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Schedule 3

Aboricultural Assessment: Sefton Train Station - Hills Fig

9.1 Introduction

The design upgrade for Sefton Train Station identifies a new public domain pathway to replace the existing aged concrete in order to provide higher quality pedestrian access.

Within the existing pathway, near the stations main entrance, is a mature *Ficus microcarpa var. hillii* (Hills Fig). This report, commissioned by Caldis Cook on behalf of ARTC, discusses the feasibility of retaining or transplanting the tree.

This report is based on a visual inspection of the tree on 28th April 2009.

9.2 Condition of the Tree

The Hills Fig is a mature specimen in fair to average condition, approximately 15m high and 15m wide. The canopy has been successively lopped around existing overhead powerlines causing an unbalance canopy distribution (Figure 1). There are no obvious signs of decay within the trunk.

Figure 1: The tree viewed from the north showing lopped canopy.

The base of the tree has been contained by surrounding concrete pavement which has caused surface roots to deflect at right angles. Uplifting concrete provides evidence that roots extend beneath the adjacent path. There are no obvious signs that the roots have extended beneath the adjacent roadway asphalt surface.

9. 3.0 Viability of Transplanting

9.3.1 General impacts on a tree

The majority of tree roots are located close to the surface. In general these roots extend outward from the trunk and occupy irregularly shaped areas. Studies have shown that the spread of root systems often extend well beyond the drip zone (outer canopy edge).

Root systems consist of three main parts - the primary woody root system, secondary woody, and non woody roots. The root system provides uptake of water and nutrients, and transportation of these to the foliage for conversion through photosynthesis, storage of food, and structural anchorage.

Transplanting a mature tree requires the removal of a significant portion of its root system. This results in the loss of a substantial amount of secondary and non woody roots, which provide the most capacity for absorption of water and nutrients. Transplanted trees therefore suffer an immediate loss of water and nutrient uptake. Additionally, it can take some time for regenerated roots to regrow and uptake the required amount of water and nutrients to support the tree. The length of time depends on many factors including moisture, temperature, available oxygen and the age of the roots severed.

Once roots are severed trees commonly exhibit wilting (a trees attempt to minimise gaseous exchange), leaf loss, reduced leaf size and restricted growth rates of new shoots. Reduction of foliage reduces the capacity for photosynthesis and sugar production is reduced. Sugars are used by trees to repair damage. When damaged, trees compartmentalise wounds, using stored sugar reserves. Retaining the correct amount of stored sugar reserves when transplanting is critical to ensure the trees ability to heal wounds.

The reduction in canopy to offset root loss will reduce transpiration, but a reduction in foliage will reduce photosynthetic material and sugar production reducing healing capacity. Additionally, branches are exposed may be scorched by the new exposure to sun.

The severing of large woody roots may also affect structural stability of the tree, particularly when uneven canopy distribution exists. The potential also increases for pathogen entry into heartwood, which may cause decay and possible future mechanical failure (limb drop).

Additional to the scientific complexities of transplanting mature trees there is always the risk of mechanical damage from machinery such as cranes etc. Damage to above ground parts of the tree may provide entry points for pathogens and diminish visual amenity.

9.3.2 Site limitations

The integrity of the root ball is one of the key factors to successful transplantation. A well defined root system will suffer fewer disturbances and therefore induce more rapid regeneration and long term tree health. It is unlikely that the Hills Fig would have a well defined root system. The heavily compacted roadway and pathway subgrade and base would not create an environment advantageous to root development. The root system would also be deflected by the kerb and gutter, and adjacent service pits. It may also link with any service trenches backfilled with sandy material and extend for large distances away from the tree.

Due to the surrounding concrete and asphalt it is likely that a substantial portion of the root system is within Railcorp land behind the adjacent chainwire fence. This portion of root system will require removal for the new SSFL leaving a significantly reduced root system (Figure 2). Additionally, retaining walls and an acoustic wall will be located behind the Fig. Footings etc. for these items will cause further impact on tree roots.

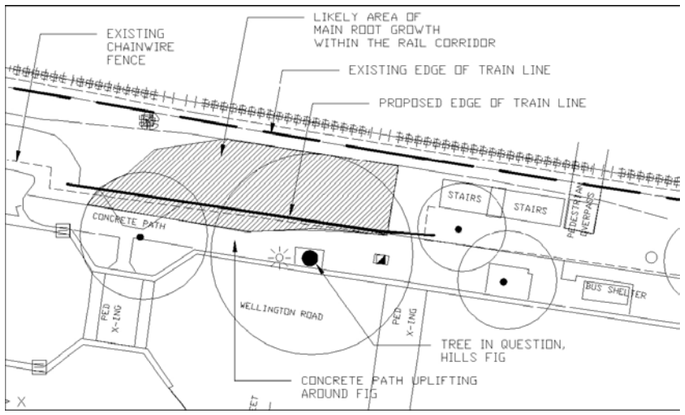

Figure 2: The SSFL will require the removal of a significant area of tree roots (hatched area).

The technique to transplant such a large tree requires ample space for trenching around the tree to insert the underpinning steel raft poles. The urban context would make this difficult to achieve without damaging services. A power pole is located approximately 1.5m away from the base of the trunk, overhead wires are present, and a service pit is located within 2.5m from the trunk. Transplanting a mature tree around such services would be intricate and complicated.

9.4.0 Viability of Retaining the Tree Insitu

The following consideration has been given to possibly retaining the tree in its current location. The design proposal shifts the kerb alignment further into the existing road providing additional garden space for new roots to develop. For this area to be viable in performing this function the garden should be established for some time prior to any other root severance works. It is unlikely the current construction program can cater for this requirement.

The design proposal also reinstates the pedestrian path around the tree. This path will overlay remaining roots after the SSFL is excavated. The new path will prevent the ability to employ tree management procedures such as watering, fertilising and mulching to encourage regeneration of roots from severed ends. The potential for expanding roots to damage the new path may also exist.

Retaining the tree insitu will also establish a scenario of tree branches overhanging the rail line. This is not an acceptable outcome based on Railcorp safety and maintenance concerns. The tree would have to be heavily lopped on frequent occasions greatly disfiguring its visual amenity.

9.5.0 Conclusions

The Hills Fig has a heavily deflected root system due to its urban context. Much of this root system will require removal through excavations for the SSFL. This will have a severe impact on the trees health and long term health and viability.

There is definitely a risk to the tree in its present form if it is to be transplanted. Due to its unbalanced canopy distribution the crown will need to be heavily modified to balance foliage mass. Sunburn of the once shaded branches is likely in hot western Sydney sun. It is also likely that guying will be required to support the tree for some time. Additionally, the tree will likely suffer leaf loss, a common defence mechanism of the species under stress, and it may continue to be stressed for many years. How long the inevitable stress symptoms remain is difficult to predict as it will depend on the size of the rootball, the success of transplanting operations, the quality of the new site and the maintenance it receives for the years after it is transplanted. The trees age, condition and urban context make transplanting much more challenging than the relocation of a young and healthy tree in a park.

Given the complications addressed in this report it should be stated that a successful transplanting operation cannot be guaranteed, particularly given the unknown nature of the underlying soil and deflected root system. If there is a lot of rubble and loose fill, it may be impossible to maintain an intact rootball. If roots spread out in a linear fashion within service trenches retaining enough of a root plate may be impossible.

9.6.0 Recommendations

The ability to transplant the tree may be possible but comes with significant risk. The risk to long term viability is based on the trees age, the unknown nature of the underlying soil and root structure, and the mass of roots that will be lost through the SSFL excavation. All this combined with the already disfigured branching structure of the tree would suggest that the risk does not out way the benefit. Transplanting the tree is therefore not recommended.

Retention of the tree also raises some concerns. The tree will undoubtedly suffer through substantial root loss by the SSFL excavations. It is likely that the tree will survive but with a period of severe stress evidence through leaf drop, dieback and potential limb drop. Furthermore, the tree is large enough to establish a canopy over the rail line becoming a future hazard and high maintenance issue. Retention of the tree is therefore not recommended.

The potential money spent on either transplanting or maintaining the tree would be better spent sourcing another tree and planting wholly within the proposed new garden bed adjacent the path. A tree in this location will replace the focal point now provided by the Fig when viewed through the vista of Helen St. The proposed species should have of a mature canopy spread which avoids the rail corridor. A mature ex-ground specimen should be sourced and the garden bed prepared to best horticultural standards to provide the opportunity for the new specimen to achieve a mature stature in good long term health and vigour. Discussion with Council should be undertaken who can assist with species selection possibly linked to a street tree Master Plan. This advice does not consider any heritage aspects of the tree. If the tree is considered to be of heritage value the recommendations within this report would require review.