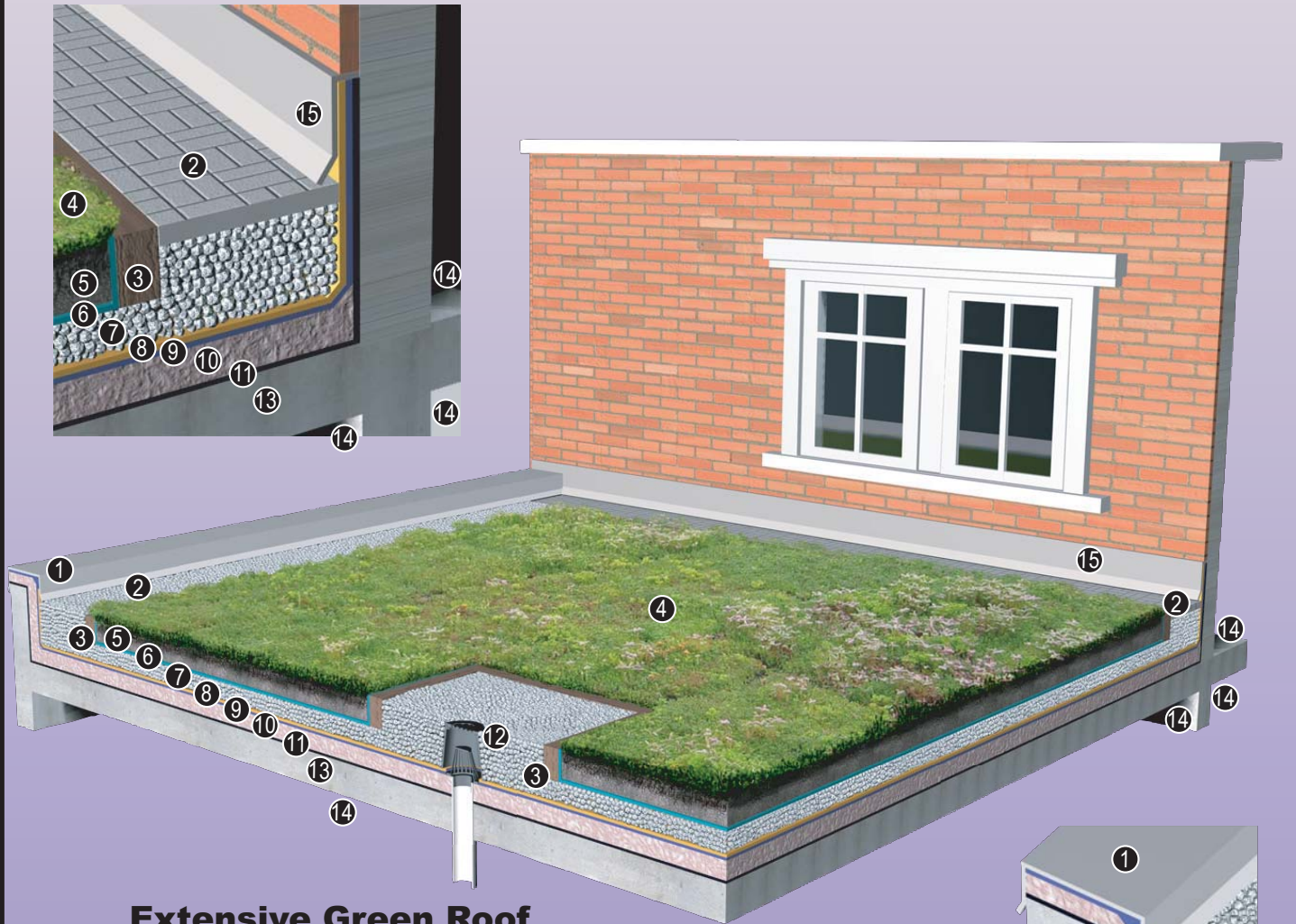


## DESIGN PRINCIPLES

- Suitable for flat roofs and, with proper design, roofs of 20° (4:12 roof pitch) or less.
- Suitable for many rooftop situations – industrial, warehousing, commercial buildings, office complexes, hospitals, schools, institutional/ administrative buildings, residential and garages.
- Design a green roof at the same time as designing the building or retrofit, so that the structural load can be balanced with the design of the building.
- In calculating structural loads, always design for the saturated weight of each material.
- Provide construction and maintenance access to extensive green roofs. Access through a 'man door' is preferable to a roof hatch.
- Roofs with less than 2% slope require special drainage construction so that no part of the growing medium is continuously saturated.
- Avoid monocultures when planting a green roof; the success of establishing a self-maintaining plant community is increased when a mix of species is used.
- Provide intensive maintenance for the first 2 years after plant installation – irrigation in dry periods, weed removal, light fertilization with slow release complete fertilizers, and replacement of dead plants.
- To facilitate access and prevent moisture on exposed structural components, provide plant free zones along the perimeter, adjacent facades, expansion joints, and around each roof penetration.
- Fire breaks of non-combustible material, 50cm wide, should be located every 40m in all directions and at roof penetrations.
- Provide protection against root penetration of the waterproof membrane by either adding a root barrier or using a membrane that is itself resistant to root penetration.

A **Green Roof** is a roof with a veneer of drainage and growing media that supports living vegetation. Green roofs provide a wide range of benefits – from reduction in peak flows and volumes to building heat gain reductions. There are two basic types:

- Intensive – deeper growing medium to support larger plants and trees; designed for public use as well as stormwater and insulation functions.
- Extensive - shallow, lightweight growing medium; designed for stormwater, insulation and environmental functions; vegetation is low and hardy; usually no public access.



### Extensive Green Roof

1. Wall Cap Flashing, waterproof membrane extends to 100mm above finished grade
2. Drain Rock, Paving Slab, or Other Buffer Equivalent
3. Wood, Steel or Concrete Curb/Edging (Optional)
4. Planting
5. Growing Medium
6. Filter Layer
7. Drainage Layer
8. Protection Layer and Root Barrier
9. Waterproof Membrane
10. Thermal Insulation
11. Vapour Barrier
12. Area Drain
13. Structural Slab
14. Building Interior
15. Wall Flashing, waterproof membrane extends to 150mm above finished grade

### Green Roof Benefits

- Reduced peak flows & stormwater volume
- Mitigation of urban heat island effect
- Insulation against heat loss and gain
- Extended roof membrane life
- Sound insulation and air filtration
- Urban habitat
- Aesthetics

## Green Roof



Greater  
Vancouver  
Regional  
District

### Stormwater Source Control Design Guidelines 2005



Goya Ngan  
Landscape Architect

Detailed design guidelines can be found in the Design Guidelines 2005 report, available at [www.gvrd.bc.ca](http://www.gvrd.bc.ca)