1.1.1 Screening Existing Facilities

The following are some of the criteria which should be used in the screening process for renewable energy opportunities.

Available Land Area

A variety of technologies can make use of available land area. In areas with minimal shading, ground-mounted solar PV or solar thermal may be an option. Where there is elevated ground or a large area with minimal trees, outbuildings or other structures which could provide wind blocks, wind may be feasible. Geo-exchange systems are more cost effective when adequate land is available to implement horizontal ground loops.

Available Rooftop Area

Solar PV and Thermal systems can be effectively installed on rooftops, provided they are in good condition, sufficiently sturdy, and free of obstructions. Solar PV systems typically require between 8-12 square meters / kW.[1]

Significant Heating Loads

While a renewable thermal energy system can be implemented to address any size of load, the greatest impacts may be found on the most significant loads in the City's portfolio. Increased load diversity also helps to ensure a constant demand which is better able to take advantage of thermal energy as it is generated.

Boiler Replacement

Many solar thermal systems simply will not be cost effective when the base case involves no replacement of existing equipment. When a boiler or hot water system must be replaced, then the energy savings only has to pay back the incremental investment, which can improve project economics significantly.

Chiller or major HVAC equipment replacement

Geo-exchange systems can be applied to a wide range of building types and installed under various different conditions. Where space is limited, vertical loops may be utilized, however cost increases may apply. Given the significant capital costs, geo-exchange systems are not likely to be economic when the base case involves natural gas heating without any capital investment, however if existing equipment is scheduled to be replaced, the project economics can be improved.

Roof replacement

When a roof is being replaced, it presents an opportunity for implementing rooftop solar projects, or for specifying replacement in such a way to make the rooftop "solar ready".

Existing electrical heating equipment

At current prices, natural gas is a much more cost effective method of heating (Natural gas at $.41 / m^3 is equivalent to about $0.06 / kWh at 70% efficiency,[2] compared to electricity costs of $0.11 /kWh). For this

[1] Lisell, L.;Tetrault,T., and Watson, A., Solar Ready Buildings Planning Guide, National Renewable Energy Laboratory, December 2009. Web: http://www.nrel.gov/docs/fy10osti/46078.pdf, December 2, 2011.

reason, projects where renewable heat will replace electric heat will have better payback than projects that replace gas heating sources.

Building Cladding / Envelope replacement

Technologies such as solar ventilation preheat can be integrated as part of a building's cladding, sometimes at minimal incremental cost if existing cladding must be replaced anyway. Buildings with high heating and ventilation needs, and large walls with little glazing are ideal, such as garages, community centres or arenas; however these technologies have also been implemented on multi-residential and commercial buildings.

1.1.2 New or Re-Development

As the City develops new facilities or redevelops sites, it has the opportunity to invest in opportunities which may provide synergistic value, or a positive business case that would not be realized as a retrofit.

District Energy (DE): City properties within the proximity of new developments planning on implementing district energy may be able to generate energy which can be fed into these systems. DE systems provide a large consistent thermal load which ensures that thermal technologies are utilized most efficiently.

Geo-exchange: A considerable portion of the cost of geo-exchange systems is incurred in the drilling of boreholes. In addition, where land is available, a horizontal configuration can reduce costs, but when space is limited, a more costly vertical configuration may be necessary. By incorporating the investigation of feasibility of geo-exchange into new build specifications, this opportunity can be maximized.

Hybrid Solar / Green-Roofs: The City's Green Roof policy requires newly constructed buildings to incorporate green roofs. While under the City's current policy, solar PV cannot be used to offset the amount of roof space required to be a green roof (as is the case with the City's bylaw applying to other facilities), there may still be advantages to a mixed use of solar and vegetative roofs, where capital budgets allow. In particular, the cooling effect of green roofs helps optimize the efficiency of solar, and the shading effects of solar help moisture retention for vegetative roofs.

1.1.3 GIS-based opportunity analysis

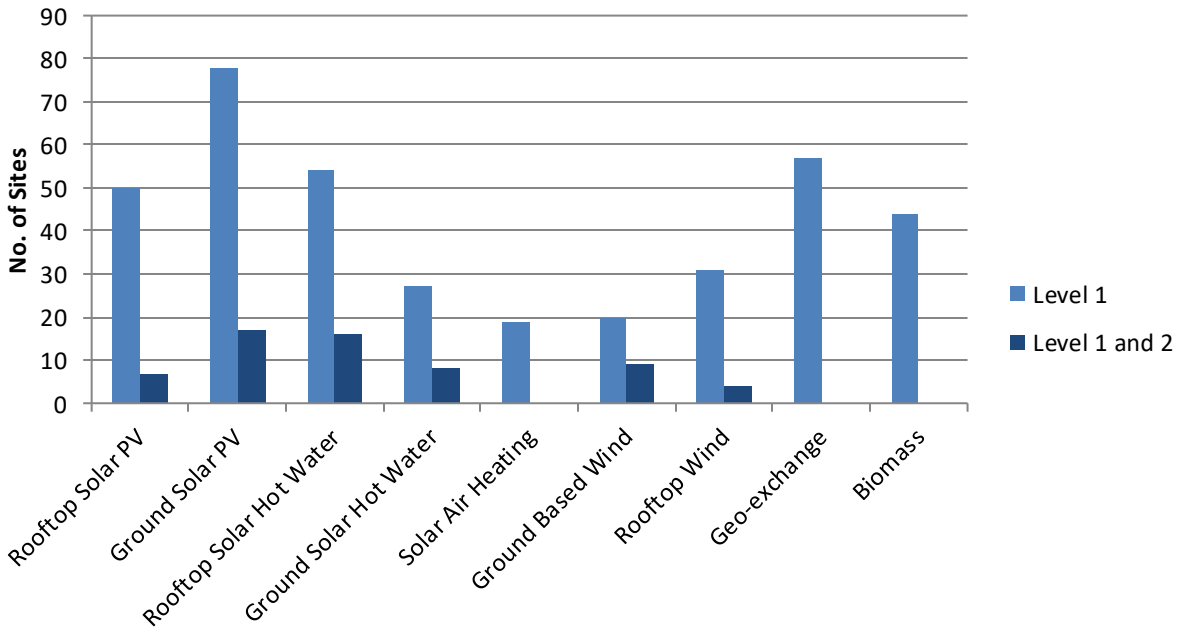
Using the screening criteria described above, Golder undertook a preliminary analysis of the City's properties using Geographic Information Systems (GIS) tools (See Appendix M). The analysis was completed using available building and parcel data provided by the City, which were "geo-coded" in order to correlate the City's property information to digital elevation maps and other relevant data. Using the key facility characteristics described in Table 33, a series of filters were applied to the property information to identify facilities for which specific renewable energy technologies may be feasible. This preliminary assessment is not intended to be definitive; rather it only identifies facilities that the City should prioritize for further investigation. It is quite possible that some of the identified properties will not be eligible due to practical considerations not captured in the GIS data (such as type of roof construction or condition, or land area which must remain unobstructed for other use). Other sites which were excluded by the filtering may in fact offer viable opportunities. The compiled dataset is intended to capture the most likely candidates for specific technologies and to serve as the basis for ongoing customizable

[2] $1m^3$ of natural gas contains approximately 37MJ of energy, equivalent to 10.3 kWh. Assuming natural gas boiler is 70% efficient, $ 0.41 / (10.3 * 0.7) = $ 0.06.

analyses using GIS tools, which the City can undertake as it continues to refine its property data and seek opportunities for renewable energy project development.

Based on the screening exercise, using assigned facility characteristics, we have identified a number of facilities that the City may wish to prioritize for further Renewable Energy project investigation. Figure 1 below illustrates the number of sites meeting basic (level 1) criteria used for the screening analysis for each technology. Table 1 (below) summarizes the results of this preliminary screening exercise, indicating the number of potentially eligible sites, the criteria assigned for each technology importantly, and additional criteria which could be used to enhance future screening analyses and narrow the preliminary results. This methodology is intended to be a high level exercise to identify candidate sites and further site-specific analysis is required confirm the feasibility of each technology at these sites. Appendix M includes the results and site details for each screening analysis performed.

Figure 1: GIS screening analysis results[3]



[3] Note: No level 2 criteria were applied to Solar Air Heating, Geoexchange or Biomass projects.

Table 1: GIS Screening analysis results

Technology	Level 1 Filter Criteria	Level 2 Filter Criteria	Results	Additional Recommended Future Criteria
Rooftop Solar PV	▪ Roof top Area greater than 100m^2 ▪ Solar insolation greater than 1200kWh/m^2 ▪ No buildings 10% higher within 100m (shading indicator)	▪ No buildings 10% higher within 500m (shading indicator)	▪ 50 Sites meet level 1 filter criteria ▪ 7 Sites meet level 2 filter criteria ▪ 173,000 m^2 rooftop area ▪ Average solar insolation 1211 kWh/m^2	▪ Enhanced solar shading ▪ Zoning (esp. height restrictions) of sites to east, south and west
Ground Mounted Solar PV	▪ Usable Area greater than 10,000m^2 ▪ Solar insolation greater than 1200kWh/m^2	▪ No structures 20m high within 500m (solar shading indicator)	▪ 78 unique sites meet level 1 filter criteria ▪ 17 sites meet level 1 and 2 filter criteria ▪ 2,100,000 m^2 usable ground area ▪ Average solar insolation 1215kWh/m^2	▪ Enhanced solar shading ▪ Zoning (esp. height restrictions) of sites to east, south and west
Rooftop Solar Thermal (Hot Water)	▪ Roof top Area greater than 1000m^2 ▪ Solar insolation greater than 1200kWh/m^2 ▪ Natural Gas use greater than 50,000 kWhe (indicator of hot water use) ▪ Excluding: Animal Holding, curling rink, garage & shop, garage, garden, golf course, greenhouse, heritage, lab, museum, office, outdoor pool/rink, parkette, service yard, transfer station. ▪ No buildings 10% higher within 100m (shading indicator)	▪ No buildings 10% higher within 500m (shading indicator)	▪ 54 Sites meet level 1 filter criteria ▪ 6 Sites meet level 1 and level 2 filter criteria ▪ Total 70,000 m^2 rooftop area ▪ Average solar insolation 1211 kWh/m^2 ▪ Total annual natural gas use 74,296,000 kWhe	▪ DHW portion of energy use ▪ DHW load factor & seasonality ▪ Enhanced solar shading ▪ Renovations planned ▪ Zoning (esp. height restrictions) of sites to east, south and west
Ground Mounted Solar Thermal (Hot Water)	▪ Usable Area greater than 1000m^2 ▪ Solar insolation greater than 1200kWh/m^2 ▪ Natural Gas use greater than 500,000 kWhe/year ▪ Excluding: Animal Holding, curling rink, garage & shop, garage, garden, golf course, greenhouse, lab,	▪ No buildings 10% higher within 500m (shading indicator)	▪ 27 Sites meet level 1 filter criteria ▪ 8 Sites meet level 1 and level 2 filter criteria ▪ 412,500 m^2 usable area ▪ Average insolation 1216kWh/m^2 ▪ Total annual natural gas	▪ DHW portion of energy use ▪ DHW load factor & seasonality ▪ Enhanced solar shading ▪ Renovations planned ▪ Zoning (esp. height

Technology	Level 1 Filter Criteria	Level 2 Filter Criteria	Results	Additional Recommended Future Criteria
	museum, outdoor pool/rink, parkette, service yard, transfer station. ▪ No buildings 10% higher within 100m (shading indicator)		use 110,119,000 kWhe (Approximately 11,011,900 m^3)	restrictions) of sites to east, south and west
Solar Air Heating	▪ Roof Area greater than 1000m^2 ▪ Natural gas use greater than 500,000 kWhe/yr ▪ Solar insolation greater than 1000kWh/m^2 ▪ No buildings 10% higher within 100m (shading indicator)	▪ None	▪ 19 unique sites meet level 1 filter criteria ▪ Average insolation 1197 kWh/m^2 ▪ Total natural gas use 150,334,000 kWhe (approximately 15,033,400 m^3)	▪ Space heating portion of energy use ▪ Space heating load factor & seasonality ▪ Enhanced solar shading ▪ Renovations planned ▪ Zoning (esp. height restrictions) of sites to east, south and west
Ground-Mounted Wind	▪ Usable Area greater than 5000m^2 ▪ 50m wind speed greater than 4.5 m/s ▪ No obstructions greater than 20m within 100m radius.	▪ No obstructions greater than 20m within 500m radius.	▪ 20 sites meet level 1 filter criteria ▪ 9 sites meet level 1 and level 2 filter criteria ▪ 1,452,900 m^2 total usable site area ▪ Average wind speeds at 50m 4.84 m/s	▪ Proximity to residences
Rooftop Wind	▪ Roof top Area greater than 500m^2 ▪ 50m wind speed greater than 4.25 m/s ▪ No obstructions greater than 20m within 100m radius.	▪ No buildings greater than 10% higher within 500m radius	▪ 31 sites meet level 1 filter criteria ▪ 4 unique sites pass level 1 and level 2 filter criteria ▪ Total rooftop area 93,000m^2 ▪ Average wind speeds at 50m 4.45 m/s	▪ Proximity to residences
Geo-exchange	▪ Usable Area greater than 10,000 m^2 ▪ Natural Gas use Greater than 500,000 kWhe/year ▪ Electricity use greater than 100,000 kWh/year	▪ Depth to bedrock: Less overburden (less depth to bedrock) requires less	▪ 57 sites meet level 1 filter criteria ▪ 3,902,000 m^2 usable area ▪ 200,327,557 kWhe (approximately	▪ Space heating/cooling load factor & seasonality ▪ Renovations planned ▪ Groundwater maps and profile maps

Technology	Level 1 Filter Criteria	Level 2 Filter Criteria	Results	Additional Recommended Future Criteria
		drilling expense to install ground loop	20,032,756 m^3) total natural gas use ▪ 52,480,000 kWh total electricity use	
Biomass	▪ Usable Area greater than 5,000 m^2 ▪ Natural Gas use Greater than 1,000,000 kWhe/year	▪ None	▪ 44 unique sits meet level 1 filter criteria ▪ 198,245,000 kWhe (approximately 19,824,500 m^3) total natural gas use ▪ 246,662,000 kWh total electricity use	▪ Heating and DHW portion of energy use ▪ Heating and DHW load factor & seasonality ▪ Renovations planned ▪ Proximity to residences

Appendix M
GIS Analysis

INTRODUCTION

The following section provides a high level overview of the processes and steps taken as part of the GIS study in support of the project. All data supporting the GIS study was provided by the City of Toronto. A number of datasets including, Building Footprints, Digital Terrain Model (DTM), and Assessed Parcel fabric were provided directly from the City of Toronto, Information and Technology Division, Geospatial Competency Centre. Building and DTM data was provided in DGN format and was converted to ArcGIS SHP files. Additional spatial data was down loaded from the City of Toronto Open data website. These datasets included Parks, Renewable Energy Installations, Road Center Lines, Wards, Address Point Locations and Urban Forestry datasets. The City of Toronto publically accessible WMS services were also leveraged where possible for the study. All data maintained the City of Toronto's defined MTM 3Degree NAD27 projection system;

Projection: Transverse_Mercator

False_Easting: 304800.000000

False_Northing: 0.000000

Central_Meridian: -79.500000

Scale_Factor: 0.999900

Latitude_Of_Origin: 0.000000

Linear Unit: Meter (1.000000)

Geographic Coordinate System: GCS_North_American_1927

Angular Unit: Degree (0.0174532925199433299)

Prime Meridian: Greenwich (0.000000000000000000)

Datum: D_North_American_1927

Spheroid: Clarke_1866

Semimajor Axis: 6378206.400000000400000000

Semiminor Axis: 6356583.799998980900000000

Inverse Flattening: 294.978698200000000000

All GIS processing was performed using ESRI ArcGIS version 10 software.

DATA CONDITIONING

Key City of Toronto asset and building information was not provided in a GIS "ready" format. Facility data was provided in a Microsoft Excel table which included attribute information as well as address data. To integrate this data into the project GIS database required geocoding. Geocoding is the process of finding associated geographic coordinates (often expressed as latitude and longitude) from other geographic data, such as street addresses, or postal codes. With geographic coordinates,

the features can be mapped and integrated into the project GIS. To expedite the process the asset and facility data provided by the City was visually checked for address data completeness. Address records that were incomplete were removed from the list and sent back to the client for additional information. From the list of assets with complete addresses, ESRI's ArcGIS geocoder was used to generate an initial point file of the asset locations. Depending on the address information provided, geocoded locations were spatially positioned along the road center lines and close to the associated parcel or actual building footprint. As with all geocoding algorithms a "score" is provided which ranks the accuracy of the geocoded locations. Addressing discrepancies resulted in a number of locations with poor geocoding scores. These locations were further investigated manually by a GIS analyst to resolve geocoding issues that algorithms could not resolve. As a result of the lack of associated attribute information, such as building Unique ID, Roll or Pin Number that may provide a link to either parcel or building foot print data there was no automated method(s) available to spatially associate the geocoded facilities and assets to their exact location. As a result, the first step in the data conditioning process was to determine how best to relate the geocoded asset attribute table provided by the City of Toronto to the parcel fabric. This process was best addressed by manually moving approximately one thousand geocoded points to locations within their respective parcel polygon. To aid in this manual process additional datasets such as the more detailed Assessed Master Parcels, Address Point Locations, 2005 ortho imagery and the provided building descriptions were evaluated to assist in the manual refined geocoding exercise to ensure each location was spatially associated with its respective parcel.

With the refined geocoding processing completed to the best of our ability with the data provided, a simple GIS selection was possible to extract only parcels that were associated with a geocoded asset. No individual parcel coverage provided a realistic extent for all the assets (See Figure 1). For that reason the geocoded assets containing elementary building types (Expressway Light, Field House, Fountain, Garden, Parkette, Street Light and Submeter) were spatially associated to the City of Toronto Master Parcel fabric. The remaining geocoded assets containing larger building types were spatially associated to the City of Toronto Assessed Parcels fabric. This was achieved through a simple spatial point in polygon selection process and the resulting combined polygon parcel layer represented the "final" parcel data layer that would be used in further calculations.

The final parcel data layer was then used to filter relevant building foot prints through a similar spatial association. Once the relevant building footprints were extracted one additional spatial operation need to be completed before the building data could be used to support further analysis. The City of Toronto buildings dataset consists of polygon footprints for each significant change in elevation (masl) of a building structure. To calculate the approximate height of each building footprint the centroid (point) of each building was calculated. Using the provided DTM information an elevation was calculated for each building centroid which represented the ground elevation. A simple table calculation, subtracting the provided building elevation value from the extracted DTM ground elevation resulted in an approximate building height for each building structure.

This combined set of parcels and building outlines subsets formed the foundation baseline dataset used in subsequent spatial analysis and calculations in support of the project.

DATA LIMITATIONS

Geocoding and Parcel Data Association

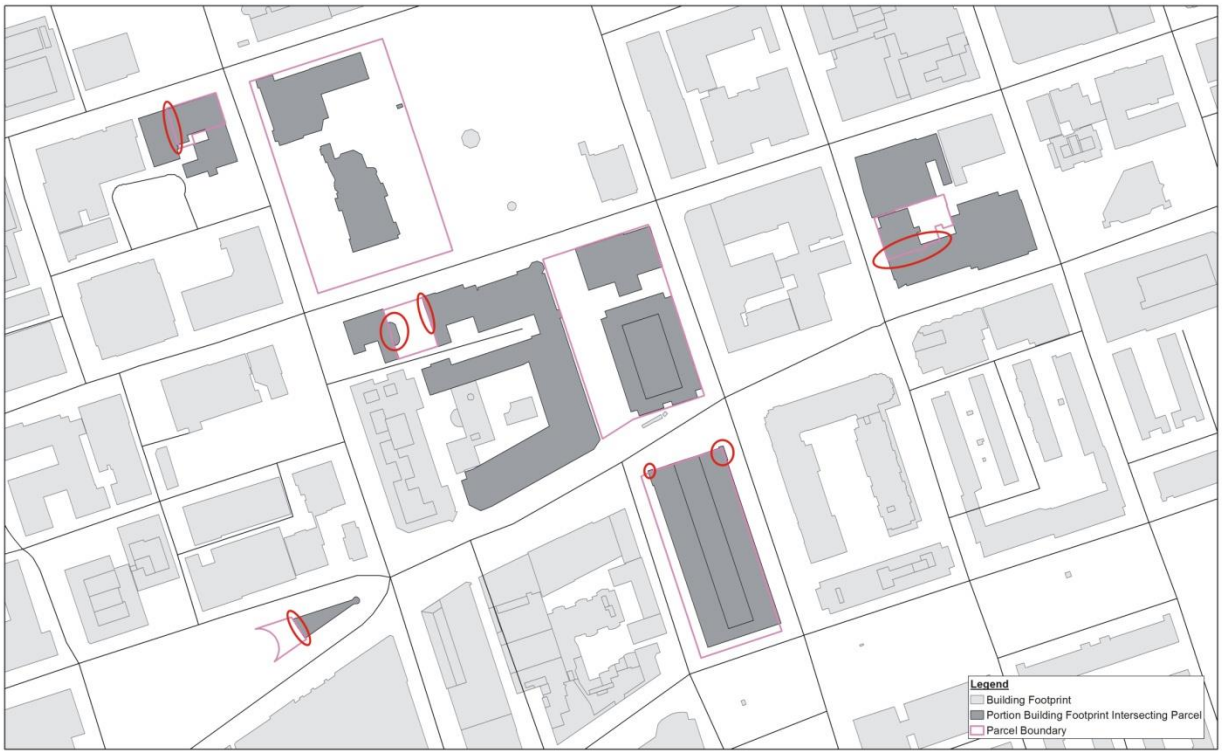
With the type of assets being analyzed for potential renewable energy, the address information provided did not always have a match to the City of Toronto's Address Point dataset. Using a variety of data available, assumptions were made on the precise parcel for consideration. Further, after the location of the asset was linked to a parcel, the provided usage/description (e.g. parkette) did not always align to the potentially sizeable extents of the Assessed Parcel layer. The Master Parcel layer which contained more detailed polygon features at times also did not provide an accurate representation for analysis for renewable energy technologies based on the usage/description either. With almost one thousand parcels to consider, generalizations needed to be applied to achieve a "best fit" for the data for analysis. For this reason some parcel boundaries were selected from the Master Parcel fabric and others from the Assessed Parcels based on individual evaluations and the information provided. For larger assets such as Treatment Plants (below left) the Master Parcel fabric was too detailed and the Assessed Parcel fabric was used. For minor assets like Parkettes (below right) the Assessed Parcel fabric was too coarse and the Master Parcel data provided the necessary detail. Both Master and Assessed Parcel fabric were used to determine the most accurate parcel layer representation.

Figure 2: Master Parcel Fabric vs. Assessed Parcel Fabric

Building Data

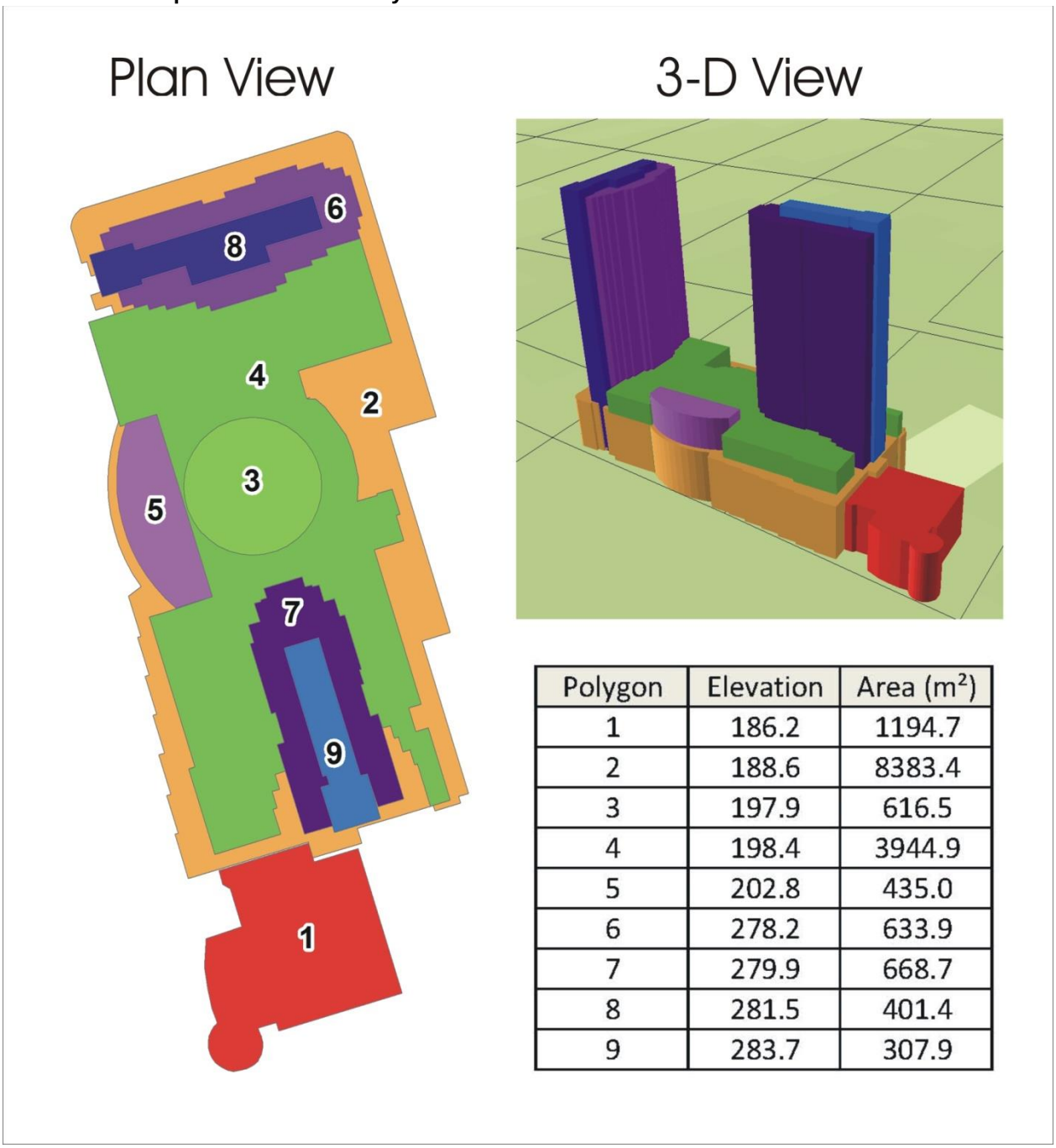
The building layer although very detailed was also limited with respect to attribute content. Building data at times did not correspond accurately to the surrounding parcel fabric (Figure 66) and would extend into portions of adjacent parcels or straddle multiple Assessed parcels.

Figure 3: Example of alignment issues between the Parcels and Building Footprints



The Building footprint data also had no unique feature or attribute that would identify them as a single entity. This made it difficult to apply some of the calculations described below on a single building or subset. Each building elevation was therefore considered for analysis to avoid any exclusion resulting in a change in building elevation to be counted in the analysis, as opposed to entire building structure (Figure 67).

Figure 4: Example of a building coloured by elevations showing how a single building entity can be counted multiple times in the analysis.



Polygon	Elevation	Area (m^2)
1	186.2	1194.7
2	188.6	8383.4
3	197.9	616.5
4	198.4	3944.9
5	202.8	435.0
6	278.2	633.9
7	279.9	668.7
8	281.5	401.4
9	283.7	307.9

DATA ANALYSIS AND CALCULATIONS

With the geocoding and data conditioning compete, the subset data was then used in a series of calculations to better identify or assess the potential of alternative energy technologies and solutions. The subsequent analysis and calculations were applied separately to both selected parcel areas as well as building features.

Parcel Area Calculations

The purpose of this calculation was to determine the ground area (m^2) available for potential alternative energy use. To calculate this value a series of criteria were developed that identified features that could obstruct or limit usable ground area. Features such as building footprints, tree cover, paved or other hard surfaces as well as water features were all identified as features that could restrict development.

From the City of Toronto Building dataset the building footprints were clipped to the extents of each parcel polygon selected in phase 1. For each building the total roof area was calculated. As a result of the spatial inconsistencies identified above, a spatial clipping process was applied to the selected buildings to ensure the reported roof area calculation and extents represents the exact area on each individual parcel while limiting the impact of the spatial errors between the two datasets. Tree coverage, hard surfaces and water were extracted from City of Toronto land cover raster dataset. Tree cover and building foot print areas were subtracted from the total parcel area to calculate the *ground area* for each individual parcel (GrndArea). Hard surfaces and water features were identified as possibly more flexible constraints with respect to total usable area calculations. As a result a second area calculation was performed which included the removal of hard surfaces and water features from the ground area value to determine a more refined *usable* ground area for each individual parcel (UsableGrnd).

Figure 5: Example showing the various dataset used to determine useable ground area for a parcel.

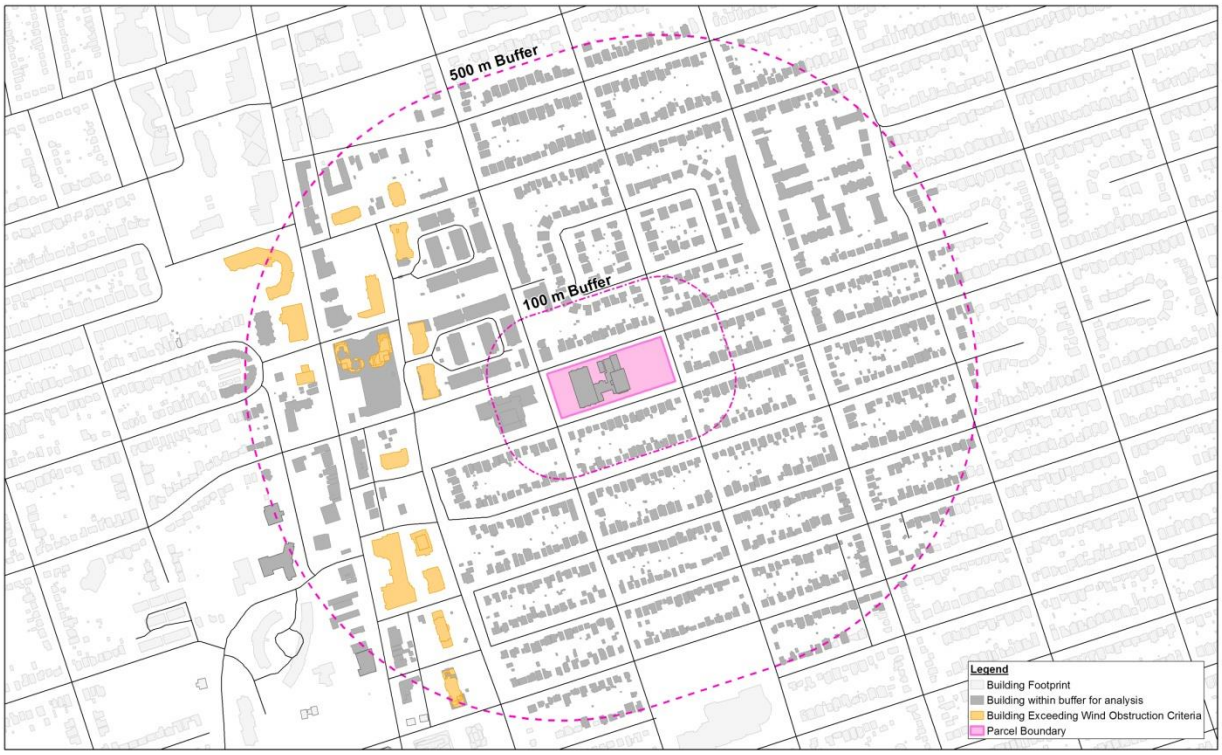
Wind Potential Calculation

The purpose of this calculation was to determine the wind potential of each individual parcel and building. Wind potential calculations leveraged the provincial Ontario Wind Atlas[4] GIS dataset. This data contains GIS data that supports the Ontario Wind Resource Atlas for the Province. Wind potential resource data is represented as GIS grids that provide wind speed and wind power measurements at various heights (10m, 30m, 50m, 80m, and 100m) above ground level.

Included in this calculation was the assessment and analysis of any potential local obstructions that may affect wind energy potential of the individual parcels at ground level. The criteria for a wind obstruction at ground level was defined as a building 20 m above the parcel elevation as recorded at the centroid. Buffers were generated for each parcel at 100 m and 500 m (see Figure 69) from the parcel boundary. Using spatial joins with the City of Toronto Building data, the buffer areas were used to select surrounding buildings and determine the height and number of maximum wind obstructions as defined by the obstruction criteria. The values for wind speed (Wind_Speed) and wind power (Wind_Power) for each individual parcel centroid at an elevation of 50 masl were extracted from the Ontario Wind Atlas GIS dataset.

[4] Ontario Ministry of Natural Resources, Renewable Energy Atlas, Queen's Printer for Ontario, 2011. Web: http://www.lio.ontario.ca/imf-ows/imf.jsp?site=renew_en

Figure 6: Example showing buildings selected and considered as obstructions for wind obstruction analysis



A similar buffer analysis as to that which was applied to the Parcel data layer was applied to the building dataset to calculate the rooftop wind potential for the target building(s). A ten percent (10%) increase was applied to the target building height and compared against the surrounding structures to determine the rooftop wind energy potential. Buffers of 100 m and 500 m were generated and used to spatially join the surrounding City of Toronto buildings. Through the spatial join it was possible to compare the wind obstructions criteria against the buildings within each buffer and calculate the maximum height and total number of buildings considered as an obstruction to the target structure(s) within each of the buffer distances. Along with the total count of buildings exceeding the obstruction criteria, the total number of buildings within the respective buffers was also calculated. The values for wind speed for each building centroid at an elevation of 50 masl (WndSpd_50) and 100 masl (WndSpd_100) were extracted from the Ontario Wind Atlas GIS dataset respectively.

With the feature specific wind obstruction analysis complete for both Buildings and Parcels separately the two distinct datasets and resulting calculated values were spatially joined using ArcGIS. Due to data limitations sited above with specific reference to unique building identification, there are many situations were multiple building are present on a single parcel. As a result the highest building attribute was applied to the individual parcel. Further, if any building on the site was deemed a "*good candidate*" for rooftop wind potential, that candidate buildings attributes were applied to the parcel.

Solar Potential Calculation

The purpose of this calculation was to determine the calculated solar potential as was applied similarly to both Parcel as well as Building data layers. ESRI's ArcGIS Solar Radiation Tools were used to perform this calculation. The solar radiation analysis tools are a collection of raster analysis tools for calculating incoming solar radiation across a landscape or for specific locations. The two main solar radiation analysis tools in ArcGIS support the analysis of Area Solar Radiation and Point Solar Radiation. Each tool provides insight into calculating solar radiation for areas as well as specific locations. Data inputs supporting this calculation included parcel centroids and City of Toronto, Digital Terrain Model (DTM). A point solar radiation analysis calculation was calculated for the yearly amount of radiant energy (WH/m^2) for each parcel location based on a 12 month interval. The solar potential calculation analysis also considered the varying effects of the sun over the geographic area for specific time periods. It also accounts for atmospheric effects, site latitude and elevation, steepness (slope) and compass direction (aspect), daily and seasonal shifts of the sun angle, and effects of shadows cast by surrounding topography. Factors or obstructions not considered in this analysis include tree cover as there was no height attribute information available for this feature dataset but may be worth considering at the parcel level.

Due to both time and budget constraints a detailed analysis of the shadow effect of surrounding buildings with respect to the determination of solar potential at both the parcel as well as rooftop was not performed, however the 100m obstruction parameters described in the "Wind Potential Calculation" section above was used as an indicator or potential solar shading, however this may be too exclusive and should be refined through a more detailed shading analysis.

Geothermal Calculations

The purpose of this calculation was to assist with the evaluation of geothermal energy sources. Limited data was directly available to assist with this calculation. Through project team discussions it was concluded that data available through the York, Peel, Durham, and Toronto (YPDT) Groundwater study may offer the best resolution and information for this component of the study. Golder inquired as to the availability and support of this data for the project but the information was never provided to the study team. The YPDT data is currently available for purchase through Firstbase Solutions and data costs were deemed beyond the scope of the approved budget. In the absence of the YPDT dataset, the Bedrock Topography and Overburden Thickness mapping of Southern Ontario maintained by the Ontario Geological Survey (OGS) was substituted. The depth to bedrock (Bdrck_Elev) was extracted for the centroid of each selected parcel. This value represents the depth to bedrock not basement and should be used accordingly. Extracted depths to bedrock values were compared against DTM elevations for the corresponding point and where depth to bedrock was higher than the DTM elevation (ground surface), the DTM elevation was used. These situations are a result varying dataset resolution used.

DATA DELIVERABLE

Having completed the multivariate analysis for the potential of green energy solutions the respective calculated values were joined using the unique City of Toronto ID (PlaceID) with each parcels

geographic location. Using this unique City of Toronto identifier it was also possible to link the City of Toronto utility (Electrical and Natural Gas) data to each parcel.

Data has been provided in both tabular as well as GIS format for further consideration and evaluation. The following tables describe the associated attribute information provided with this data deliverable.

Table 2: Parcel Criteria for GIS Analysis

Parcel Criteria	
Field	**Description**
ARoll	City of Toronto Unique Assessment Roll #
Area_m2	Total area of the parcel for consideration (m²)
GrndArea	Area of the parcel not covered by building footprint or tree cover (m²)
UsableGrnd	Area of the parcel not covered by buildings, tree cover, water or hard surfaces (m²)
Roof_Area	Area of the total building footprint covering the site (m²)
DEM_Elev	Metres about sea level elevation of the parcel (Calculated at centroid)
Bdrck_Elev	Elevation of the bedrock surface of the parcel (Calculated at centroid)
GdOb100Tst	Within 100 m buffer of parcel boundary whether the parcel passes wind obstruction criteria of a 20 m high building (No Obstructions / Fail)
GdOb100Max	Height of the highest building within 100 m buffer of the parcel
GdOb100Num	Total number of buildings that fall within 100 m buffer of parcel that were considered for maximum building height
GdOb100Exc	Total number of buildings within the 100 m buffer that exceed the 20 m ground obstruction criteria
GdOb500Tst	Within 500 m buffer of parcel boundary whether the parcel passes ground obstruction criteria of a 20 m high building (No Obstructions / Fail)
GdOb500Max	Height of the highest building within 500 m buffer of the parcel
GdOb500Num	Number of buildings that fall within 500 m buffer of parcel and were considered for maximum building height
GdOb500Exc	Total number of buildings within the 500 m buffer that exceed the 20 m ground obstruction criteria
Insolation	Direct incoming solar radiation for each location for whole calendar year (watt hours per square meter - WH/m²)
Wind_Power	Wind Power at 50 magl (W/m²)
Wind_Speed	Wind Speed at 50 magl (m/s)
RofWindObs	Based on no building 10% higher within 500 m criteria whether the parcel is eligible (No Obstructions / Fail)
Bldg_Hght	Height of the highest building on the parcel
PlaceID	City of Toronto Data Field *(Unique ID used to join Natural Gas and Electrical Usage)*
CostCenter	City of Toronto Data Field
CostCent_1	City of Toronto Data Field
CostCent_2	City of Toronto Data Field

Parcel Criteria	
Field	**Description**
PlaceName	City of Toronto Data Field
Address	City of Toronto Data Field
City_1	City of Toronto Data Field
Province	City of Toronto Data Field
Country	City of Toronto Data Field
FlrArea_m2	City of Toronto Data Field
BldgType	City of Toronto Data Field
Note	City of Toronto Data Field
Retrofit	City of Toronto Data Field
NatGas	Summary 2009 Natural Gas Usage (kWhe)
Electric	Summary 2009 Electrical Usage (kWhe)
REProject	Current Renewable Energy Project Installed (type)

Table 3: Building Criteria for GIS Analysis

Building Criteria	
Field	**Description**
Bldg_ID	Unique ID created to for joining data attributes
Area_m2	Total area of the building footprint for consideration (m²)
Elevation	Elevation of the top of the building (meters above sea level)
DEM_Elev	Meters about sea level elevation of the base of the building (Calculated at centroid)
Bld_BdrkEl	Elevation of the bedrock surface of the building (Calculated at centroid)
Bldg_Hght	Height of the building (m)
10_prcnt	10% calculation of building height
Wind_Eval	Height considered for evaluation of rooftop wind potential (Elevation + 10 % of building height)
RfOb100Tst	Based on no building 10% higher within 100 m criteria whether the site is eligible (No Obstructions / Fail)
RfOb100Num	Number of buildings that fall within 100 m buffer of building footprint and were considered for maximum building height
RfOb100Max	Height of the highest building within 100 m buffer of the building footprint
RfOb100Exc	Total number of buildings within the 100 m buffer that exceed the 10% higher obstruction criteria
RfOb500Tst	Based on no building 10% higher within 500 m criteria whether the site is eligible (No Obstructions / Fail)
RfOb500Num	Number of buildings that fall within 500 m buffer of building footprint and were considered for maximum building height

Building Criteria	
Field	**Description**
RfOb500Max	Height of the highest building within 500 m buffer of the building footprint
RfOb500Exc	Total number of buildings within the 500 m buffer that exceed the 10% higher obstruction criteria
WndSpd_50	Wind Speed at 50 magl (m/s)
WndSpd_100	Wind Speed at 100 magl (m/s)
Insolation	Direct incoming solar radiation for each location for whole calendar year (watt hours per square meter - WH/m²)
ARoll	City of Toronto Unique Assessment Roll #
Prcl_Area	Total area of the parcel for consideration (m²)
GdOb500Tst	Within 500 m buffer of parcel boundary whether the parcel passes wind obstruction criteria of a 20 m high building (No Obstructions / Fail)
GdOb500Max	Height of the highest building within 500 m buffer of the parcel
PlaceID	City of Toronto Data Field *(Unique ID used to join Natural Gas and Electrical Usage)*
CostCenter	City of Toronto Data Field
CostCent_1	City of Toronto Data Field
CostCent_2	City of Toronto Data Field
PlaceName	City of Toronto Data Field
Address	City of Toronto Data Field
City_1	City of Toronto Data Field
Province	City of Toronto Data Field
Country	City of Toronto Data Field
FlrArea_m2	City of Toronto Data Field
BldgType	City of Toronto Data Field
Note	City of Toronto Data Field
Retrofit	City of Toronto Data Field
NatGas	Summary 2009 Natural Gas Usage (kWhe)
Electric	Summary 2009 Electrical Usage (kWhe)
REProject	Current Renewable Energy Project Installed (type)

Initial Data Analysis

Based on the available data, a set of criteria was developed for screening the GIS parcel data for renewable energy technologies. Data in excel form was sorted and filtered according to these criteria in order to provide a list of possible candidates. In some cases buildings are associated with multiple parcels; therefore this list was reviewed to eliminate any duplicate results. The following sections outline the results of the initial analysis.

SOLAR PV (ROOFTOP)

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for rooftop solar PV. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Roof top Area greater than 100m^2
- Solar insolation greater than 1200kWh/m^2
- No buildings 10% higher within 100m (shading indicator)

Level 2:

- No buildings 10% higher within 500m (shading indicator)

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data.

- More accurate solar shading (based on both position and height of surrounding buildings)
- Zoning (esp. height restrictions) of sites to east, south and west

Table 4: GIS analysis results – Solar PV (Rooftop) (sorted by Insolation)

Area_m2 (m^2)	RfOb500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType
1769	Fail	1235347	Don Valley Gc Service Bldg	4070 Yonge St	Service Yard
1856	Fail	1235255	Milliken Concession	4235 McCowan Rd	Parkette
2053	Fail	1220776	Maryvale Park	1325 Pharmacy Ave	Parkette
2055	Fail	1220309	Goulding Arena & R.C	45 Goulding Ave	Arena
3027	Fail	1220243	Esther Shiner Stadium	5720 Bathurst St	Stadium
2708	Fail	1219557	Fire Station 343	65 Hendrick Av	Fire Station
2116	Fail	1219485	Bendale Acres	2920 Lawrence Ave.E.	Nursing Home
1297	Fail	1218982	Wallace-Emerson C.C	1260 Dufferin St	Community Center/Outdoor Rink
2396	Fail	1218784	Public Order	4610 Finch Ave.E.	Office
3120	Fail	1217928	Humber Sheppard Community Ctr	3100 Weston Rd	Parkette
2240	Fail	1217757	G. Ross Lord Park	4801 Dufferin St	Parkette
14871	No Obstructions	1217688	Barbara Ann Scott	777 Bay St	Outdoor Rink
1136	Fail	1217213	Fire Station 344	240 Howland Ave	Fire Station
3337	Fail	1216987	Casa Loma Stables	330 Walmer Rd	Historic & Heritage
1754	Fail	1215945	Lynngate Park	129 Cass Ave.	Parkette
15658	Fail	1214390	1675 Martin Grove Rd	1675 Martin Grove Rd	Parkette
24914	Fail	1212981	Property Evidence Unit	330 Progress Ave	Warehouse
1485	No Obstructions	1212100	North York Memorial Hall	5120 Yonge	
2298	Fail	1211848	Norseman Pool (indoor)	105 Norseman St	Indoor Pool
1423	Fail	1211695	50A Tuxedo Crt Unit Comser	50A Tuxedo Crt	Parkette
3349	Fail	1211557	Knob Hill Park	25 Seminole Ave	Parkette
1276	Fail	1211362	1 Copeland St	1 Copeland St	Parkette
3016	No Obstructions	1211045	Runnymede & Western Office	2340 Dundas St W	Office
4290	Fail	1210014	Gracedale Park	186 Gracedale Blvd	Parkette
2727	Fail	1209781	Seven Oaks	9 Neilson Rd.	Nursing Home

Area_m2 (m^2)	RfOb500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType
535	Fail	1209219	Albion Comm Ctr & Pool (indoor)	1485 Albion Rd	Community Center
2082	No Obstructions	1208669	The Guild Inn	201 Guildwood Pky	Heritage
2954	Fail	1207862	Fire Station 442	2015 Lawrence Ave W	Fire Station
1155	Fail	1207817	Humberside Parkette	280 Quebec Ave	Parkette
2726	Fail	1206781	Lakeshore Lodge	3197 Lakeshore Blvd	Nursing Home
1058	Fail	1206162	Stan Wadlow Clubhouse	373 Cedarvale Ave	Community Center
1026	Fail	1206105	280 Birmingham St	280 Birmingham St	Parkette
4205	Fail	1204376	Ourland Community Ctr	18 Ourland Ave	Community Center
2474	Fail	1204160	2 Orianna Dr	2 Orianna Dr	Parkette
1788	Fail	1204077	Fire Station 224	1313 Woodbine Ave	Fire Station
2342	Fail	1203984	3741 Bloor St W	3741 Bloor St W	House
1084	Fail	1203926	Tam O'shanter Golf Course	2461 Birchmount Rd	Golf Course
9705	Fail	1203848	F.J. Horgan Filtration Plant	201 Copperfield Rd	Filtration Plant
2029	Fail	1203408	Pleasantview Arena & R.C	545 Van Horne Ave	Arena
2201	Fail	1203235	Stephen Leacock Arena	2500 Birchmount Rd	Arena
1832	Fail	1203169	Fire Station 231	740 Markham Rd	Fire Station
3908	Fail	1203021	Atlantic Ave Storage Bldg	98 Atlantic Ave	Warehouse
1701	Fail	1202945	Humber Valley Gc Serv.bldg	10 Armel Crt	Service Yard
1193	Fail	1202778	Greenfield Family Centre	305-311 Greenfield Ave	Hostel
5221	Fail	1202049	Family Residence	4222 Kingston Rd	Hostel
2566	Fail	1201948	Fire Station 433	615 Royal York Rd	Fire Station
1274	No Obstructions	1201308	S.H Armstrong R.C	56 Woodfield Rd	Community Center
3374	No Obstructions	1200878	Island Filtration Plant	446 Lakeshore Ave	Filtration Plant
5965	Fail	1200462	Fire Station 335	235 Cibola Ave	Fire Station
1467	No Obstructions	1200339	Etobicoke South Office	779 The Queensway	Office

SOLAR PV (GROUND)

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for ground-mounted solar PV. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Usable Area greater than 10,000m^2
- Solar insolation greater than 1200kWh/m^2

Level 2:

- No structures 20m high within 500m (solar shading indicator)

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data.

- More accurate solar shading (based on both position and height of surrounding buildings)
- Zoning (esp. height restrictions) of sites to east, south and west

Table 5: GIS analysis results – Solar PV (Ground) (sorted by Insolation)

UsableGrnd (m^2)	GdOb500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType
95511	Fail	1288110	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant
18586	Fail	1286822	72A Westhead Rd	72A Westhead Rd	Parkette
15671	Fail	1257313	Wigmore Park	106 Wigmore Dr	Parkette
11220	Fail	1255567	Eastern District Office	1 Eastville Ave.	Office
30747	Fail	1238241	Maple Leaf A.I.R	320 Culford Rd	Outdoor Rink
20432	Fail	1233549	Hulmar Park Walkway	95 Hullmar Dr	Parkette
25433	Fail	1228517	Neilson Pk Creative Arts	56 Neilson Dr	Heritage
74107	No Obstructions	1222012	Keele Pumping Station	4995 Keele St	Pumping Station
30684	Fail	1221548	Firgrove Park	254 Firgrove Cres	Parkette
23387	Fail	1220442	Sentinel Park Baseball	295 Sentinel Rd	Parkette
15020	Fail	1220171	Goulding Arena & R.C	45 Goulding Ave	Arena
19187	Fail	1219387	Etobicoke Olympium	590 Rathburn Rd	Community Center
11951	No Obstructions	1219369	Royalcrest Rink (outdoor)	50 Cabernet Crcl	Outdoor Rink
15609	Fail	1218927	Corvette Park	40 Corvette Ave	Parkette
10507	Fail	1218539	Rockford Park T.C	70 Rockford Rd	Fieldhouse
11913	Fail	1218057	Fenside Arena	30 Slidell Cres	Arena
28244	Fail	1216485	Iroquois Fieldhouse	295 Chartland Blvd	Fieldhouse
18275	Fail	1215872	16 Palm Dr.	16 Palm Dr.	Parkette
18275	Fail	1215872	Clanton Park Baseball	15 Clanton Park Rd	Fieldhouse
13620	Fail	1215712	Humber Valley Rink	70 Anglesey Blvd	Outdoor Rink
46345	Fail	1215499	Withrow Park	725 Logan Ave	Parkette
46345	Fail	1215499	Withrow Park Ice Rink	725 Logan Ave	Outdoor Rink
18814	Fail	1215286	McNicoll Park	215 Mcnicoll Ave	Parkette
10103	Fail	1215191	Berner Trail C.C	120 Berner Trail	Community Center
47445	Fail	1215143	Centennial R.C (Ice Galaxy)	1967 Ellesmere Rd	Community Center

UsableGrnd (m^2)	GdOb500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType
12778	Fail	1215022	Edge Park	1369 Victoria Park Ave.	Parkette
31633	Fail	1214097	1675 Martin Grove Rd	1675 Martin Grove Rd	Parkette
34950	No Obstructions	1213663	Scott Westney House	180 McLevin Ave	House
16664	Fail	1213583	Edithvale C.C	7 Edithvale	Community Center
12678	Fail	1213564	Dovercourt B&G Club	155 Bartlett Ave	Community Center
12678	Fail	1213564	Salem Parkette	150 Salem Av	Parkette
10911	Fail	1213401	Bridletowne Park	2295 Bridletowne Circle	Parkette
24578	Fail	1213388	31 Lavington Dr	31 Lavington Dr	Parkette
21344	No Obstructions	1213099	Alexmuir Park	205 Alexmuir Blvd.	Parkette
73317	Fail	1212513	Earlscourt Park	1501 St Clair Av W	Parkette
73317	Fail	1212513	Giovanni Caboto Pool/Rink	1369 St Clair Ave W	Outdoor Pool/Rink
73317	Fail	1212513	Joseph J. Piccininni R.C	1369 St Clair Ave W	Community Center
20447	No Obstructions	1212499	Highland Creek Community Park	3500 Ellesmere Rd	Parkette
10411	Fail	1212305	Tournament Park Tennis	30 Tournament Dr	Fieldhouse
10424	Fail	1212253	231 Glenholme Ave	231 Glenholme Ave	Office
26336	Fail	1211871	The Elms Pool (indoor)	45 Golfdown Dr	Indoor Pool
35630	Fail	1211857	1155 Lake Shore Blvd W	1155 Lake Shore Blvd W	Service Chamber
15251	Fail	1211845	Blue Haven Park Lights	7 Blue Haven Cres	Parkette
26015	No Obstructions	1211729	Chapley C.C / Wilmington Park	205 Wilmington Ave.	Community Center
15952	No Obstructions	1211051	Ancaster C.C.	41-47 Ancaster Rd	Community Center
12071	No Obstructions	1210921	Rivercrest Rink	30 Harefield Dr	Outdoor Rink
11223	Fail	1210474	Glenlong C.C & A.I.R	35 Glen Long Ave	Community Center
20226	No Obstructions	1210056	Kipling Acres	2233 Kipling Ave	Nursing Home
24608	Fail	1209592	Maryvale Park	1325 Pharmacy Ave	Parkette
25530	No Obstructions	1209428	115 Wellesworth Dr.	115 Wellesworth Dr.	Parkette

UsableGrnd (m^2)	GdOb500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType
25530	No Obstructions	1209428	Eringate Pool (outdoor)	121 Wellesworth Dr	Outdoor Pool
37632	Fail	1208975	250 Valermo Dr	250 Valermo Dr	Parkette
10688	Fail	1207797	Lakeshore Assembly Hall	1 Colonel Samuel Dr	Heritage
19703	Fail	1207776	Dieppe Park Baseball Clubhouse	455 Cosburn Ave	Fieldhouse
19703	Fail	1207776	Dieppe Park Ice Rink	355 Cosburn Ave	Arena
23455	No Obstructions	1207165	Sunnydale Rink (outdoor)	50 Amoro Dr	Outdoor Rink
10382	Fail	1207160	Trace Manes Clubhouse	110 Rumsey Rd	Community Center
15550	Fail	1206255	Cummer Arena	6000 Leslie St	Arena
72851	Fail	1205801	Cedarvale Park Arena	443 Arlington Ave	Arena
14942	No Obstructions	1205789	100 Smith Cres	100 Smith Cres	Parkette
14942	No Obstructions	1205789	Queensway Rink	8 Avon Park Dr	Outdoor Rink
24879	Fail	1205389	Richmond Gardens Pool (outdoor h	44 Strathdee Dr	Outdoor Pool
36029	Fail	1205185	300 Valermo Dr Unit 1	300 Valermo Dr	Parkette
36029	Fail	1205185	300A Thirtieth St	300A Thirtieth St	Parkette
25580	Fail	1205184	Flagstaff Pool (outdoor htd)	42 Mercury Rd	Outdoor Pool
13618	Fail	1205156	Felstead Park	60 Felstead Av	Parkette
20114	Fail	1204413	1 Torbolton Dr.	1 Torbolton Dr.	Parkette
20114	Fail	1204413	40 Leduc Dr	40 Leduc Dr	Parkette
18856	Fail	1203899	Rosedale Park	26 Scholfield Av Rose Pk	Parkette/Outdoor Rink
10972	No Obstructions	1203476	Westway Rink (outdoor)	175 The Westway	Outdoor Rink
24078	Fail	1203100	McCleary Park Washrm	775 Lakeshore Bv E	Parkette
42568	Fail	1203044	Elmbank Community Centre	10 Rampart Rd	Community Center
86730	No Obstructions	1202477	Island Filtration Plant	446 Lakeshore Ave	Filtration Plant
29532	Fail	1201983	Buttonwood Rink	30 Mulham Pl	Outdoor Rink

UsableGrnd (m^2)	GdOb500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType
11570	Fail	1201945	Cedar Ridge C.C	225 Confederation Dr	Community Center
64996	No Obstructions	1200590	F.J. Horgan Filtration Plant	201 Copperfield Rd	Filtration Plant
22642	Fail	1200249	Ourland Community Ctr	18 Ourland Ave	Community Center
16685	Fail	1200015	West Rouge C.C	270 Rouge Hills Dr	Community Center

SOLAR THERMAL (ROOFTOP)

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for rooftop solar thermal. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Roof top Area greater than 1000m^2
- Solar insolation greater than 1200kWh/m^2
- Natural Gas use greater than 50,000 kWhe (indicator of hot water use)
- Excluding: Animal Holding, curling rink, garage & shop, garage, garden, golf course, greenhouse, heritage, lab, museum, office, outdoor pool/rink, parkette, service yard, transfer station.
- No buildings 10% higher within 100m (shading indicator)

Level 2:

- No buildings 10% higher within 500m (shading indicator)

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- DHW portion of energy use
- DHW load factor & seasonality
- More accurate solar shading (based on both position and height of surrounding buildings)
- Renovations planned
- Zoning (esp. height restrictions) of sites to east, south and west

Table 6: GIS analysis results – Solar Thermal Hot Water (Rooftop) (sorted by Insolation)

Area_m2 (m^2)	RfObs500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType	NatGas (kWhe)
271	Fail	1265087	R.L. Clark Filtration Plant	1-45 Twenty Third St.	Filtration Plant	765450
150	Fail	1260676	Castleview Wychwood Towers	351 Christie St	Nursing Home	4065533
600	Fail	1220941	Women's Residence	674 Dundas St. w	Hostel	1131899
2055	Fail	1220309	Goulding Arena & R.C	45 Goulding Ave	Arena	907004
543	Fail	1220146	Fire Station 114	12 Canterbury Place	Fire Station	391152
2708	Fail	1219557	Fire Station 343	65 Hendrick Av	Fire Station	286552
2116	Fail	1219485	Bendale Acres	2920 Lawrence Ave.E.	Nursing Home	6388579
545	Fail	1218998	Fire Station 141	3965 Keele St.,	Fire Station	132611
1297	Fail	1218982	Wallace-Emerson C.C	1260 Dufferin St	Community Center/Outdoor Rink	1413881
2396	Fail	1218784	Public Order	4610 Finch Ave.E.	Office	320643
358	Fail	1217641	Burrows Hall Community Complex	1081 Progress Ave	Community Center	1694674
245	Fail	1217405	Ellesmere C.C	20 Canadian Rd	Community Center	360225
1136	Fail	1217213	Fire Station 344	240 Howland Ave	Fire Station	269543
168	Fail	1216718	Commander Park C.C	140 Commander Blvd	Community Center	668388
320	Fail	1215529	Fenside Arena	30 Slidell Cres	Arena	515222
655	Fail	1214675	Wesburn Manor	400 The West Mall	Nursing Home	4656815
710	Fail	1214264	Berner Trail C.C	120 Berner Trail	Community Center	325017
613	Fail	1213934	Mitchell Field Arena	89 Church Ave	Arena	929214
607	Fail	1213522	East York Civic Centre	850 Coxwell Ave	Office	777847
261	No Obstructions	1212157	Metro Track And Field	4700 Keele St.	Other	1483666
2298	Fail	1211848	Norseman Pool (indoor)	105 Norseman St	Indoor Pool	1093776

Area_m2 (m^2)	RfObs500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType	NatGas (kWhe)
119	Fail	1210848	Station #13	555 Martin Grove Rd	Ambulance Station	177114
915	No Obstructions	1210773	Ambulance Headquarters	4330 Dufferin St	Office	2692919
2727	Fail	1209781	Seven Oaks	9 Neilson Rd.	Nursing Home	5014228
516	Fail	1209364	Matty Eckler R.C	953 Gerrard St E	Community Center	1990533
1535	Fail	1209219	Albion Comm Ctr & Pool (indoor)	1485 Albion Rd	Community Center	1504573
806	Fail	1209181	#33 Police Division	50 Upjohn Rd	Police Station	371402
217	Fail	1208061	Station #11	1135 Caledonia Rd	Ambulance Station	140241
2954	Fail	1207862	Fire Station 442	2015 Lawrence Ave W	Fire Station	264570
451	Fail	1207026	717 Broadview Ave.	717 Broadview Ave.	Hostel	135878
648	Fail	1206876	Pine Point Arena	15 Grierson Rd	Arena	319868
2726	Fail	1206781	Lakeshore Lodge	3197 Lakeshore Blvd	Nursing Home	2019402
247	Fail	1206780	Dyas Rd 18	18 Dyas Rd	Office	641504

SOLAR THERMAL (GROUND)

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for ground-mounted solar thermal. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Usable Area greater than 1000m^2
- Solar insolation greater than 1200kWh/m^2
- Natural Gas use greater than 500,000 kWhe/year
- Excluding: Animal Holding, curling rink, garage & shop, garage, garden, golf course, greenhouse, lab, museum, outdoor pool/rink, parkette, service yard, transfer station.
- No buildings 10% higher within 100m (shading indicator)

Level 2:

- No buildings 10% higher within 500m (shading indicator)

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- DHW portion of energy use
- DHW load factor & seasonality
- More accurate solar shading (based on both position and height of surrounding buildings)
- Renovations planned
- Zoning (esp. height restrictions) of sites to east, south and west

Table 7: GIS analysis results – Solar Thermal Hot Water (Ground) (sorted by Insolation)

UsableGrnd (m^2)	GdObs500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType	NatGas (kWhe)
95511	Fail	1288110	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant	60641815
11220	Fail	1255567	Eastern District Office	1 Eastville Ave.	Office	1872688
2212	Fail	1225349	C.O Bick College	4620 Finch Ave.E.	Office	2489748
15020	Fail	1220171	Goulding Arena & R.C	45 Goulding Ave	Arena	907004
19187	Fail	1219387	Etobicoke Olympium	590 Rathburn Rd	Community Center	5402112
1090	No Obstructions	1218814	Ambulance Headquarters	4330 Dufferin St	Office	2692919
11913	Fail	1218057	Fenside Arena	30 Slidell Cres	Arena	515222
4654	Fail	1216879	Mitchell Field Arena	89 Church Ave	Arena	929214
5142	Fail	1215510	McCormick R.C	66 Sheridan Ave	Community Center	2895583
47445	Fail	1215143	Centennial R.C (Ice Galaxy)	1967 Ellesmere Rd	Community Center	2604708
12678	Fail	1213564	Dovercourt B&G Club	155 Bartlett Ave	Community Center	754903
3579	Fail	1212810	Victoria Village Arena	190 Bermondsey Ave.	Arena	898960
73317	Fail	1212513	Joseph J. Piccininni R.C	1369 St Clair Ave W	Community Center	1699338
26336	Fail	1211871	The Elms Pool (indoor)	45 Golfdown Dr	Indoor Pool	1025242
1238	No Obstructions	1211245	Commander Park C.C	140 Commander Blvd	Community Center	668388
4425	Fail	1210124	Matty Eckler R.C	953 Gerrard St E	Community Center	1990533
4657	No Obstructions	1210076	Franklin Horner	432 Horner Ave	Community Center	989228
20226	No Obstructions	1210056	Kipling Acres	2233 Kipling Ave	Nursing Home	4385794
8284	No Obstructions	1209931	Norseman Pool (indoor)	105 Norseman St	Indoor Pool	1093776
3308	No Obstructions	1208606	Alderwood Pool (indoor)	520 Horner Ave	Indoor Pool	1727545
3324	Fail	1207328	60 Tiffield Rd	60 Tiffield Rd	Office	786450
1507	Fail	1206591	St Albans Boys Club	843 Palmerston Ave	Community Center	964650
15550	Fail	1206255	Cummer Arena	6000 Leslie St	Arena	1550390
4842	Fail	1205150	Pleasantview Arena & R.C	545 Van Horne Ave	Arena	1183061
3313	Fail	1204925	Central Arena	46-48 Montgomery Rd	Arena	1847210

UsableGrnd (m^2)	GdObs500Tst	Insolation (Wh/m^2)	PlaceName	Address	BldgType	NatGas (kWhe)
9479	No Obstructions	1204367	Thistletown C.C	925 Albion Rd	Community Center	765873
3011	No Obstructions	1204360	Cummer Lodge	205 Cummer Ave	Nursing Home	6837077

SOLAR AIR HEATING

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for solar air heating. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Roof Area greater than 1000m^2
- Natural gas use greater than 500,000 kWhe/yr
- Solar insolation greater than 1000kWh/m^2
- No buildings 10% higher within 100m (shading indicator)

Level 2:

- None

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- Space heating portion of energy use
- Space heating load factor & seasonality
- More accurate solar shading (based on both position and height of surrounding buildings)
- Renovations planned
- Zoning (esp. height restrictions) of sites to east, south and west

Table 8: GIS analysis results – Solar Air Heating (sorted by Insolation)

Area_m2 (m^2)	Insolation (Wh/m^2)	PlaceName	Address	BldgType	NatGas (kWhe)
2055	1220309	Goulding Arena & R.C	45 Goulding Ave	Arena	907004
2116	1219485	Bendale Acres	2920 Lawrence Ave.E.	Nursing Home	6388579
1297	1218982	Wallace-Emerson C.C	1260 Dufferin St	Community Center/Outdoor Rink	1413881
3120	1217928	Humber Sheppard Community Ctr	3100 Weston Rd	Parkette	1447373
2298	1211848	Norseman Pool (indoor)	105 Norseman St	Indoor Pool	1093776
2727	1209781	Seven Oaks	9 Neilson Rd.	Nursing Home	5014228
1535	1209219	Albion Comm Ctr & Pool (indoor)	1485 Albion Rd	Community Center	1504573
2726	1206781	Lakeshore Lodge	3197 Lakeshore Blvd	Nursing Home	2019402
2029	1203408	Pleasantview Arena & R.C	545 Van Horne Ave	Arena	1183061
5221	1202049	Family Residence	4222 Kingston Rd	Hostel	705436
1111	1197152	Main Treatment Plant	1091 Eastern Ave	Treatment Plant	38443241
2820	1196768	Central Water Services	545 Commissioners St.	Office	523163
1168	1192553	#43 Police Division	4331 Lawrence Ave E	Police Station	875653
1810	1190250	Eastern & Booth Blocks	433 Eastern Ave	Service Yard	6448665
3276	1185975	Humber Treatment Plant	130 The Queensway	Treatment Plant	18407961
1503	1182788	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant	60641815
6799	1172998	Ingram Drive Transfer Station	50 Ingram Dr	Transfer Station	590766
1852	1169740	CNE Animal Centre	2 Manitoba Dr	Animal Holding	706077
2183	1132073	Lakeshore Lodge	3197 Lakeshore Blvd	Nursing Home	2019402

WIND (GROUND)

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for ground-mounted wind. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Usable Area greater than 5000m^2
- 50m wind speed greater than 4.5 m/s
- No obstructions greater than 20m within 100m radius.

Level 2:

- No obstructions greater than 20m within 500m radius.

Additional Comments

The level 2 criteria resulted in the exclusion of a significant number of sites. In reality, other factors are likely to be more critical therefore it is recommended that this be used as an informational guideline only. It may be more appropriate to assess similar obstructions within a smaller radius to expand the results.

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- Proximity to residences

Table 9: GIS analysis results – Wind (Ground) (sorted by wind speed)

UsableGrnd (m^2)	GdOb500Tst	Wind_Speed (m/s)	PlaceName	Address	BldgType
19166	No Obstructions	5.36	Algonquin Island	16 Wyandot Av	Pumping Station
86730	No Obstructions	5.34	Island Filtration Plant	446 Lakeshore Ave	Filtration Plant
57151	No Obstructions	5.26	Fire Station 335	235 Cibola Ave	Fire Station
57151	No Obstructions	5.26	60 Lake Shore Ave.	60 Lake Shore Ave.	Parkette
57151	No Obstructions	5.26	Toronto Island Service Yard	1 Centre Isld Pk	Service Yard
566592	No Obstructions	5.15	Beare Road Landfill	Beare Road	Landfill Site
35630	Fail	4.98	1155 Lake Shore Blvd W	1155 Lake Shore Blvd W	Service Chamber
64996	No Obstructions	4.83	F.J. Horgan Filtration Plant	201 Copperfield Rd	Filtration Plant
82663	Fail	4.80	East Point Park	101 Copperfield Rd	Parkette
25996	Fail	4.75	Budapest Park	1575 Lake Shore Blvd W	Parkette
14818	Fail	4.73	Sunnyside Park	1755 Lake Shore Blvd W	Parkette
6383	Fail	4.64	Sir Casimir Gzowski Park	2001 Lake Shore Blvd. W.	Parkette
60101	No Obstructions	4.63	Morningside Yard	891 Morningside Ave	Garage & Shop
50186	Fail	4.61	1 Ellis Ave Near S Trks	1 Ellis Ave	Service Chamber
95511	Fail	4.60	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant
17734	Fail	4.58	Beechgrove Dr #100	100 Beechgrove Dr	House
7021	No Obstructions	4.53	93 Beechgrove Dr	93 Beechgrove Dr	House
68347	Fail	4.52	R.L. Clark Filtration Plant	1-45 Twenty Third St.	Filtration Plant
68347	Fail	4.52	35 Twenty Third St	35 Twenty Third St	Service Chamber
11220	Fail	4.52	Eastern District Office	1 Eastville Ave.	Office

WIND (ROOFTOP)

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for rooftop wind. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Roof top Area greater than 500m^2
- 50m wind speed greater than 4.25 m/s
- No obstructions greater than 20m within 100m radius.

Level 2:

- No buildings greater than 10% higher within 500m radius

Additional Comments

The level 2 criteria resulted in the exclusion of a significant number of sites. In reality, other factors are likely to be more critical therefore it is recommended that this be used as an informational guideline only. It may be more appropriate to assess similar obstructions within a smaller radius to expand the results.

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- Proximity to residences

Table 10: GIS analysis results – Wind (Rooftop) (sorted by wind speed at 50m)

Area_m2 (m^2)	Bldg_Hght (m)	RfObs500Tst	WndSpd_50 (m/s)	WndSpd_100 (m/s)	PlaceName	Address	BldgType
3374	8.2	No Obstructions	5.37	6.41	Island Filtration Plant	446 Lakeshore Ave	Filtration Plant
5965	8.2	Fail	5.21	6.15	Fire Station 335	235 Cibola Ave	Fire Station
9705	3.4	Fail	4.83	6.01	F.J. Horgan Filtration Plant	201 Copperfield Rd	Filtration Plant
1503	8.2	Fail	4.81	5.99	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant
567	5.8	Fail	4.64	5.92	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant
2082	18.1	No Obstructions	4.60	5.85	The Guild Inn	201 Guildwood Pky	Heritage
837	6.4	No Obstructions	4.51	5.66	Beare Road Landfill	Beare Road	Landfill Site
563	4.0	Fail	4.49	5.63	Maintenance Yard #6	7 Leslie St.	Garage & Shop
542	3.6	Fail	4.49	5.74	Woodbine Beach Park	1675 Lake Shore Blvd E	Parkette
2820	9.2	Fail	4.47	5.61	Central Water Services	545 Commissioners St.	Office
2715	7.7	Fail	4.43	5.74	Seven Oaks	9 Neilson Rd.	Nursing Home
2727	11.5	Fail	4.43	5.74	Seven Oaks	9 Neilson Rd.	Nursing Home
866	9.2	Fail	4.38	5.36	Centennial Pk Svc Bldg	149 Elmcrest Rd	Service Yard
1423	41.9	Fail	4.35	5.63	50A Tuxedo Crt Unit Comser	50A Tuxedo Crt	Parkette
710	17.1	Fail	4.35	5.63	Berner Trail C.C	120 Berner Trail	Community Center
900	17.1	Fail	4.34	5.52	Don Valley Brickwork	550 Bayview Ave	Heritage
5221	8.6	Fail	4.34	5.64	Family Residence	4222 Kingston Rd	Hostel
6596	11.2	Fail	4.33	5.60	Scarborough Transfer Station	1850 Markham Rd	Transfer Station
552	15.7	Fail	4.32	5.43	L'Amoreaux C.C	2000 McNicoll Ave	Community Center
1832	8.6	Fail	4.31	5.61	Fire Station 231	740 Markham Rd	Fire Station

Area_m2 (m^2)	Bldg_Hght (m)	RfObs500Tst	WndSpd_50 (m/s)	WndSpd_100 (m/s)	PlaceName	Address	BldgType
4895	9.7	Fail	4.31	5.39	Centennial Pk Svc Bldg	149 Elmcrest Rd	Service Yard
729	10.8	Fail	4.30	5.34	Lakeshore Assembly Hall	1 Colonel Samuel Dr	Heritage
565	17.6	Fail	4.30	5.42	L'Amoreaux C.C	2000 McNicoll Ave	Community Center
545	10.3	Fail	4.30	5.40	R.L. Clark Filtration Plant	1-45 Twenty Third St.	Filtration Plant
3276	15.4	Fail	4.29	5.41	Humber Treatment Plant	130 The Queensway	Treatment Plant
1111	12.7	Fail	4.28	5.53	Main Treatment Plant	1091 Eastern Ave	Treatment Plant
1579	12.6	No Obstructions	4.28	5.53	Scarborough North Office	5639 Finch Ave. E.	Office
24914	8.3	Fail	4.27	5.56	Property Evidence Unit	330 Progress Ave	Warehouse
2116	8.7	Fail	4.26	5.58	Bendale Acres	2920 Lawrence Ave.E.	Nursing Home
1168	9.7	Fail	4.26	5.59	#43 Police Division	4331 Lawrence Ave E	Police Station
678	6.4	Fail	4.25	5.53	401 Sewells Rd.	401 Sewells Rd.	

GEO-EXCHANGE

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for geo-exchange. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Usable Area greater than 10,000 m^2
- Natural Gas use Greater than 500,000 kWhe/year
- Electricity use greater than 100,000 kWh/year

Level 2:

- Depth to bedrock: Less overburden (less depth to bedrock) requires less drilling expense to install ground loop

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- Space heating/cooling load factor & seasonality
- Renovations planned
- Groundwater maps and bedrock dept and profile maps
- Renovations planned

Table 11: GIS analysis results – Geo-exchange (sorted by depth to bedrock)

UsableGrnd (m^2)	Bdrck_Depth (m)	PlaceName	Address	BldgType	NatGas (kWhe)	Electric (kWh)
402171	0.0	Centennial Greenhouse	149-151 Elmcrest Rd	Parkette	2165930	251389
27440	0.0	Gus Ryder Pool (indoor)	302 Birmingham St	Indoor Pool	1624383	834225
402171	0.0	Etob Centennial Arena	56 Centennial Pk Rd	Arena	1045043	1777911
33992	0.0	Police Academy	70 Birmingham		3916089	2644256
68347	0.2	R.L. Clark Filtration Plant	1-45 Twenty Third St.	Filtration Plant	765450	53693172
19187	2.7	Etobicoke Olympium	590 Rathburn Rd	Community Center	5402112	2816555
77477	4.2	Trinity Comm Rec Ctr	155 Crawford St	Community Center	2165506	603794
140836	4.3	Humber Treatment Plant	130 The Queensway	Treatment Plant	18407961	52890871
15175	7.0	Lakeshore Lodge	3197 Lakeshore Blvd	Nursing Home	2019402	1556469
10615	9.7	Dee Avenue Lab	30 Dee Ave.	Lab	763485	1191431
14678	10.1	John Innes C.C	150 Sherbourne St	Community Center	1080437	438941
14818	11.8	Sunnyside Park	1755 Lake Shore Blvd W	Parkette	1210287	297064
73323	13.4	Main Treatment Plant	1091 Eastern Ave	Treatment Plant	38443241	113700747
16344	13.5	Jimmie Simpson R.C	870 Queen St E	Community Center/Outdoor Rink	2009486	962964
18644	15.9	Allan Gardens	160 Gerrard St E	Greenhouse	1807267	241533
11716	16.5	Heron Park C.C	4285 Lawrence Ave E	Community Center	1148960	1035796
26336	17.2	The Elms Pool (indoor)	45 Golfdown Dr	Indoor Pool	1025242	355244
20226	18.4	Kipling Acres	2233 Kipling Ave	Nursing Home	4385794	2151138
106681	18.8	Riverdale Park East	640 Broadview Ave	Parkette/Outdoor Rink	633025	448505
21633	22.5	Sunnybrook Park	1050 Leslie St.	Parkette	1236406	675258
10153	24.7	Etobicoke Civic Centre	399 The West Mall	Office	3008599	2750246
14975	28.6	McGregor Park C.C	2231 Lawrence Ave E	Community Center	1128994	1046644

UsableGrnd (m^2)	Bdrck_Depth (m)	PlaceName	Address	BldgType	NatGas (kWhe)	Electric (kWh)
31175	29.8	York Civic Center	2700 Eglinton Ave W	Office	1746778	1494762
95511	30.3	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant	60641815	29608598
60914	30.6	East York Arena	888 Cosburn Ave	Arena	775117	813978
47445	31.1	Centennial R.C (Ice Galaxy)	1967 Ellesmere Rd	Community Center	2604708	2736482
75359	31.4	Amesbury Community Center	1507 Lawrence Ave W	Community Center	704599	260909
75359	31.4	Amesbury Arena	155 Culford Rd	Arena	957443	667130
34675	35.0	Roding Arena & R.C	600 Roding St.	Arena	667406	537830
39678	36.2	Birchmount C.C	93 Birchmount Rd	Community Center	2043081	1488113
36805	36.7	Ingram Drive Transfer Station	50 Ingram Dr	Transfer Station	590766	1400405
18921	39.0	Fairbanks Community Centre	2213 Dufferin St	Community Center	510786	268067
21228	39.6	Civic Garden Centre	755 Lawrence Ave. E.	Garden	705167	490572
26764	41.4	Emery Parks Yard	27 Toryork Dr.	Parkette	647946	181315
26764	41.4	Emery Works Yard	61 Toryork Dr	Garage & Shop	583362	243536
13010	42.0	Toryork Office	40 Toryork	Garage & Shop	1164739	663396
12227	42.4	Wallace-Emerson C.C	1260 Dufferin St	Community Center/Outdoor Rink	1413881	907414
11220	42.5	Eastern District Office	1 Eastville Ave.	Office	1872688	101842
153643	46.5	L'Amoreaux Tennis Club	200 Silver Springs Blvd	Community Center	1181200	994535
17486	47.8	Grandravine Arena & R.C	25 Grandravine Dr	Arena	813861	394634
16213	48.6	West Scarborough N.C	313 Pharmacy Ave	Community Center	1461693	309928
397694	55.0	High Park Greenhouses	1 Greenhouse Dr	Greenhouse	5154811	571445
397694	55.0	Train Storage Building		Garage & Shop	707297	204111
15819	55.9	Agincourt Arena and R.C	31 Glen Watford Dr	Arena	2588319	2069809

UsableGrnd (m^2)	Bdrck_Depth (m)	PlaceName	Address	BldgType	NatGas (kWhe)	Electric (kWh)
15850	56.9	Driftwood C.C	4401 Jane St.	Community Center	591955	342609
10530	57.1	East York Civic Centre	850 Coxwell Ave	Office	777847	1592555
17325	58.8	Burrows Hall Community Complex	1081 Progress Ave	Community Center	1694674	805210
11943	59.4	Scarborough Transfer Station	1850 Markham Rd	Transfer Station	848552	2862530
61782	59.8	Baycrest Arena	160 Neptune Dr	Arena	730449	425204
15020	61.8	Goulding Arena & R.C	45 Goulding Ave	Arena	907004	725129
86719	62.2	Dufferin Transfer Station	35 Vanley	Transfer Station	1028582	4362101
20061	62.6	Malvern R.C	30 Sewells Rd	Community Center	1629605	2262816
49314	67.0	North Toronto Mem Rec Ctr	200 Eglinton Ave W	Community Center	2789866	1724256
340181	69.4	Northern Services Building	4801 Dufferin St.	Garage & Shop	633511	225798
15550	72.1	Cummer Arena	6000 Leslie St	Arena	1550390	1316416
11913	72.3	Fenside Arena	30 Slidell Cres	Arena	515222	359007
73317	78.4	Joseph J. Piccininni R.C	1369 St Clair Ave W	Community Center	1699338	1033942

BIOMASS

Criteria Applied

The following criteria were evaluated in order to filter the parcel data for opportunities for biomass. The results are summarized in the following table. Shaded cells represent colour-gradient mapped criteria indicating better opportunities in **green**, poorer opportunities in **red**.

Level 1:

- Usable Area greater than 5,000 m^2
- Natural Gas use Greater than 1,000,000 kWhe/year

Level 2:

- None

Additional Comments

The following criteria were not assessed, however could be included in further refinements to the initial assessment through inclusion of additional data:

- Heating and DHW portion of energy use
- Heating and DHW load factor & seasonality
- Renovations planned
- Proximity to residences

Table 12: GIS analysis results – Biomass (sorted by facility natural gas use)

UsableGrnd (m^2)	PlaceName	Address	BldgType	NatGas (kWhe)	Electric (kWh)
95511	Highland Creek Treatment Plant	51 Beechgrove Dr	Treatment Plant	60641815	29608598
73323	Main Treatment Plant	1091 Eastern Ave	Treatment Plant	38443241	113700747
140836	Humber Treatment Plant	130 The Queensway	Treatment Plant	18407961	52890871
19187	Etobicoke Olympium	590 Rathburn Rd	Community Center	5402112	2816555
397694	High Park Greenhouses	1 Greenhouse Dr	Greenhouse	5154811	571445
20226	Kipling Acres	2233 Kipling Ave	Nursing Home	4385794	2151138
33992	Police Academy	70 Birmingham		3916089	2644256
10153	Etobicoke Civic Centre	399 The West Mall	Office	3008599	2750246
5142	McCormick R.C	66 Sheridan Ave	Community Center	2895583	1979301
49314	North Toronto Mem Rec Ctr	200 Eglinton Ave W	Community Center	2789866	1724256
7748	Ellesmere Yard	1050 Ellesmere Rd	Garage & Shop	2717311	1433091
47445	Centennial R.C (Ice Galaxy)	1967 Ellesmere Rd	Community Center	2604708	2736482
15819	Agincourt Arena and R.C	31 Glen Watford Dr	Arena	2588319	2069809
402171	Centennial Greenhouse	149-151 Elmcrest Rd	Parkette	2165930	251389
77477	Trinity Comm Rec Ctr	155 Crawford St	Community Center	2165506	603794
39678	Birchmount C.C	93 Birchmount Rd	Community Center	2043081	1488113
15175	Lakeshore Lodge	3197 Lakeshore Blvd	Nursing Home	2019402	1556469
16344	Jimmie Simpson R.C	870 Queen St E	Community Center/Outdoor Rink	2009486	962964
11220	Eastern District Office	1 Eastville Ave.	Office	1872688	101842
18644	Allan Gardens	160 Gerrard St E	Greenhouse	1807267	241533
31175	York Civic Center	2700 Eglinton Ave W	Office	1746778	1494762
73317	Joseph J. Piccininni R.C	1369 St Clair Ave W	Community Center	1699338	1033942
17325	Burrows Hall Community Complex	1081 Progress Ave	Community Center	1694674	805210

UsableGrnd (m^2)	PlaceName	Address	BldgType	NatGas (kWhe)	Electric (kWh)
20061	Malvern R.C	30 Sewells Rd	Community Center	1629605	2262816
27440	Gus Ryder Pool (indoor)	302 Birmingham St	Indoor Pool	1624383	834225
15550	Cummer Arena	6000 Leslie St	Arena	1550390	1316416
36924	Metro Track And Field	4700 Keele St.	Other	1483666	0
16213	West Scarborough N.C	313 Pharmacy Ave	Community Center	1461693	309928
9927	Humber Sheppard Community Ctr	3100 Weston Rd	Parkette	1447373	312521
12227	Wallace-Emerson C.C	1260 Dufferin St	Community Center/Outdoor Rink	1413881	907414
21633	Sunnybrook Park	1050 Leslie St.	Parkette	1236406	675258
14818	Sunnyside Park	1755 Lake Shore Blvd W	Parkette	1210287	297064
153643	L'Amoreaux Tennis Club	200 Silver Springs Blvd	Community Center	1181200	994535
13010	Toryork Office	40 Toryork	Garage & Shop	1164739	663396
11716	Heron Park C.C	4285 Lawrence Ave E	Community Center	1148960	1035796
14975	McGregor Park C.C	2231 Lawrence Ave E	Community Center	1128994	1046644
8284	Norseman Pool (indoor)	105 Norseman St	Indoor Pool	1093776	354775
14678	John Innes C.C	150 Sherbourne St	Community Center	1080437	438941
5339	Victoria Park Transfer Station	3350 Victoria Pk Ave.	Transfer Station	1069383	1169371
402171	Etob Centennial Arena	56 Centennial Pk Rd	Arena	1045043	1777911
86719	Dufferin Transfer Station	35 Vanley	Transfer Station	1028582	4362101
9326	Gord & Irene Risk Arena & R.C	2650 Finch Ave. W	Arena	1026410	668126
26336	The Elms Pool (indoor)	45 Golfdown Dr	Indoor Pool	1025242	355244
6184	Oriole Arena & R.C	2975 Don Mills Rd.	Arena	1014302	1262437