# Appendix C

## Field Assessment Form

## Neighbourhood Characteristics

Based on the inventory already conducted at the desktop level, you likely already have an indication of neighbourhood characteristics within your potential implementation areas.

**Figure 1: This neighbourhood is entirely developed with single-detached dwellings. Neighbourhood characteristics in this residential area include sidewalks that bisect the driveways and large boulevards. (Source: Aquafor Beech).**

During the field assessment, confirm that all information collected via desktop analysis is correct. Make notes on:

- % of properties that are single-detached dwellings, semi-detached, townhouses, and multi-unit residential
- % of properties with predominately turf lawns
- % of homes with gardens
- % neighbourhood that is covered by natural areas

## General Lot Characteristics

It is not economically feasible to spend time analysing every lot within your potential retrofit areas. An approach that will save you time and money is to conduct a benchmarking survey on a small percentage of representative properties.

*Online mapping tools such as Google Street View can be a great resource when assessing general lot characteristics.*

For example, within a potential retrofit area, you may choose to drive along each street within the neighbourhood photographing every third or fourth home. In some areas there will be very little variation in lot characteristics, while other areas may be comprised of a variety of lot characteristics. Be sure to make note of transitions from one general lot characteristic to another if they occur along the street. The exercise of filling out a sheet similar to the Residential Field Assessment Form should be done as you are conducting field reconnaissance. A detailed photo record allows you to develop a more detailed report from the comfort of your office. When you assess general lot characteristics look for the following characteristics.

**% of property coverage by house**: Roof drainage is an easy target for residential retrofits because it is already concentrated to outlets via eaves troughs and downspouts.

**Driveway sizes**: Driveways contribute to stormwater pollutant loading but are often difficult to direct to pervious surfaces.

**Driveways types (% of asphalt, gravel, block pavers, etc.)**: Driveways that are in need of repair can be replaced with pervious pavement. Existing decorative block pavers may indicate a desire by the homeowner to beatify their landscape.

**% of property covered by turf**: Turfed areas can be retrofit with many LID options including fusion landscaping.

**% of property covered by alternative landscaping**: Alternatives to traditional grass lawns include non-grass ground cover and xeriscaping. Touching base with these homeowners to identify motivations and local resources is likely to be beneficial for your project team.

**% of property covered by trees**: Mature trees provide shading, evapotranspiration, and interception of rain. Healthy, mature trees should not be removed during the retrofit process and should instead be incorporated into the design if possible.

**Location and general condition of gardens**: Gardens can be easily enhanced to provide stormwater benefits. Gardens located down-gradient of downspouts are ideal.

**Distribution and coverage of natural vegetation**: Most urban homes will not have natural vegetation. Those areas that do indicate a low-maintenance approach to home landscaping may be preferred among residents.

**Location of septic systems**: On partially serviced or non-serviced lots, septic tank and bed locations should be noted if observed. These systems constrain the property area that can be retrofit with LID practices.

**Location and style of fencing**: Fencing can constrain grading and excavation necessary for some LID retrofits. Fencing style can be integrated with the aesthetic of the retrofit.

**Prevalence of irrigation systems**: Irrigation systems can indicate landscaping water demands that exceed natural supply from precipitation. These systems may also present constraints to construction activities during a retrofit.

**Figure 2: This property includes a substantial area covered by landscape alternatives. The gardens are well maintained. Areas with similar lot characteristics are often early adopters of LID practices due to easy integration with the existing property aesthetic. (Source: CVC).**

**Figure 3: This property has a large relatively flat driveway. The green areas on this property are relatively low maintenance. (Source: CVC).**

**Figure 4: This property has a steep grade sloping to the road and little front yard area. These are constraints that can be overcome with innovative designs. Attaining significant implementation from a neighbourhood with non-conventional lot characteristics such as this may be difficult. (Source: CVC).**

## Drainage Characteristics

Modern subdivisions are generally designed with one of two common lot drainage patterns. Lot drainage patterns include front drainage and spilt drainage. Residential LID retrofits can be established on both types of properties.

Front drainage allows for the majority of the developed potion of the property to be conveyed to front yard LID practices. Split drainage allows for only the front portion of the home to be conveyed to front yard LID practices. LID practices can also be established in rear yards, though these areas typically produce less runoff per unit area and do not contribute to significant pollutant loading. Older neighbourhoods may have larger lots with more complex drainage patterns.

Along with lot drainage your field assessment should help identify the drainage characteristics on the municipal right-of-way. Open channel drainage systems such as swales and roadside ditches offer advantages ranging from filtration to infiltration when compared to curb-and-gutter systems.

**Figure 5: The drainage pattern on this lot is split. Notice that a significant slope is present on the left side of the home. It would be difficult to direct rear and side yard drainage to the front of the property. (Source: CVC).**

## Roof Downspouts

Roof drainage is an excellent source of relatively clean water that can be directed to residential LID practices. During your field assessment of potential retrofit areas it is important to establish how roof drainage is managed by residents.

In some communities, downspouts may be connected directly to municipal storm sewers. This configuration represents an excellent opportunity to reduce runoff volumes and peak flow rates contributing to municipal storm sewers by disconnecting the downspout and directing roof drainage to a rain garden,, soakaway or even to a pervious surface. Rain barrels and cisterns are also options for disconnection initiatives, although they do not provide the same aesthetic appeal and provide little benefit if collected water is not used. Downspouts connected directly to the sewer can be difficult to spot as the area around the foundation of the house is often obstructed by garden features.

On some residential properties, downspouts discharge to impervious surfaces. On these properties you are likely to see a pipe a running from the eves to the driveway or impervious pathway. This configuration is not ideal as the water flows down the driveway often into the gutter picking up pollutants without an opportunity to for filtration or infiltration to occur.

**Figure 6: Roof drainage from this property is directed to a lawn area. The long overland flow path across this relatively flat grassed surface allows for infiltration to occur. (Source: CVC)**

On many residential properties, roof runoff is directed onto pervious surfaces such as lawns or gardens. This configuration allows for infiltration to occur reducing the overall runoff volume from the residential property when compared to properties that discharge roof drainage onto impervious surfaces. This roof drainage configuration is easy to retrofit with a rain garden established in the lawn area. A rain garden provides additional detention in shallow depressions and enhances the infiltration capacity with specially engineered bioretention soil media.

Some residents in your field assessment area may already be harvesting roof drainage in rain barrels either as part of a municipal rain barrel program or through independent implementation.

## Best Management Practice Info

Along with general lot characteristics, drainage characteristics, and roof downspout configurations, you should be assessing additional lot conditions that are included in the field assessment form under the heading Best Management Practice Info. These characteristics relate specifically opportunities and constraints that may exist within target neighbourhoods.

**% of lots with positive drainage**: On a residential property drainage should be sloped away from the home, typically towards property boundaries. In some instances, especially in older neighbourhoods areas of residential property do not drain to property boundaries and tend to accumulate runoff. These areas are ideal targets for retrofits.

**% of homes with pervious area down-gradient of roof leader**: Pervious areas down-gradient of roof leaders can be easily retrofit with infiltration practices such as rain gardens.

**% of homes with poor location of roof leader**: Roof leaders that disappear below the ground surface at low points of the property or have little pervious area down-gradient do not provide ideal retrofit conditions.

**% of homes with suitable location for rainwater harvesting**: Rainwater harvesting systems require opened space in the vicinity of the downspout or roof leader.

**% of homes with space for soakaway pit**: For site assessments assume that infiltration practices will require an area that is approximately 10% of the impervious drainage area.

**% of homes with available space for landscaping or bioretention**: Bioretention is an infiltration practice. Assume that bioretention will require an area that is approximately 10% of the impervious drainage area. Fusion landscaping can more easily be scaled to any property size as long as the property includes a front yard. Homes that do not have front yards such as those in dense urban centres, have limited retrofit options.

**Evidence of stains or hydrocarbon leaks**: Stains and slicks on driveways indicate potential water quality threats. These problem areas should not be directed to infiltration practices.

**Evidence of fertilizer use**: Using grass alternatives can reduce the need for fertilizer use. Understanding the prevalence of fertilizer use within a neighbourhood can help you understand local landscaping trends and opportunities to reduce maintenance costs.

**Available space for rain gardens**: Rain gardens typically accept roof runoff and like other infiltration practices require a surface area approximately equal to 10% of the contributing impervious surface. Alternatively, rain gardens can accept runoff from sidewalks, driveways, and grassed areas.

**Available space for tree planting:** Trees can be key components of landscape alternatives. Tree by-laws and/or municipal urban forest management strategies should be consulted for information where available.

**% of homes with a steep driveway**: Driveways that are sloped at a steep grade

are not ideal for permeable pavement and can be difficult to convey to other LID practices without significant re-grading.

**% of lot area that could generate runoff pollutants**: This includes driveways and parking areas.

Once your residential field assessment is complete, you need to compile data on the areas visited, compare benefits, opportunities, and implementation constraints. This includes a review of data collected during your desktop review. At this stage of your residential LID program distinct areas should be targeted to proceed with your marketing strategy.

# Residential Field Assessment Form for Source Control Measures

| Performed by | Date: |
|---|---|

| **Municipality:** | **Size of Neighborhood Survey Area (ha):** | |
|---|---|---|
| **Neighborhood/ Street names:** | | |
| Avg. Lot Width (m): | Avg. Lot Length (m): | Age of Neighborhood: |
| Avg. Street Width (m) – from back of curb to back of curb: | | |
| Street Parking: ☐ absent ☐ one side of street ☐ both sides of street | | |
| Sidewalk: ☐ absent ☐ one side of street ☐ both sides of street | | |
| Avg. Road Condition: ☐ New ☐ Avg ☐ Cracking ☐ Clean ☐ Dirty | | |
| Avg. Driveway Condition: ☐ New ☐ Avg ☐ Cracking ☐ Clean ☐ Dirty | | |
| Avg. Sidewalk Condition: ☐ N/a ☐ New ☐ Avg ☐ Cracking ☐ Clean ☐ Dirty | | |

| **Neighborhood Characteristics** | **%** | **Best Management Practice Info** | **%** |
|---|---|---|---|
| % Single Family Detached: | | % of lots with positive drainage ie. no major risk of flooding, standing water etc): | |
| % Single Family Attached: (Duplexes, Row Homes) | | % of homes with a pervious area down-gradient of rooftop leader | |
| % Multi Family: (Apts, Townhomes, Condos) | | % of homes with poor location of roof leader | |
| % of homes with predominantly Turf Lawns: | | % of homes with suitable location for rainwater harvesting | |
| % of homes with predominantly landscape gardens: | | % of homes with available space for rain garden | |
| % with natural areas (e.g. forest, park etc.) | | % of homes with available space for soakaway pit | |
| % within Wellhead Protection Area | | % of homes with available space for landscape alternative (gardens, trees, xeriscaping) | |
| **General Lot Characteristics for Neighbourhood** | **%** | % of homes with available space for tree planting | |
| % Home Surface Area: | | % homes with evidence of oil, gas, or fluid stains | |
| % Driveway, walkway, patio surface area | | % of homes with evidence of lawn fertilizer use | |
| % Turf grass cover: | | Dominant Soil Type | |
| % Landscaped area: | | % Soils with high infiltration potential | |
| % Tree cover: | | % Soils with low to moderate infiltration potential | |
| % Natural (native) vs. Formal (turf) (i.e. 50/50) | | % homes with steep (greater than 5%) driveway | |
| **Drainage Characteristics for Neighbourhood** | **%** | Streets with a Large Public Easement | |
| % Roadside Swales: | | % of area that could generate contaminated runoff | |
| % Curb and Gutter: | | **Recommended Actions** | |
| % Homes with Front Drainage: | | ☐ Landscaping Alternative<br>☐ Disconnect Downspout Leader<br>☐ Rain Barrel / Cistern<br>☐ Soakaway Pit<br>☐ Infiltration Trench Beside/Behind Homes<br>☐ Tree Planting<br>☐ Rain Garden<br>☐ Permeable Walkway<br>☐ Permeable Driveway | |
| % Homes with Split Drainage: | | | |
| **Rooftop Downspouts for Neighbourhood** | **%** | | |
| % Connected to Sewer: | | | |

# Residential Field Assessment Form for Source Control Measures

| Performed by | Date: |
|---|---|

| | | |
|---|---|---|
| % Directed to Impervious Surface: | | |
| % Directed to Pervious Area: | | |
| % Directed to a Cistern, Rain Barrel or LID technique already (specify): | | |
| **Comments/ Notes:** (Note: record photo numbers/log) | | |
| | | |

## Residential Field Assessment Form for Source Control Measures

| Performed by | Date: |
| --- | --- |