



Soil volumes for tree pits designed with structural soils

People have been building tree pits for over a century and deciding how big to build them has always been a trade-off between how much space the tree needs and how much can be afforded in the design. Sadly, the trees often lose out in the deal. The most limiting factor in the growth of urban trees is the lack of usable soil for root growth, and inadequate underground rooting space is one of the main contributors to the premature mortality of urban trees. Small and short-lived trees do not provide significant green infrastructure benefits, and nor do they contribute to long-term increases in canopy cover. Therefore, when designing urban spaces we need to make sure that the species that we wish to plant is provided with enough soil to be healthy and reach a degree of maturity that will deliver benefits to the local community. The minimum volume of structural soil recommended for trees of different sizes is provided in Table 1.

Table 1: Minimum requirements for tree pit specifications when using structural soils

	Mature Size of Tree*†				
	Very Small (<5m)	Small (5–10m)	Medium (10–15m)	Large (15–25m)	Massive (>25m)
Recommended minimum volume of stone-based structural soil	12m³ (10m ³ if shared)	24m³ (19m ³ if shared)	40m³ (32m ³ if shared)	56m³ (48m ³ if shared)	72m³ (60m ³ if shared)
Recommended number of aeration wells	1 (0.5 if shared)	1 (0.5 if shared)	1	2 (1.5 if shared)	2

There is a direct relationship between the volume of below ground growing space and how a tree is likely to develop, the greater the soil volume:

- + the faster the tree will grow
- + the bigger it will become
- + the healthier it will be
- + the better it will look
- + the longer it can be expected to live

TABLE NOTES

*Mature tree sizes are listed in Tree Species Selection for Green Infrastructure - a guide for specifiers [tdag_treespeciesguidev1.3.pdf](#)

†Fastigate trees will require less rooting space than trees with wide canopy shapes. As a rule of thumb, one should assume that a tree with a narrow and columnar crown form would require half as much soil volume as a tree of the same height that has a wide crown.