**Tree pit design principles**

**Using street trees to treat stormwater**

**What is a tree pit?**
Tree pits provide a great alternative design for planting street trees. They reduce demand on potable water and provide an opportunity to treat stormwater. Tree pits can sometimes be referred to as bio-retention systems as they provide treatment through fine filtration, extended detention and some biological uptake. Careful and considered designs will allow easy access for maintenance – litter and sediment removal and be safe for pedestrians to move around.

**Good design elements**

- Discuss the design with council maintenance staff to ensure easy access for maintenance and litter removal
- Incorporate early in the streetscape design
- Dial before you dig – find out the location of underground services and understand when/if permits are required
- Choose an appropriate tree species to suit wet and dry conditions
- Understand that additional watering may be required during plant establishment and/or in dry summer month

**For technical guidance**


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**ELEVEN KEY COMPONENTS OF TREE PITS**

1. **Kerb and channel**
   Channels stormwater flows from road or surrounding hard surface to tree pit.

2. **Kerb inlet**
   Large opening in kerb to direct water to tree pit. May be a side entry spillway pit built into footpath.

3. **Plant covers**
   Crete or similar at base of tree trunk to protect roots.

4. **Plants**
   Usually one large shrub or tree to help filter runoff, look attractive, and withstand extreme wet and dry periods.

5. **Ponding area**
   Area around tree set lower than surrounding ground where stormwater percolates before filtering through soil.

6. **Mulch layer**
   [If included] Prevents weeds and helps soil stay moist.

7. **Plant soil**
   Mix of sand, topsoil - without clay and silt to drain well.

8. **Root barrier**
   [If included] Specialized manufactured tree-draining geotextile fabric used to line tree pit, preventing roots growing outside area and causing damage to utility services, building foundations and roadways.

9. **Waterproof lining**
   [If included] Used to avoid saturating tree pit in areas of poor draining soils or where groundwater lies close to ground surface.

10. **Underdrain**
    Set in base of pit to collect water draining through pit and direct to stormwater network.

11. **Overflow and observation well**
    [If included] A standpipe or channel grate to direct higher than usual flows from tree pit to piped stormwater network. Observation well, similar to expanded pipe to monitor water depth and drainage rates in pit. Discharge and overflow pipes may also have clean-out and inspection points, usually clipped.

**Source – Auckland Council Tree Pit Operation and Maintenance Guide – November 2009**