Step 2. Ensure suitable water distribution

The second key design area for passive irrigation is the method of water distribution.

Water from a single inlet point can lead to localised erosion and poor spread of soil moisture if a distribution mechanism is not included. Coordination is needed during the design and construction of the tree pit and the soil layers to ensure water distribution is effective.

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IORWWUEWHHDDHHWVUSRW
DUHUHDUOHOHDUHRHEUHUHDWHUHWHU
EHORDRSHUIRUDWHSSHURHDHH
RIDHODOWUEWHDWHUDFURWHRSURIH

EWRH*apply design solutions that spread the water gently to support vegetation growth and avoid scouring*

Step 3. Design overflow and drainage

The provision of overflow and drainage points for water as it is important that the growing area does not become water logged. Provide underdrainage below the soil area so water that isn't needed can rejoin the drainage system.

Action: Apply a design solution to supports drainage and maximises healthy plant growth

Drainage Design Solution – Option 1 (No Pedestrian Activity)

In areas where pedestrian activity is located only along the footpath, continuous soil volumes parallel to footpath and road can support healthy root growth and allow for passive irrigation through kerb inlets.

These inlets allow water to filter through to a soakage trench as shown in Figure 3. Roots growing laterally are provided with adequate water and nutrients and are therefore much less likely to grow towards private property, seeking water.

Drainage Design Solution – Option 2 (Pedestrian Activity)

By using a structural vault, greater soil area becomes available to a tree, while still supporting other uses on the surface such as car parking, roadways and pedestrian pavements.

This increased soil area is able to store more water for later use by vegetation and reduce stormwater pollution. Figure 4 shows an example design which can be replicated for an avenue of trees to provide a continuous root growing space underneath pavements.

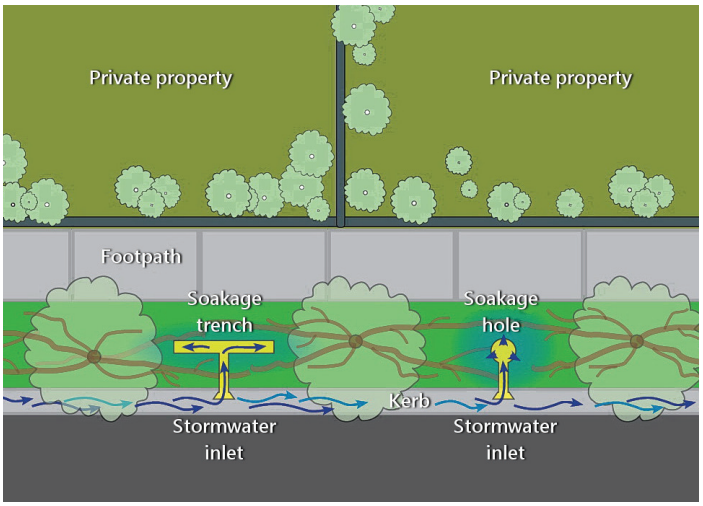

Figure 3: Aerial view of soaker trenches between trees in an avenue allowing roots to access water and soil volume, whilst also minimising damage to nearby property from tree roots (TreeNet, 2005)

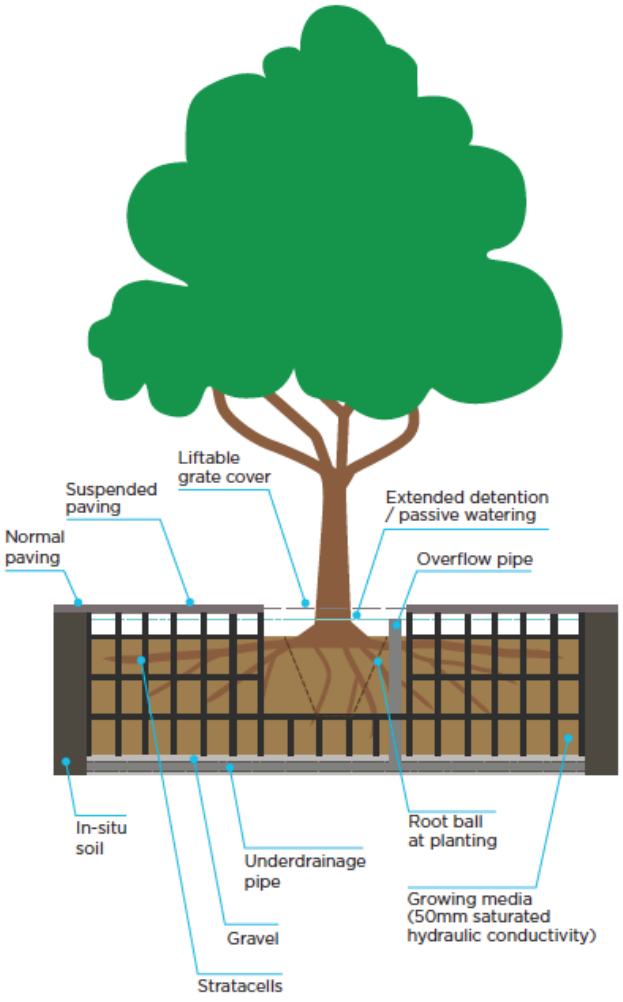

Figure 4: Example design of a tree plot designed for passive irrigation and stormwater treatment (E2Designlab, 2015)

Step 4. Plan for healthy plant growth

Successful tree establishment is critical for new plantings to become productive in the landscape. The principles for best practice tree planting are:

a) Select species appropriate to the site and purpose
b) Use quality nursery tree stock
c) Adequately size the tree pit
d) Install specified soil or ameliorate soil prior to planting
e) Transplant by personnel skilled in these practices
f) Regularly water tree (root ball) to initially support root growth and development

Incorporation of temporary (ie 2-3 years) active irrigation to support establishment must be considered as a secure water source available during this vulnerable stage of tree establishment.

Action: Apply best practice tree establishment techniques

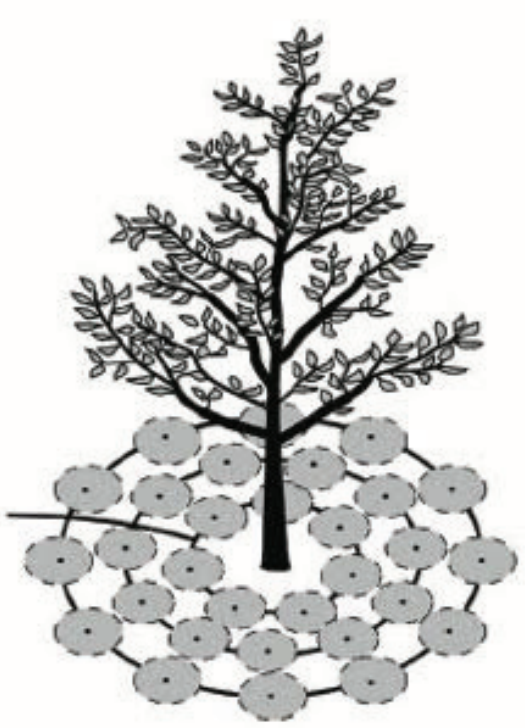

Figure 5: The irrigation system design should consider the species, age, soil and climate conditions of different trees. This figure shows a drip irrigation system applying water to most of the tree root zone. (Image Best Practice Functional Open Space Guidelines)

Step 5. Consider supplementary active irrigation

In addition to reducing pressure on our stormwater system and local water bodies, it is critical to design irrigation to maximise the health of trees and vegetation.

There are situations where supplementary watering, in addition to passive irrigation, is warranted to ensure that the tree and other vegetation is healthy and provides the desired services.

Examples of situations in which 'active' irrigation may be required include when there are low soil volumes, high water use species, a need for strong tree development and growth stages, periods of drought, high evaporative demand conditions and during the tree establishment stage.

The principles for best practice tree irrigation are:

1. Distribute the water as widely as possible to the root system. This will prevent concentrated and confined root systems around irrigation delivery point areas which increases vulnerability and diminishes the resilience of the tree.
2. Use mulch to cover irrigation components, however, select coarse mulch materials that allow rainfall to penetrate.
3. Select robust irrigation components and fittings. The urban street environment is harsh. System reliability is essential.
4. Small outlet orifices are prone to blockage, from within and external debris. Select non- clogging, flushing type of emitter devices.
5. Installation, including excavation, should be protective of tree root systems.
6. Irrigation system application rate should allow for the limited infiltration capacity compacted soils, so that runoff is prevented.
7. Water proactively, before the high evaporative demand conditions, rather than responding to physical signs of stress, such as leaf curl, leaf scorch and leaf drop.
8. Include dedicated water use metering to monitor and to schedule irrigation application.
9. Soil moisture monitoring is extremely valuable in understanding soil water status and water movement. The scheduling of irrigation can be programmed based on the actual water available to the tree.

Action: Apply best practice irrigation techniques

Better Best Practice Notes are designed to help practitioners strive for best possibilities in delivering city shaping and sustainability projects. We call them Better Best Practice Notes to remind ourselves that our best is always getting better.

This Better Best Practice Note has been developed in partnership with E2Designlab, G&M Connellan Consultants. Last updated December2017

Attach this Better Best Practice Note next time you request a quote, and ask bidders how they will incorporate best possibilities for your project.

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