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ARBORICULTURAL ASSESSMENT ARTERIAL ROAD QUEENSTOWN



Date: 8 October 2020

| | |
|------------------|---|
| Attention: | Tony Pickard Transport Strategy Manager QLDC |
| Property Address | QLDC Private bag 50072 Queenstown. 9300 |
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| Dated: | 8 October 2020 |
| Prepared by: | New Zealand Tree Care Ltd P.O. Box 2353 Wakatipu 9349 |
| Consultant: | David Finlin Tel: 0274-334-845 |
| Status | Revised 8/10/2020 |
| Our Ref: | Elm Tree (Qtn Arterials) R20.091 |

1.0 Introduction

NZ Tree Care has been commissioned by the Queenstown Lakes District Council (**QLDC**) to assess the potential arboricultural effects related to the construction, operation and maintenance of the Arterials Project (**Project**) on trees identified as protected in the Queenstown Proposed District Plan.

The Project involves the creation of a new arterial road that delivers an alternative urban route around Queenstown's commercial area. The new route commences at the Frankton Road / Suburb Street intersection then circuits the town centre along Melbourne Street, Henry Street, Gorge Road, Memorial Street, Man Street, Thompson Street, and down to a new One Mile roundabout at the Fernhill Road/Lake Esplanade/Glenorchy Road intersection.

The construction of the Project requires the removal of one tree identified as protected in the Proposed District Plan. The impacted tree is a Horizontal or Spreading Elm tree (**Tree**) and is located in an urban area on the corner of Ballarat and Henry Streets, immediately adjacent to the proposed route. The location of the Tree is depicted in Appendices 10.1 and 10.2 of this report.

This assessment sets out:

- A description and assessment of the Tree and its values;
- An assessment of the actual and potential environmental effects resulting from the removal of the Tree; and
- Recommended mitigation measures including considering relocation of the Tree to another site.

2.0 Tree Protection information

The Tree is listed in the Schedule of Protected Trees in Chapter 32 of the Proposed District Plan (Part Five) Decision Version Sep 2020.

| Tree Ref. | Botanical Name | Legal Description | Parcel ID | Road /Water Margin |
|-----------|-----------------------------|-------------------|------------------|--------------------|
| 199 | Ulmus glabra 'horizontalis' | Section 2 Blk XVI | TN OF Queenstown | 3008324 |

The rules pertaining to the Tree are:

- Rule 32.4.2 Significant trimming, removal, damage or destruction of a protected tree or hedgerow is a discretionary activity.
- Rule (32.4.3.) Any works within the root protection zone of a protected tree is a Discretionary activity.

3.0 Tree Details

The location of the Tree is depicted in Appendices 10.1 and 10.2. It is located in a carpark on the corner of Henry and Ballarat Street.

A ground visual assessment of the Tree and site visit was undertaken on 7 September 2020. At that site visit a Tree Survey was undertaken which involved the collection of the following information to assist with the assessment of the health and value of the Tree:

- Tree ref no:** - 1. Tree name: Common name
Diameter: - Diameter of the main trunk at 1.4m above ground.
Height: -Estimated height of tree.
Vigour: - an indication of tree health based on a comparison to similar age and stature trees within the district.
 N for normal vigour.
 L for low vigour.
 P for poor to dead/dying.

Estimated canopy area to the dripline – Area in m2 of the canopy spread up to the dripline.

Canopy Spread – distance across width of canopy at widest point (canopy dripline).

Comments: - additional information.

3.1 Tree Survey Data

| Ref No | Name | Trunk Diameter | Height | Vigour | Estimated canopy area to the dripline. | Canopy spread. |
|--------|----------------|----------------|--------|--------|--|----------------------|
| 1. | Horizontal Elm | 500mm | 8-9m | N | 130 m2 | 5.5 -7.5m (diameter) |

Comments:

The tree is located on an elevated rectangle of land approximately 800mm above the height of the surrounding carpark, the elevated area is approximately 10m wide by 18m long.

In addition to the protected Horizontal Elm there are a number (20 – 30) of Elm suckers established around the perimeter of the elevated land, some with a girth of up to 150mm in diameter. These are likely to have their origin as root suckers from the rootstock of the Horizontal Elm.

The tree is showing a normal level of vigour, the annual extension growth is comparable to other Horizontal Elms within the district.

The tree's form and stature are typical of the species however there has been no canopy maintenance undertaken for many years and this, along with the establishment of the adjacent root suckers, is likely to have compromised the tree's development to some degree.

The trunk of the tree appears to have been vandalized at some point with a trunk wound about 1m above the ground on one side of the tree, the damaged trunk appears to be callusing over the wounded area.

A retaining wall is located approximately 5m to the north eastern side of the tree. The tree is estimated to be around 60 years old with a practical life expectancy of a further 80+ years.

3.2 Background History relating to the tree

It is understood that the Tree was originally planted to commemorate community efforts, in particular that of Jock Keen (a local builder), relating to the construction of a swimming pool on the site. The swimming pool was opened in 1963 and the Tree was planted soon after. As noted above, the original swimming pool and its surrounds for which the Tree was planted no longer exist.

This background information was provided to me by a resident of Ballarat Street in approximately 2003 and is quoted below.

The tree was planted by Mr George Green who once resided in a property off Beetham Street overlooking the site.

This Horizontal Elm tree and the Horizontal Elm on the ground of St Peters in Church Street were both purchased from Newman's Nursery in Gore and planted around the same time.

The tree was planted to commemorate the community efforts and enormous amount of voluntary labor, in particular that of Jock Keen (local builder) in the building of the swimming pool.

The Pool was opened by John Chewing's of the Southland Education Board on 30th of November 1963.

Lyall Barry was the headmaster of the school at the time and a keen swimmer having represented the country at the Empire Games (50s).

A group was set up to fund raise with some money coming from a council community fund and the Education department with the shortfall donated by the community.

One fund raiser scheme promoted was "Be a brick and buy a brick" for the amount of 2 & 6 bought one concrete brick.

The result being the pool was built and a Horizontal Elm planted as an excellent tree to provide summer shade, however no actual formal tree planting ceremony ever took place, but the tree survived without it and has remained relatively undisturbed to date.

In July of 2002 the Tree was considered for inclusion to the Heritage tree list and I understand it was first incorporated into the District Plan as a protected tree by Plan Change 03 – Heritage (Part 2) which was notified on 18 May 2005 and made operative in March 2008.

4.0 Tree Maintenance

The Tree appears to have had little maintenance in recent years, the surrounding area contains a number of root sucker regrowth's, which have established to a point that the tree is somewhat hidden.

Horizontal Elm trees are typically grown because of their ability to provide a broad horizontal spreading habit, which is particularly suitable for a large garden or reserve area providing shelter and shade. Examples are the tree at St. Peters and in the center of the rose garden in the Queenstown Gardens.

The tree can be pruned quite heavily, however the usual maintenance programme is to prune to encourage the spreading habit, raise the crown height for people to sit under the tree and generally remove sucker growth and deadwood.

The present site of the tree is not exactly the best to encourage the natural spreading form as there is a retaining wall along the north eastern of the site. This will not affect the health of the tree but will continue will to distort the horizontal shape of the tree.

5.0 Evaluation of the Tree – Standard Tree Evaluation Method (STEM)

The QLDC Tree Policy (September 2010) recommends the use of the RNZIH Tree Evaluation Method (STEM) to assess the health and condition of trees within Council land.

The STEM analysis is a standardized method of evaluating the health and intrinsic quality of trees. The health and intrinsic quality of a tree is evaluated based on its condition, amenity and notability. Each evaluation category is further broken down and calculated against various criterion (set out below). The STEM methodology requires an assessment of each tree or group of trees against the criteria in each category. Each criterion is awarded a point's score out of 30, these can be represented as a percentage of the optimal score with 30 points equaling 100%. The applicable scoring and associated percentages are shown below and relate to the description in each criterion.

Points 3 9 15 21 27 30
 Percentage 10% 30% 50% 70% 90% 100%

The evaluation categories and associated criteria are set out briefly below and are further detailed in Appendices 10.3 of this report.

| | |
|-----------------------------|---|
| Condition Evaluation | Form Occurrence Vigour/Vitality Function |
| Amenity Evaluation | Age Stature Visibility Proximity Role Climate |
| Notable Evaluation | -Stature Feature Form -Historic Age Association Commemoration Remnant Relict -Scientific Source Rarity Endangered |

I undertook a STEM analysis of the Tree on 18 September 2020 in order to assess its health and intrinsic values. My full STEM analysis is set out in Appendix 10.3 of this Report. Overall, I evaluated the Tree as having a STEM score of 117. A STEM score of 120 is generally a starting point for whether a tree should be considered for protection.

The tree's current Condition Evaluation is within the middle range of scoring, this reflects the minimal degree of tree maintenance to date. The trees form would potentially score higher had a greater level of general maintenance been undertaken throughout its lifespan.

The tree's Amenity Evaluation score is at the lower end of the range, because of the tree's moderate age, estimated at around 60 years old. The tree is not highly visible, less than 500m, and its Role and

Climate attributes at this site are considered minor.

With regard to the tree's Notable Evaluation, I consider the main contributing factors for this Tree's inclusion in the District Plan; Protected Tree Schedule is the commemorative association with the community's voluntary efforts to establish the swimming pool at the time and the amenity a Spreading Elm tree provided giving summer shade for the pool users. None of the other criterion in the Notable Evaluation section are relevant to this particular Tree.

On the basis of my STEM analysis, I consider the value of the Tree to be moderate.

6.0 Proposed works and Assessment of Effects

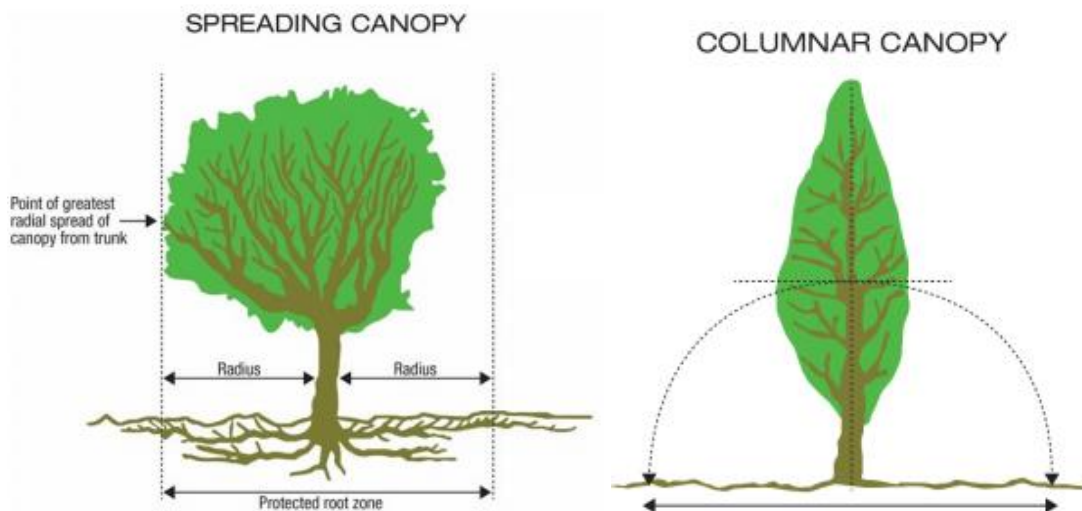
I am advised that the Project will remove the Tree to allow for the construction of a piled retaining wall. In order to construct the retaining wall, activities (such as boring of piles and drilling of rock anchors) will need to take place in the vicinity of the Tree.

I have considered whether it would be possible to construct the Project without removing, causing damage (above or below ground) or compromising the Tree's future health/growth potential.

To assist with this assessment, I have calculated the approximate Tree Root Protection Area (TRPA) necessary to maintain the tree at its present level of health. A TRPA is calculated to establish an area around the tree that will need to remain undisturbed during construction to ensure that no damage occurs. The TRPA does not have to be circular but rather is defined by what area best encapsulates the potential root system. Existing structures such as buildings, roads, services, and other environmental constraints are all to be considered.

The root protection zone is defined in the QLDC PDP¹ as:

means for a tree with a spreading canopy, the area beneath the canopy spread of a tree, measured at ground level from the surface of the trunk, with a radius to the outer most extent of the spread of the tree's branches, and for a columnar tree, means the area beneath the canopy extending to a radius half the height of the tree. As demonstrated by the diagram below.



The above diagram is a useful starting point but needs to be applied in conjunction with the arboricultural assessment. This is because differing soil types, ground surface treatments,

¹ QLDC Proposed District Plan, Chapter 2, Definitions.

tree species, root development, tree health, vigor, physical, climate and environments conditions will all impact on the way in which a tree's roots system will develop and to what extent the surrounding area will need to be protected to ensure a tree's long term health and longevity.

Applying the above guideline, for a spreading tree canopy the radius of the dripline for the Tree is approximately 5.5m in the direction of the proposed Project route.

In addition, the Tree's root system is likely to have restricted growth along the north eastern side to a point around the edge of the existing retaining wall, at approximately 5m from the base of the tree. The canopy spread in this direction has also been somewhat limited by the existing retaining wall.

On this basis, the TRPA that would be considered as the practical minimum setback from the base of the tree would be in the vicinity of 5.5m along the alignment of the existing retaining wall, extending to a radius of around 7.5m to accommodate the remaining tree canopy circumference.

This setback distance is considered to be the minimum required to provide for the Tree's present growth requirements, however to take into account future root and canopy expansion given the spreading habit of the Tree, an appropriate setback would be more in the vicinity of 10+m radius providing an area of at least 315m² to accommodate future growth.

I understand that the minimum setback distance required cannot be accommodated within the current design of the Project such that the necessary space above and below ground to ensure the Tree's long-term health and potential longevity cannot be maintained. On this basis, the Tree will need to be removed.

In addition, even if the Tree could be retained, the naturally spreading nature of the tree canopy would be further compromised by the Project's retaining wall infrastructure, reducing the amenity and visual attributes associated with the tree.

8.0 Effects of Removal

The Tree is currently constrained physically in its present location adjacent to the retaining wall, it is not highly visible and has not had any maintenance undertaken for many years. Further, the commemorative association to the Queenstown former swimming pool (no longer on the site) has been lost.

However, the Tree does provide useful amenity within this public carpark and affords summer shape, spring flowering and autumn colour. The Tree is showing a normal level of health. At around 60 years of age, it is only approaching its midlife expectancy and will therefore continue to provide an increasing degree of amenity for many years.

On balance the environmental effect of removing the Tree would in my opinion be more than minor.

7.0 Transplanting Option

A practical solution that should be considered to mitigate the effect of removal of the Tree from its present location, is transplant the Tree within the Manawa site, or to another location (such as a local reserve). Transplanting the Tree will assist to maintain the current tree population within the district. In a new reserve location, The Tree would be able to re-establish to its full potential and provide an increasing level of amenity.

Horizontal Elm is highly valued as an amenity tree and suitable for planting on council reserves to provide summer shade and form as an individual specimen tree. The Horizontal

Elm as a tree species is generally capable of being successfully transplanted as a large specimen tree. An example of this, is the Horizontal Elm in the Queenstown Rose Garden. This was transplanted to its present site from near the main gates in 1966.

Successfully transplanting a large tree is a specialist task and does require a degree of tree preparation so the more lead in time the better to accommodate the seasonal changes in the tree's growth and requirements for canopy and root pruning preparation.

The cost of transplanting a tree of this size would vary depend on whether it was to be relocated within the existing Manawa site or removed to another location.

A preliminary estimation of the cost to transplant the tree within the existing site is \$20,000 + gst and to transport the tree and transplant on another site would be more in the range of \$30,000 – \$35,000 + gst.

The horizontal spreading growth habit of the tree requires any new site to have sufficient area for tree to fully develop, giving consideration to the future growth of the tree a site would have to have the capacity to accommodate at least 315m² (10m radius) for the Tree.

9.0 Conclusion and Recommendation

Transplantation of the Tree should be considered if there is suitable local reserve space available or space available elsewhere in the Manawa site.

In my opinion, the option of transplanting the tree is a practical solution and will mitigate the effect of removal of the Tree from its present location.

Transplanting the protected tree will assist in maintaining the current tree population within the district which is increasingly under pressure as land use intensifies.

The Tree in a new reserve location could then re-establish to its full potential and continue to provide an increasing level of amenity.

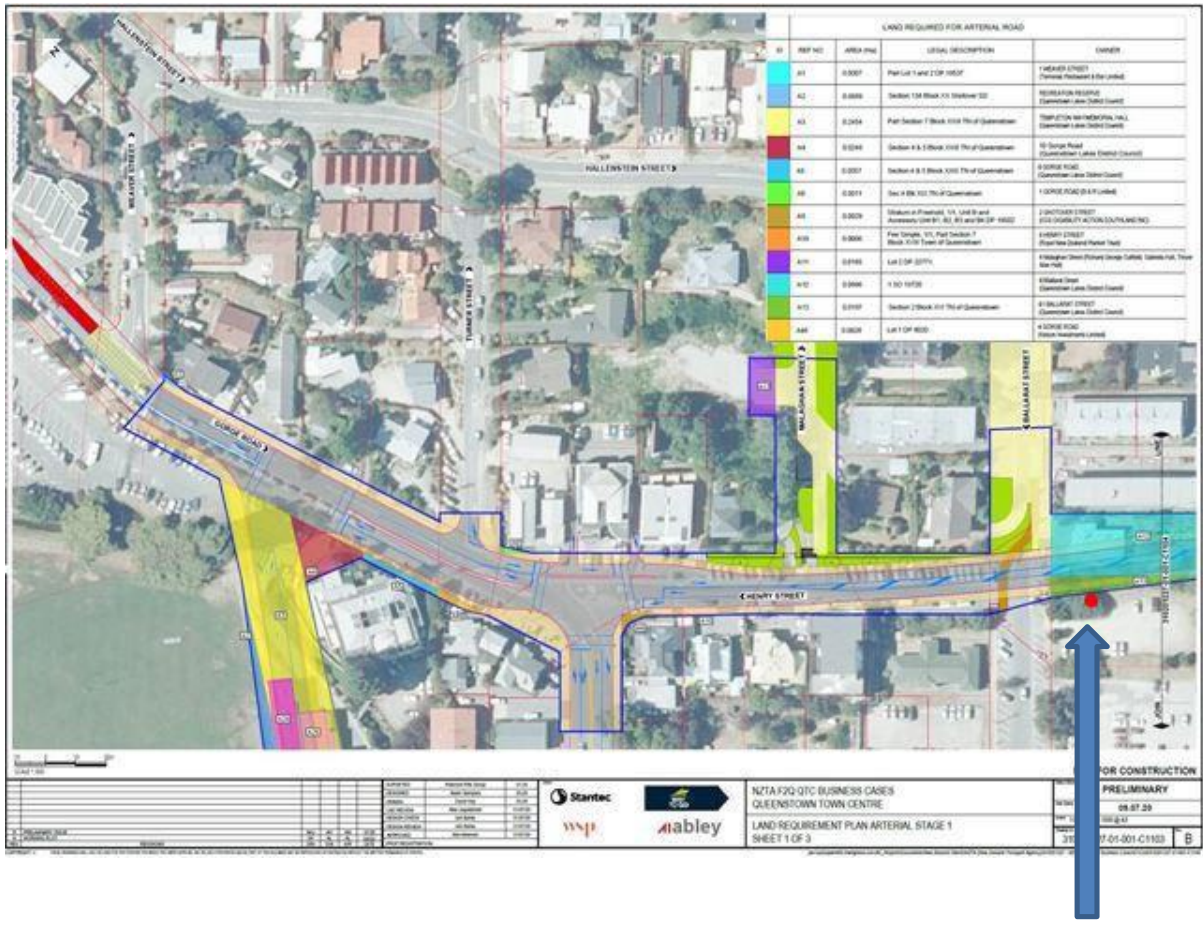
10.0 APPENDICES

10.1 TREE LOCATION

10.2 PHOTOGRAPH

10.3 STEM ASSESSMENT

10.1 TREE LOCATION



Horizontal Elm

10.2 PHOTOGRAPH



10.3 STEM ASSESSMENT

Tree Ref Number: 199

Tree Name: Spreading Elm Species: Ulmus glabra 'horizontalis'

Location: Manawa Site, Ballarat Street, Queenstown.

| Condition Evaluation | | | | | | |
|------------------------------|-------------|-----------|------------|-------------|---------------|--------------|
| Points | 3 | 9 | 15 | 21 | 27 | Score |
| Form | Poor | Moderate | Good | Very good | Specimen | 15 |
| Occurrence | Predominant | Common | Infrequent | Rare | Very Rare | 15 |
| Vigour & Vitality | Poor | Some | Good | Very Good | Excellent | 15 |
| Function | Minor | Useful | Important | Significant | Major | 9 |
| Age (yr.) | 10 yrs. + | 20 yrs. + | 40 yrs. + | 80 yrs. + | 100 yrs. + | 15 |
| Subtotal Points | | | | | | |
| Amenity Evaluation | | | | | | |
| Points | 3 | 9 | 15 | 21 | 27 | Score |
| Stature (m) | 3 to 8 | 9 to 14 | 15 to 20 | 21 to 26 | 27+ | 9 |
| Visibility (km) | 0.5 | 1.0 | 2.0 | 4.0 | 8.0 | 3 |
| Proximity | Forest | Parkland | Group 10+ | Group 3+ | Solitary | 21 |
| Role | Minor | Moderate | Important | Significant | Major | 3 |
| Climate | Minor | Moderate | Important | Significant | Major | 3 |
| Subtotal Points | | | | | | |
| Notable Evaluation | | | | | | |
| Recognition | Local | District | Regional | National | International | Score |
| Points | 3 | 9 | 15 | 21 | 27 | |
| Stature | | | | | | |
| - Feature | | | | | | |
| - Form | | | | | | |
| Historic | | | | | | |
| - Age 100+ | | | | | | |
| - Association | | | | | | |
| - Commemoration | | | | | | 9 |
| - Remnant | | | | | | |
| - Relict | | | | | | |
| Scientific | | | | | | |
| - Source | | | | | | |
| - Rarity | | | | | | |
| - Endangered | | | | | | |
| Subtotal Points | | | | | | |
| Total Points | | | | | | 117 |

STEM Advice Notes

Condition Evaluation

Form

This includes shape and symmetry being typical, good, poor etc. for the species as well as including branching structure.

Occurrence

This has been evaluated considering the local tree stock in the Queenstown area, with the obviously most common vegetation type scored as predominant.

Vigour/Vitality

The Evaluation process is an assessment of the health of the tree.

Due to the timing of the assessment, the tree was devoid of foliage due to seasonal leaf abscission. This absence limits the accuracy of the evaluation, where size, density, discoloration and distortion of leaf could not be assessed for the determination of vitality.

For this reason, other indications were utilized, including the hue of the canopy, density of buds. Specific to vigour, previous and current growth increments were observed when identified from ground level.

Function

Trees are multi functioning green infrastructure assets that provide essential environmental and ecological services which increase in quantity and quality as the tree(s) grows and decrease in quantity and quality as tree health declines.

“Function” is a measure of the number of Environmental and Ecological factors that the tree provides and is based on the environmental and ecological services that trees in general provide.

Function (Usefulness) that trees provide:

- flowers, fruit, foliage, timber;
- oxygen;
- improve air quality (carbon sequestration and removal of other gaseous and particulate pollution);
- manage and improve storm water run-off and quality (improving quality relates to removing phosphorous, nitrogen and some metals in trace amounts, filtering and buffering for waterways);
- recycling of mineral nutrients;
- soil stabilization and erosion protection;
- wildlife corridor, refuge, shelter or food source;
- critical habitat for indigenous or endemic flora and fauna;
- noise amelioration;
- shade (includes climate change amelioration such as urban heat reduction by cooling hot surfaces, pedestrian and cyclist comfort and UV protection, shading of waterways, buildings, playgrounds.
- shelter (from wind, rain, also rain interception).

Age

This is a particularly difficult area of the STEM evaluation unless the age is known.

Tree age can be broadly identified comparatively based on a tree of x years in age comparison to another tree of x year in age and given species typical development in the region.

Amenity Evaluation

Stature

This is scored in meters and considers the subject trees greatest dimension whether that is height or crown spread.

Visibility

This is applied considering the distance a person would be able to view and distinguish the tree or group of trees being assessed. This score related to proximity and stature of the tree as well as the geographical topography.

Proximity

Large statured trees which were growing in association with other smaller shrubs or trees could be determined as solitary if this tree dominated the others into insignificance in comparison and was considered appropriate by the assessing arborist.

Due to the gap between a solitary tree and 3+ in the STEM evaluation, two trees of the same species growing together were also considered solitary for this purpose, where two trees of differing species were considered in the group 3+.

Role

This is a subjective criterion when the assessor determines the trees contribution to the local landscape in purely aesthetical terms. In this criterion the location, prominence and visual catchment are key factors to consider when attributing a score to the positive visual influence of this tree(s) in this location.

Timing is also a factor as people will often associate an increased level of amenity with autumn colour, flowering or fruiting as being more highly valued. Considering this is species dependent; a tree's score would vary depending on the time of assessment.

Climate

This criterion had a direct relationship with the associated land use in proximity to the tree(s) being assessed. Factors considered were dwellings, car parks, seating or recreation areas, as well as stock shelter. In this instance minor (3) is the default and it was a requirement for the subject tree to have a direct benefit on something adjacent to provide shelter from the various elements. A group of trees would also generally, be more valued in this criterion.

Notable Evaluation

Trees scored in the notable evaluation section are scored conservatively and only where it is considered that the tree is an exceptional example or known historical association.

The age, association and commemoration components are not scored unless historical evidence is applicable.

- Stature

- Feature

Trees score in this criterion for being of very high prominence or being easily recognizable as valued in their growing environment.

- Form

Trees only score in this criterion if they are impressive examples of their species as determined by the assessing arborist.

-Historic

To be scored only when supported by evidence.

- Age

To be scored only when supported by evidence.

- Association

To be scored only when supported by evidence.

- Commemoration

To be scored only when supported evidence.

- Remnant

Scores are given in this section for trees which existed as part of a previous land use or activity and remain; and only where evidence is provided.

- Relict

This section applies to trees considered to be part of an original forest which has now been modified from their original growing environment (forest trees now growing in urban subdivision). Trees are only scored here when supported by evidence.

Scientific

- Source

Where evidence is found that would indicate that the tree(s) have exceptional history in relation to their seed source or any distinctive variation of the species.

- Rarity

This would only apply if the species being assessed was the only known example of the species, subspecies, variety or cultivar in the area and applied accordingly, to various level of significance e.g. local, district, region etc.

STEM acknowledges that the New Zealand Botanical Society should also be utilized to confirm rarity.

- Endangered

This would only apply when a species is being predated to a point where this threatens the survival of this genus or species.

PLEASE NOTE: New Zealand Tree Care Ltd has taken every effort to ensure that all statements in this report are accurate and correct at the time of the assessment. However, trees are a natural, dynamic living entity and as such it is not possible to fully guarantee growth characteristics etc. This report is supplied as guide to the management of the tree. All inspections have taken place from ground level and no samples have been taken. No internal decay diagnostic equipment was used. All dimensions and tree numbers have been estimated.