto Music Garden



43. Victoria Memorial Square Park



44. Village Of Yorkville Park

