

STORMWATER MANAGEMENT TOOLS FOR RESIDENTIAL DEVELOPMENT

TOOL 5 RAIN GARDENS

Rain gardens are shallow infiltration systems with plants that can handle wet and dry conditions.

The soil that is used in a rain garden should be approximately 60-70% sand (2mm or finer particles), 10-20% fines (clay and silt), and 15% -20% organics. This could be achieved by using a mix of a typical lawn-blend soil mixed with well-aged compost. Ensure the mix is well-blended, and install to a depth of 450mm (18”) in the rain garden area, avoiding compaction of the underlying soils.

Rain gardens can be incorporated into a property’s existing or new planting areas as an attractive and functional feature. In rain gardens water may temporarily pool and then slowly seep into the ground. Rain gardens should be located at least 3m away from the house to keep water away from the building foundation.

The rain garden should have perforated pipe in the bottom and an overflow pipe that are both connected the nearest storm drain pipe. These pipes help prevent the rain garden from being wet for too long, and from overflowing.

Page 4 shows the recommended design of a rain garden for your property and offers an a sample list of appropriate plant species.

Rain gardens are intended to be used in addition to the recommended stormwater management tools. Refer to the flowchart to select the preferred tool for your property.



Example of residential rain garden construction (Photo: Rutgers Cooperative Extension)

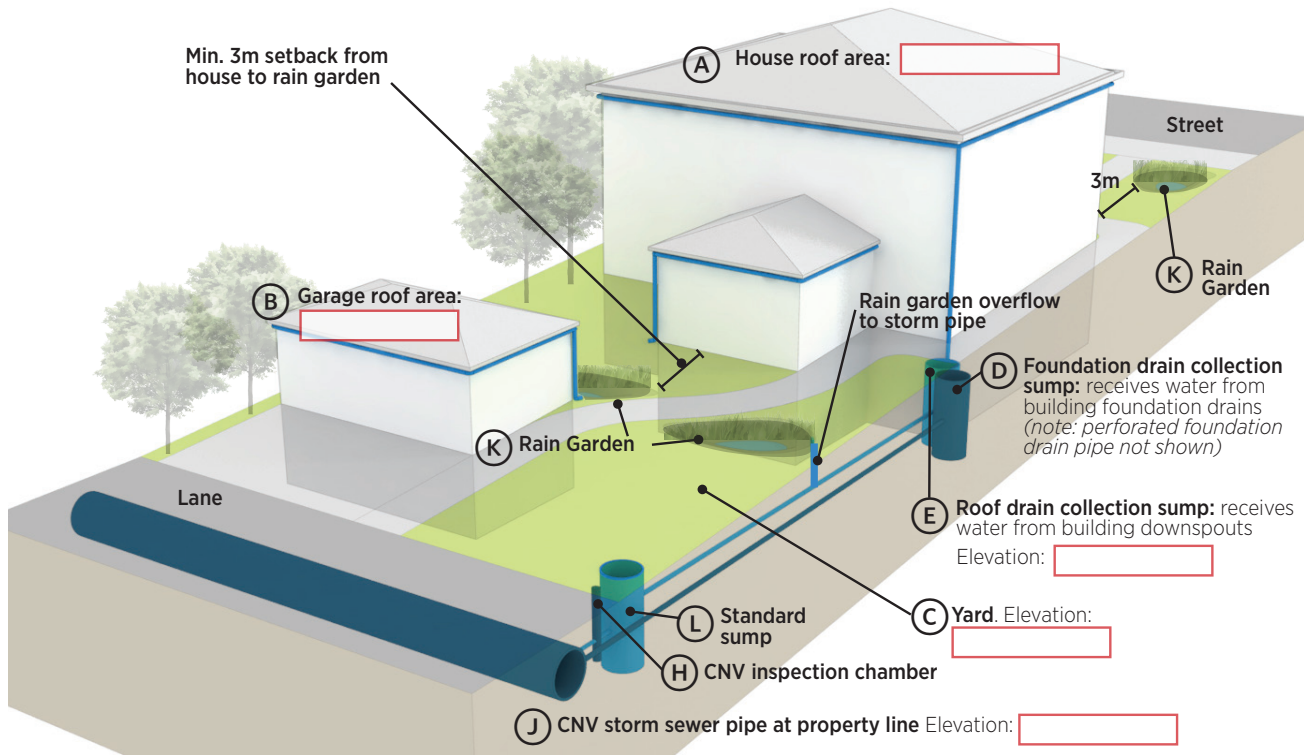
WHERE CAN I GET THE PARTS I NEED?

- **Rain garden planting soil** is available from a number of local suppliers. Ensure that the soil meets the description above.
- **Perforated pipe** is available at most hardware stores
- Rain garden overflow drain (“riser drain”), 600mm (24”) diameter, is available from [Diamond Precast Concrete](#) as “Catch basin type 2, BBY-S109.”

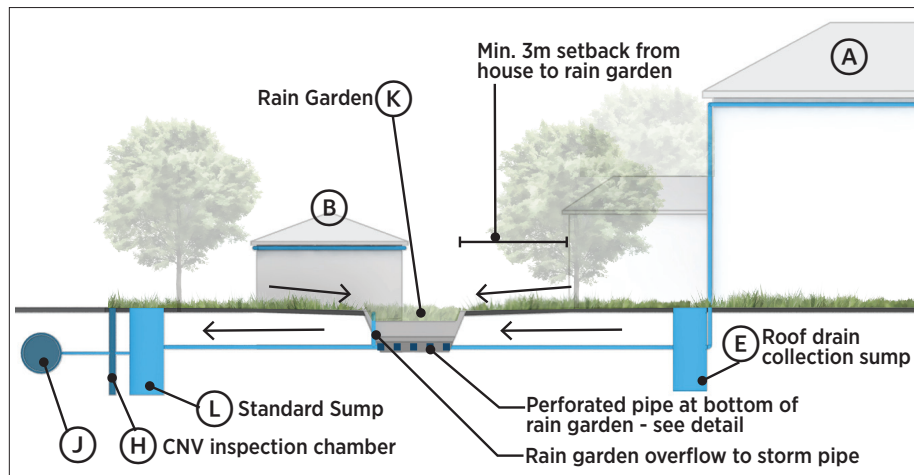
WHERE DO THE TOOLS GO ON MY PROPERTY?

The illustrations on the following pages show different layouts for rain gardens on a typical residential lot. Two examples are given: one for a typical south-facing lot and one for a typical north-facing lot. In both examples the perforated pipe and the overflow pipe from the rain gardens both connect to the nearest stormwater drain pipe. The circled letters correspond to different parts of the accompanying worksheet.

RAIN GARDENS ON A TYPICAL NORTH-FACING LOT



PERSPECTIVE VIEW

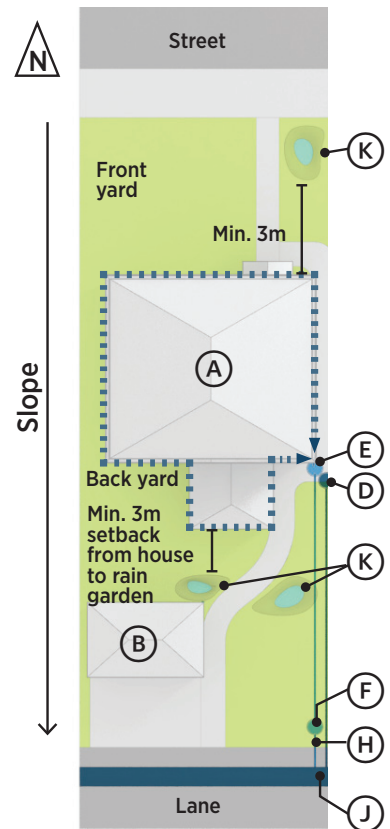


SECTION

Note: foundation drain sump connection to CNV storm sewer pipe not shown

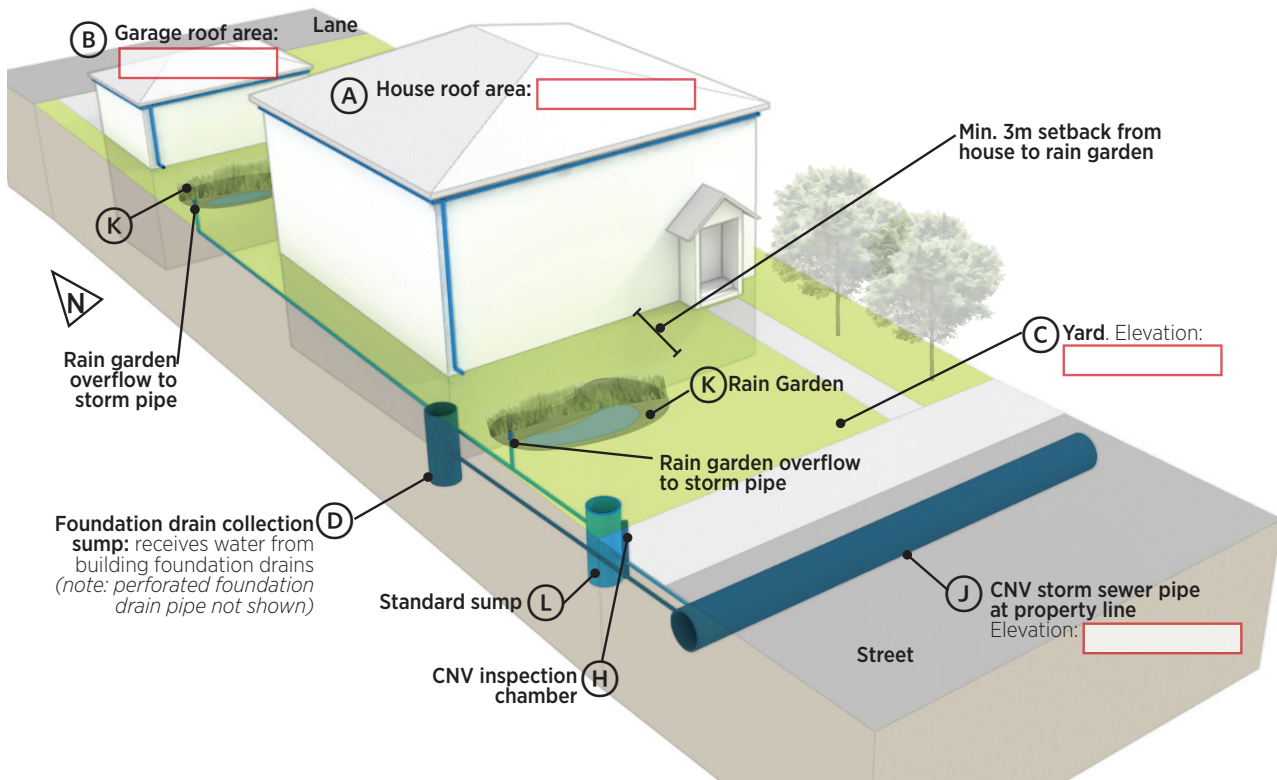
LEGEND:

- **Perforated foundation drain pipe:**
Drains water to foundation drain sump (D). Minimum 1% slope.
- **Solid foundation drain pipe:**
Drains directly to CNV storm sewer (J). Minimum 1% slope.
- **Perforated stormwater drain pipe:**
Allows rainwater to infiltrate and soak into ground. Minimum 1% slope.
- **Solid stormwater drain pipe:**
Minimum 1% slope.

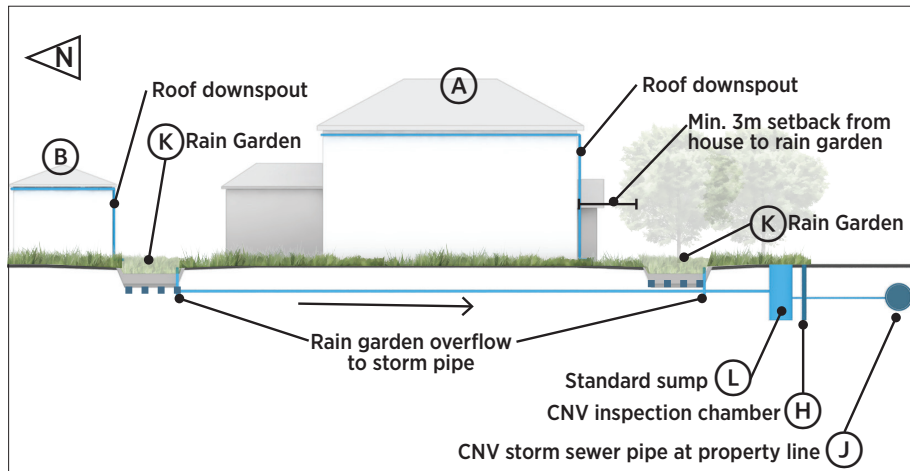


PLAN VIEW

RAIN GARDENS ON A TYPICAL SOUTH-FACING LOT



PERSPECTIVE VIEW

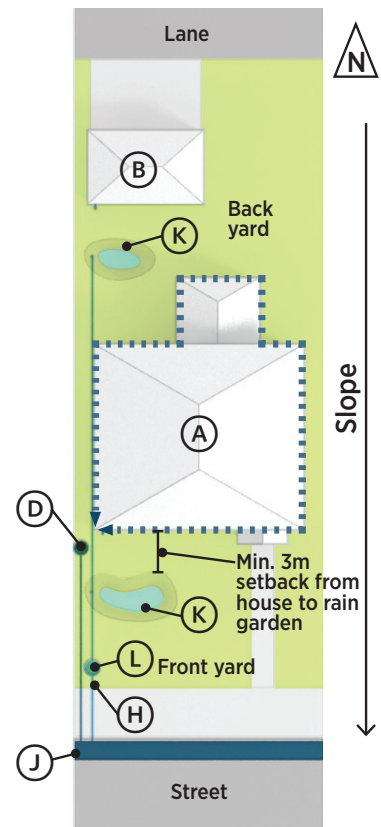


SECTION

Note: foundation drain sump connection to CNV storm sewer pipe not shown

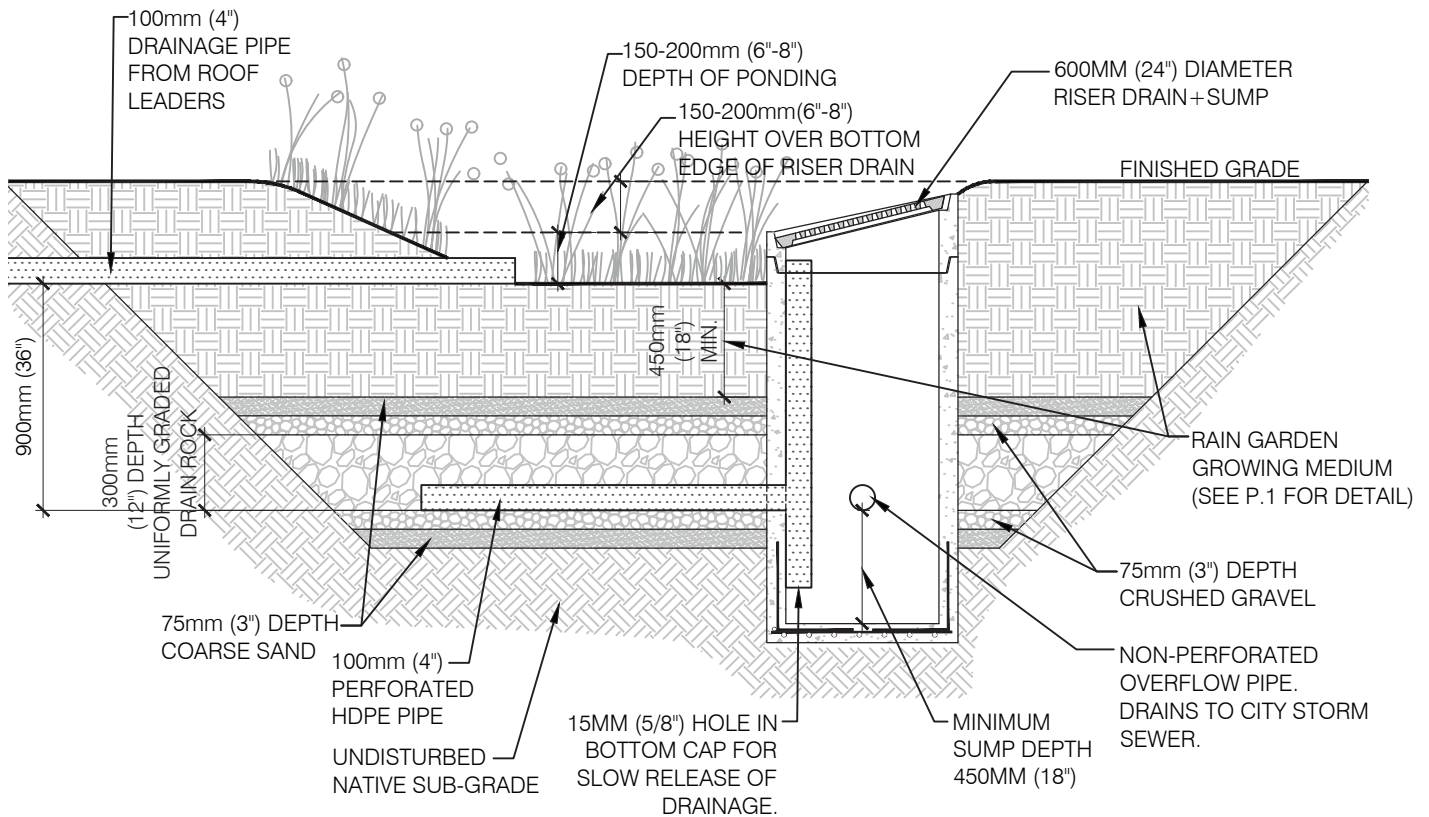
LEGEND:

- **Perforated foundation drain pipe:**
Drains water to foundation drain sump (D). Minimum 1% slope.
- **Solid foundation drain pipe:**
Drains directly to CNV storm sewer (J). Minimum 1% slope.
- **Perforated stormwater drain pipe:**
Allows rainwater to infiltrate and soak into ground. Minimum 1% slope.
- **Solid stormwater drain pipe:**
Minimum 1% slope.



PLAN VIEW

TYPICAL RAIN GARDEN DETAIL:



Required rain garden design, adapted from Oregon State University rain garden detail.
Scale 1:30

WHAT PLANTS SHOULD I CONSIDER?

EDGE OF RAIN GARDEN (DRIER AREAS) :

- *Achillea millefolium* / Yarrow
- *Arctostaphylos uva-ursi* / Kinnickinnick
- *Aster suspicatus* / Douglas' Aster
- *Cornus sericea 'Kelseyii'* / Kelsey Dogwood
- *Deschampsia cespitosa* / Tufted Hair Grass
- *Fragaria chilensis* / Coastal Strawberry
- *Helictotrichon sempervirens* / Blue Oat Grass
- *Iris tenax* / Oregon Iris
- *Lupinus micranthus* / Small Flowering Lupine
- *Mahonia repens* / Creeping Oregon Grape
- *Ribes sanguineum* / Red-Flowering Currant
- *Rosa nutkana* / Nootka Rose
- *Solidago canadensis* / Canada Goldenrod
- *Symphoricarpos alba* / Snowberry

BASE OF RAIN GARDEN (WETTER AREAS) :

- *Blechnum spirant* / Deer Fern
- *Cares obnupta* / Slough Sedge
- *Cornus sericea 'Kelseyii'* / Kelsey Dogwood
- *Deschampsia cespitosa* / Tufted Hair Grass
- *Juncus effuses var. pacificus* / Soft Rush
- *Juncus patens* / Grooved Rush
- *Physocarpus capitatus* / Pacific Ninebark
- *Polystichum munitum* / Sword Fern
- *Scripus microcarpus* / Small Fruited Bullrush
- *Spiraea douglasii* / Douglas Spirea

HOW BIG DOES MY RAIN GARDEN NEED TO BE? (WORKSHEET)

BEFORE COMPLETING THIS WORKSHEET:

- Review the stormwater management tool **flowchart** to determine if this tool is right for you [URL]
- Collect your **building site plans and drawings**
- Contact the City of North Vancouver to get the elevation of the **City's storm sewer at your property line**
- Calculate your **soil's infiltration rate** using the directions on the CNV website here: [URL]

REQUIRED INFORMATION AND CALCULATIONS:

- Note that the circled letters below correspond to the diagrams on the previous pages
- Enter your answers into the shaded fields below.
- Transfer the numbers next to the circled letters to the appropriate diagram above
- Submit a copy of your building site plan showing the proposed locations of your **rain garden** and connecting pipes.

- ① Enter your address:
- ② What is your house roof area? **(A)** m² Your garage roof area? **(B)** m² **(A) + (B)** m²
 What is your soil infiltration rate? mm / hr
- ③ (If you are not able to calculate your soil infiltration rate, enter the default rate of 10 mm per hour. If you use the default rate you may end up with a larger rain garden than required).
- ④ What is the elevation(s) of your yard where the rain garden(s) will be installed? (Note: multiply feet by 0.3048 to get the value in meters) **(C)** m
- ⑤ What is the elevation (grade) of your house's roof drain sump? (Note: typically equals the elevation of the house corner minus 0.4m) **(E)** m
- ⑥ What is the elevation (grade) of the City storm sewer at your property line? (Note: contact the City to get this value if not already built) **(J)** m
- ⑦ Check: is the value you entered for **(E)** at least 0.3 m (1 foot) higher than **(J)**? (check one) Yes No
 If not, this stormwater tool will not work for your property. Contact the City for guidance.
- ⑧ Use the sizing table below to determine the minimum total area of your rain garden(s):
- Put a check mark next to the roof area that matches yours (area **(A) + (B)**, above). If your roof area is in between two sizes, select the bigger size.
 - Put a check mark next to the soil infiltration rate that matches yours or use the default rate of 10 mm per hour.
 - Based on the selected roof area and infiltration rate, use the table to find the corresponding infiltration chamber area. For example, with a roof area of 200 m² and a soil infiltration rate of 10 mm / hr the total area of rain garden(s) will have to be 8 m². If you don't have space to accommodate this area of rain garden(s), go back to the flowchart to find an alternate solution or contact the City for guidance.

Soil infiltration rate (mm / hr)	<input type="checkbox"/> Total roof area: 200 m ² (or 2,150 ft ²)	<input type="checkbox"/> Total roof area: 250 m ² (or 2,700 ft ²)	<input type="checkbox"/> Total roof area: 300 m ² (or 3,200 ft ²)
<input type="checkbox"/> 10 mm / hr	<input type="checkbox"/> 22 m ²	<input type="checkbox"/> 30 m ²	<input type="checkbox"/> 36 m ²
<input type="checkbox"/> 25 mm / hr	<input type="checkbox"/> 15 m ²	<input type="checkbox"/> 18 m ²	<input type="checkbox"/> 22 m ²
<input type="checkbox"/> 50 mm / hr	<input type="checkbox"/> 10 m ²	<input type="checkbox"/> 12 m ²	<input type="checkbox"/> 14 m ²

- ⑨ Calculate the elevation of the bottom elevation of your rain garden(s) by subtracting 1.4m from the value you recorded for question **(4)** above m

- ⑩ Write any additional details about your approach to stormwater management on your property: