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Dear Kimberley,

re: Oak Tree and Proposed Building Works at St Columba`s College Essendon

Introduction
Building works are proposed at St Columba`s College Essendon, as per drawings TP0.002 – TP0.006 prepared by CHT Architects. Galbraith and Associates has been requested by Fontic to assess an oak tree in a vacant block of land which abuts the south-east corner of the intersection of Buckley and Lorraine Street. Information is provided on its species type, dimensions, condition, safe useful life expectancy, recommendations for its ongoing management and tree protection zones. A number of photos accompany this report.

The Oak
The oak is an English Oak (Quercus robur). It measures approximately 16m in height by 20m in spread, with a trunk diameter of 66cm where measured at 1.4m above ground. The crown spreads approximately 9m north of the trunk centre, 10m west, 10m south and 10m east. The trunk is centred 12.6m from the southern boundary fence and 7.4m from the east boundary fence. The species is native to north-west Europe, from Ireland in the west to St Petersburg in the east and as far south as northern Italy. It is not uncommon in the Melbourne and metropolitan area but is less commonly seen these days in private gardens due to the large sizes it attains.

This particular tree is not old, very unlikely to be over 60 years of age, hence is of no historic significance. The species can live for hundreds of years. It has the potential to develop a much thicker trunk and branches, but is unlikely to grow in height and spread much more unless it encounters a more reliable water source. This particular tree is in moderate health, although is slightly thinner in the crown than what would be expected of an English Oak of this level of maturity. The slightly less than expected canopy of foliage and presence of minor dead wood near some extremities is probably related to two factors:

1. one being the absence of any source of irrigation and

2. the other due to soil compaction to the north and west of the trunk, caused by cars.

The Tree Protection Zone (TPZ) according to the relevant Australian Standard 4970:2009 'Protection of trees on development sites' is 7.9m radius from the trunk centre. The indicative structural root zone (SRZ) is 3m radius from the trunk centre. See notes on these at the end of the report. In my opinion, the TPZ guideline is inadequate in this instance. The TPZ should be approx. equal to the drip line and if excavating along one side only, the closest distance to the trunk centre should be approx. 7m.

Development
If it was desired to retain the tree in any development, it would no doubt provide very attractive amenity for many years to come, assuming appropriate clearances and care during development, and relatively routine maintenance thereafter. The tree presents low risk in terms of branch shed.

Ideally one should avoid any excavation or buildings within the drip line, however the tree should still cope with encroachment to its TPZ. The Aust Std suggests that encroachment up to 10% of the TPZ area is acceptable however I think this would cause unacceptable risk. Obviously the greater the encroachment the greater the disfigurement of the crown and risk of debilitating root loss.

Obviously according to the current plans, the tree is to be removed. Its retention impedes the proposed construction of a full-size competition court. Furthermore I am informed that levels adjacent to the oak significantly limit designability of the new building limiting at-grade useable space needed to service the existing and future needs of the College. Options were explored to retain the tree, however the fall of the land, the works required to provide level access to the building and other issues evidently meant that the tree could not be satisfactorily retained.

Retention of the tree has to be balanced against the benefits of improving the existing schools' facilities to accommodate the latest teaching and learning activities and emerging curricula through development of a consolidated facility, with a competition sized outdoor sporting facility and new landscaping.

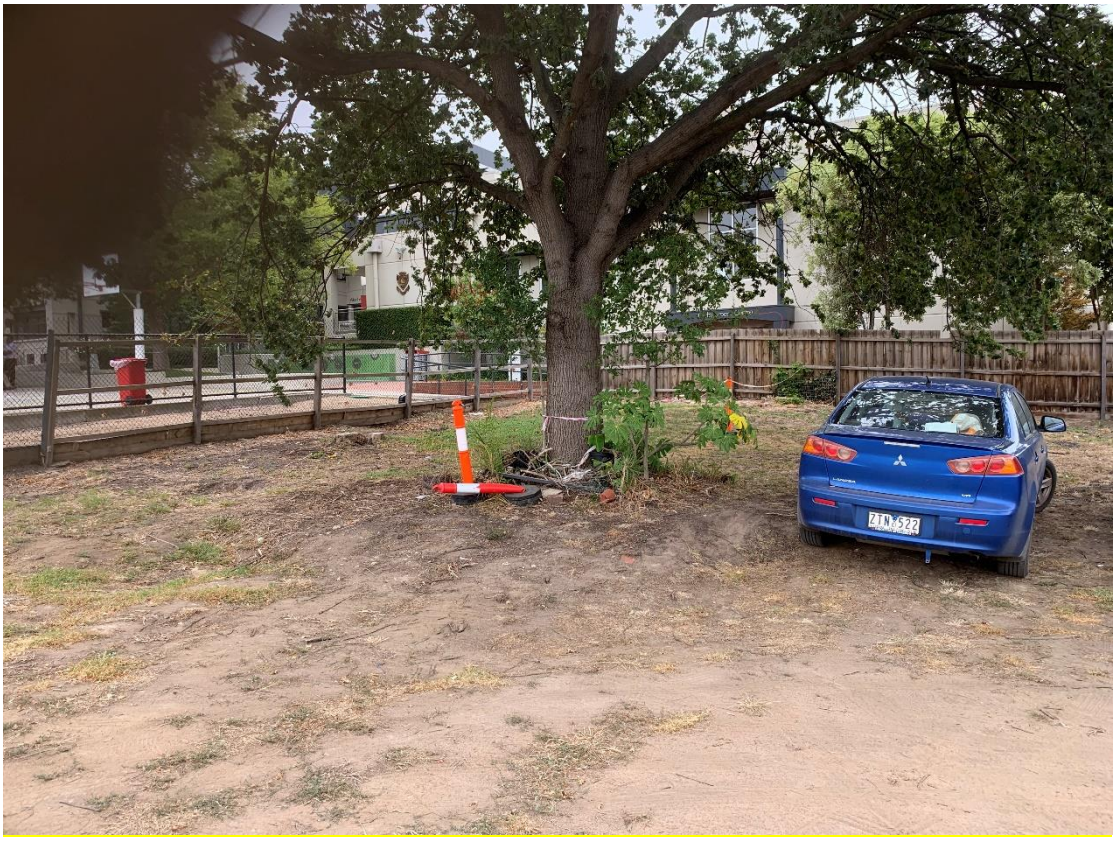
A planning permit is not required for its removal however removal triggers Moonee Valley City Council Local Law, and subsequently will require permission for its removal. I am informed that if permission cannot be obtained, the competition court would not be possible, and the STEAM building would require a complete re-design.

There are no other trees or vegetation of significance within the site or adjoining properties which appear to be impacted by the proposed redevelopment of the site.

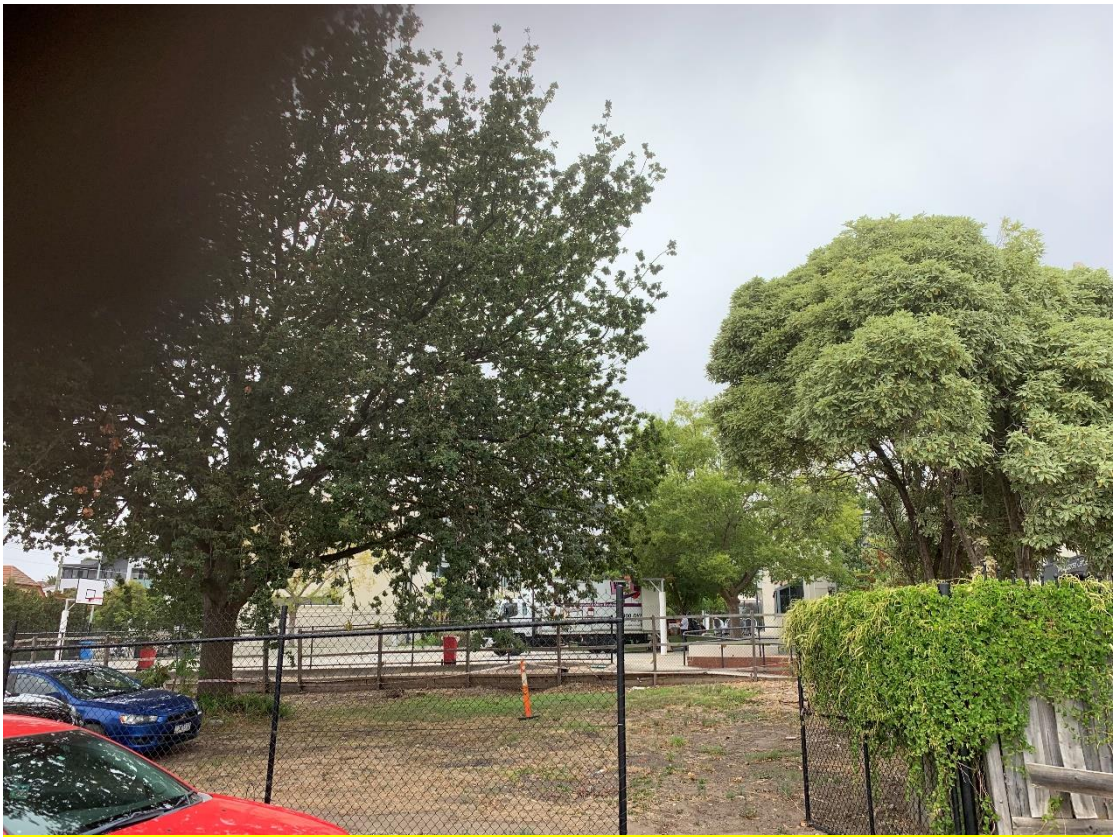
Other existing canopy trees within the site are proposed to be retained. I am informed that replacement vegetation is proposed around the perimeter of the site. This will be detailed by Tract in the landscape design.

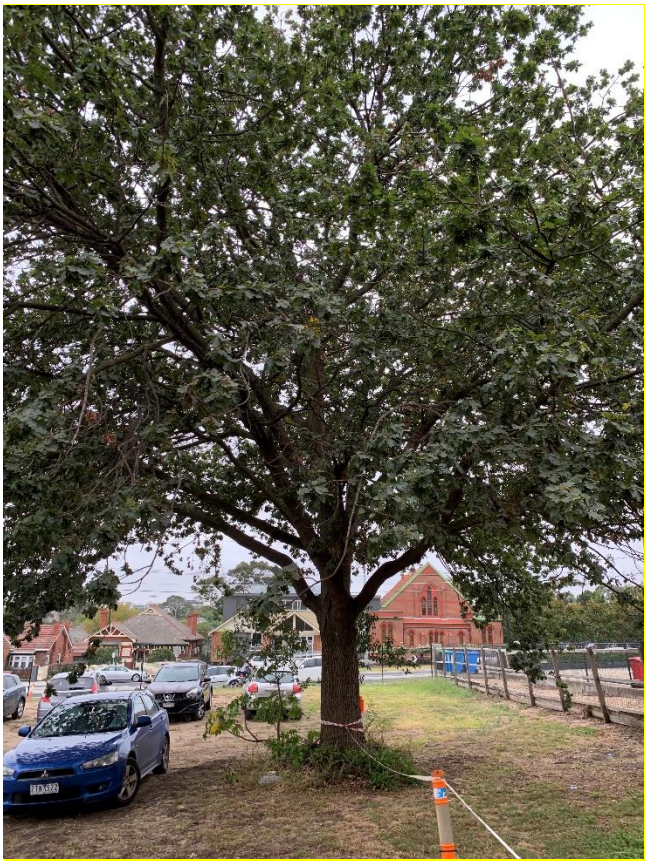
View from the north, looking south.

View looking east



View of the soil compaction around the trunk. This reduces soil porosity, hence the ability to store moisture and air, reduces penetration to the roots of soil and air and makes it difficult for roots to ramify the soil.





View looking north

Tree Protection Zone (TPZ) According to the Australian Standard AS 4970-2009 'Protection of Trees on Building Sites', the TPZ is the principal means of protecting trees on development sites. It is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.' The radius of the TPZ is calculated by multiplying the DBH by 12. The radius is measured from the centre of the stem at ground level. An area of 10% of the TPZ is deemed acceptable to violate if 10% of the ***area*** of the TPZ is made up in other directions. *Thus if encroachment is from one side only, encroachment to as close as approximately 8.3 times the DBH (~ 69% the listed TPZ radius) is acceptable according to the Standard.*

The AS 4970-2009 should only be construed as a rough guide. It is only used in this statement because various local authorities now demand it in their assessments of development applications. Many factors such as the type of encroachment on the TPZ, species tolerance, age, presence of spiral grain, soil type, soil depth, tree lean, the existence of onsite structures or root directional impediments, level of wind exposure, irrigation and ongoing tree care and maintenance are each highly influential on the size and success of the TPZ estimation, therefore the figures derived from the Standard and provided in this report must be treated as rough guides only.

Structural Root Zone

According to the Aus Std. AS 4970:2009, the structural root zone is the area of the root plate required for a tree`s stability. In order to calculate the indicative radius of such a zone from the trunk centre, according to the Aus Std., one uses the following formula: SRZ radius is $(D \times 50)^{0.42} \times 0.64$, where D is the trunk diameter in metres taken from just above the root buttress. The minimum indicative SRZ radius is 1.5m for any tree, irrespective of how small. A graph is provided in the Aust Std, with a curve depicted relating the SRZ to trunk diameter. Unfortunately, the calculated figures do not match those

derived from the graph. The Aust Std. does not mention from where this formula is taken although acknowledges the publication 'Mattheck, C. & Breloer, H. (1994) *The Body Language of Trees* HMSO Publications' in the preface and bibliography. The figures derived from the graph for the indicative SRZs are far greater than those implied from the curve of 95% fit for the results from studies of upturned root plates of windblown and winched over German trees (see Mattheck, C. & Breloer, H. (1994). Furthermore the figures derived from the graph for the indicative SRZs are far greater than what one calculates them to be, using the formula provided by the Standard i.e. $(D \times 50)^{0.42} \times 0.64$. The calculated figures according to the Aust Std. are considerably greater for small and large trunks than those of Mattheck & Breloer.

In reality, the radii calculated whether by graph or using the formula, are much larger than necessary, except in cases such as where the soils are very shallow or where the structural root development is unidirectional or highly asymmetric for some reason, and the excavation is to be within the zone of the roots. **The structural stability generally depends far more on what proportion of the circumference of the tree is to be excavated than the actual distance of excavation from a tree, and this is often not taken into account quite when using the SRZ.**

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