

# Arboricultural Report

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## Christchurch City Council Avon River Stopbanks Land Drainage Recovery Programme 507 Project (Updated Tree Report)



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## 1.0 Executive Summary

This report provides information relating to street and park trees within the vicinity of the works required for the implementation of the Avon River Stopbanks Management Project (Land Drainage Recovery Programme 507 Project). The report was commissioned by Bob Mohammed, Project Manager, Land Drainage Recovery Programme team, Christchurch City Council, and was originally produced on 19 January 2017. The report has been updated to include Christchurch Replacement District Plan tree rules that recently became operative and minor changes to the tree planting plans.

In May 2016 the Council approved the staff recommendation for fast tracking strengthening work on the Avon River Stopbanks and to progress works to raise the stopbanks. The Council's Land Drainage Recovery Programme team has investigated the condition of the stopbanks, determining risks to the stopbanks during future earthquakes, flood events and tidal flows, and has developed the design for managing the stopbanks to extend their lifespan for up to 20 years.

The project is within the Central-Heathcote-Linwood and the Burwood-Coastal areas. This report supports applications to the Central-Heathcote-Linwood Community Board and the Burwood-Coastal Community Board for the removal of trees on Council land, and relates to the second stage of the works programme.

The first stage of the works programme includes the reconstruction of isolated sections of the stopbanks that were originally constructed using sandbags. The tree removals for this part of the project were approved by the former Burwood-Pegasus Community Board, and the first stage is currently under construction. The second stage of the works programme includes various sections along both sides of the Avon River from Swans Road to Bexley Wetland.

The stopbanks were originally installed as part of the earthquake emergency works, and at that time the primary focus was flood prevention. Due to site constraints and other factors such as the level of urgency involved in the initial stopbank works, the stopbanks were constructed around a large number of trees. Since the earthquakes there has been a decline in the health of numerous trees located within Avon River corridor, and a large number of trees within the vicinity of the stopbanks are now in a state of decline. The decline exhibited by many of the trees is progressive and irreversible.

A tree survey has been carried out to assess the condition of the trees located within the vicinity of the stopbanks. The condition of each tree that will require removal has been evaluated using the Christchurch City Council tree assessment system. The tree assessment results are contained in Appendix 1 and Appendix 2 of this report and the assessment method is outlined in Appendix 3.

Arboricultural input has been provided to inform the design, and the design process has considered the current condition of individual trees within the vicinity of the stopbanks.

Trees located within the stopbanks have the potential to cause damage to the stopbanks, and could cause the structural integrity of a stopbank to be compromised. Some examples of where this could occur are; where the trunk or root system expands through typical tree growth, where significant tree movement occurs, where a tree produces sucker growth, and where the trunk or root system of a tree deteriorates. The stopbank management project will remove trees that are dead or in an advanced state of decline. This will provide an opportunity for the tree stumps and root systems to be removed during the works.

The retained trees located within the vicinity of the stopbanks will be monitored to ensure that the trees do not affect the integrity of the stopbanks, especially trees in a very poor and deteriorating condition and where trees are producing extensive suck growth. Further tree removals will be required in the future as trees continue to decline and where they cause damage to the stopbanks. This will be coordinated with the Parks Unit.

The project design has allowed for the retention of as many trees as possible, and wherever possible healthy trees are to be retained and protected from potential damage during the construction works. The removal of some healthy trees is required to achieve the construction requirements of stopbanks. This is due to the design and construction requirements and site constraints; such as the limited space between the river and road edge and other site features, including trees that can be retained.

The locations of the trees to be removed and the replacement tree planting locations and species are outlined in this report and shown on the Avon River Stopbanks Management Project (LDRP 507) drawings.

## 1.1 Tree Removals

### Central-Heathcote-Linwood

Forty-eight (48) trees are to be removed in the Central-Heathcote-Linwood area. During the survey the trees to be removed were found to be in the following condition.

- 6 trees in Fair condition
- 7 trees in Poor condition
- 35 trees in Very Poor condition (including 3 dead/almost dead)

The trees in Fair condition that will require removal are six (6) Lombardy Poplar (*Populus nigra Italica*) trees located on Avonside Drive, opposite Avon Park. There is inadequate space between the river and the road edge to change the location of the stopbank, and this section of the stopbank requires extensive works that will result in the removal of the trees.

### Burwood-Coastal

One hundred and thirty-seven (137) are trees to be removed within the Burwood-Coastal area for the stopbanks programme of works. During the survey the trees to be removed were found to be in the following condition.

- 2 trees in Good condition
- 50 trees in Fair condition
- 37 trees in Poor condition
- 48 trees in Very Poor condition (including 19 dead/almost dead)

Thirty-six (36) of the trees assessed as being in Good condition and Fair condition that require removal are small trees (up to 4.0 metres in height).

Seven (7) of the trees assessed as being in Fair condition that require removal are Grey Poplar (*Populus canescens*), Bolle's Poplar (*Populus alba Pyramidalis*) and Tree of Heaven (*Ailanthus altissima*), and are producing sucker growth that is causing damage to the stopbanks.

Six (6) of the trees assessed as being in Fair condition that require removal are directly within the existing stopbanks, and extensive works within the immediate vicinity of the trees will result in the removal of the trees.

Three (3) of the trees assessed as being in Fair condition require removal for the construction of a new section of stopbank where design options are limited by the available space and the presence of other trees, and alignment has been chosen in order to retain as many trees as possible.

In addition to the stopbank works required within the Burwood Coastal area, the project will involve a new earth bund being constructed for flood prevention within the pump station site at 205 New Brighton Road. It is possible that approximately six (6) mature exotic trees and thirty (30) semi-mature native trees (mostly in mixed native species groups) will require removal of within the pump station site. The final design for this part of the project has yet to be finalised. In addition to the replacement tree planting outlined below, it is expected that the final design will include replacement tree planting within the site.

## **1.2 Replacement Tree Planting**

A number of factors have influenced the replacement planting plan, including; the current site conditions, the residential red zone and roads that are out of service, site constraints such as the stopbanks and proximity to roads, the existing tree cover within specific areas, and the appropriateness of existing tree species.

It will not be possible to plant the majority of replacement trees in locations where they are removed and with the same species. Also, it will not be viable to transplant any of the trees that have been identified to be removed, due to the size, age and condition of the trees and site constraints.

Replacement tree planting is expected to occur during the winter planting season, and should include an establishment maintenance programme of at least twelve (12) months. Prior to planting, tree planting sites should be assessed to investigate existing soil quality and appropriate tree pit soil mix should be used where required.

The replacement tree planting quantities outlined below include mitigation for the tree removals within the Stage 1 (sandbag replacement sections of the stopbanks) and Stage 2 of the programme of works.

### **Central-Heathcote-Linwood**

One hundred and three (103) replacement trees are to be planted within the Central-Heathcote-Linwood area. This will include the following mix of native and exotic tree species.

- 40 exotic trees
- 63 native trees

### **Burwood-Coastal**

Two hundred and six (206) replacement trees are to be planted within the Burwood-Coastal area. This will include the following mix of native and exotic tree species.

- 48 exotic trees
- 158 native trees

### **1.3 District Plan Requirements**

The following sections of the Christchurch Replacement District Plan (CRDP) have been considered in relation to the proposed tree and vegetation removals for the implementation of the stopbank works. This includes;

- 6.6 Water Body Setbacks
- 9.1 Indigenous Biodiversity and Ecosystems
- 9.4 Significant and Other Trees

#### **Tree and vegetation removals:**

The stopbanks works will involve the removal of street trees that are more than 6.0 metres in height, and the rules outlined in 9.4.4.1, P6 will therefore apply. As the trees are within former Category C Special Purpose Road Zone streets, the existing Global Consent (RMA92019127) can be used for the removal of the trees for the stopbank works, and a separate resource consent is not required for the removal of those trees.

A separate resource consent will be required for the removal of any trees that are more than 10.0 metres in height for the works at the Pump Station 205 site (205 New Brighton Road), as the trees are within a park or public open space (and the Global Consent will not apply).

No other park or public open space trees that are more than 10.0 metres in height have been identified to be removed for the stopbank works.

The removal of indigenous vegetation is exempt from the Site of Ecological Significance rules where it is required for activities that are related to flood protection or drainage works, and as the proposed removal of vegetation is permitted (due to the activity type) a resource consent will also not be required for the removal of vegetation within areas that are identified as a Water Body Setback.

#### **Works within the vicinity of trees:**

A resource consent is usually required for works within 5.0 metres of street trees that are more than 6.0 metres in height and park trees that are more than 10.0 metres in height (under the provisions of 9.4.4.1 P12). As the Avon River Stopbank Management are considered to be hazard mitigation works, the associated earthworks are exempt from the rules outlined in part 9.4.4.1 P12 (as outlined in part 8.5A.3 Exemptions), and a resource consent will not be required for works within the vicinity of the trees.

However, the CCC Construction Standard Specification (CSS), Part 1, Section 19.0: protection of natural assets and habitats outlines tree protection requirements and methodologies, and it is recommended that this section of the CSS or any relevant amendments are complied with for the duration of the construction works.

Trees that are retained within the vicinity of the works are to be protected from potential construction related damage, and further arboricultural assessments will be required during the works to ensure that appropriate tree protection measures are implemented.

In addition to this, the Contractor that is engaged to carry out the construction works should appoint a Supervising Arborist and produce a Tree Management Plan that is to be approved by the Council's Arborist before the commencement of the site works.

## 2.0 Site & Tree Details

### 2.1 Central-Heathcote-Linwood

The Central-Heathcote-Linwood area includes the sections of the Avon River corridor from the Central City Area to Banks Avenue on the northern side of the river and Bickerton Street on the southern side of the river. Within this area there are forty-eight (48) trees that will require removal, and it is proposed that one hundred and three (103) replacement trees are planted.

#### 2.1.1 Tree Removals

During the survey the trees to be removed were found to be in the following condition.

- 6 trees in Fair condition
- 7 trees in Poor condition
- 35 trees in Very Poor condition (including 3 dead/almost dead)

The majority of these trees will be removed due to their current Poor or Very Poor condition, and the potential for the trees to affect the integrity of stopbanks due to deterioration of tree trunks or root systems within the stopbanks. This will allow for the tree stumps and root systems to be removed during the works.

The condition of retained trees that are in a poor condition will be monitored to ensure that a further deterioration in their condition does not affect the integrity of the stopbanks. Further tree removals will be required in the future as trees continue to decline, and this will be coordinated with the Parks Unit.

Six (6) Lombardy Poplar (*Populus nigra Italica*) trees that are in Fair condition will require removal on Avonside Drive, opposite Avon Park. This section of Avonside Drive is open to traffic, and there is a requirement that the stopbank does not encroach into the road.

There is inadequate space between the river and the road edge to change the location of the stopbanks, and to achieve the design and construction requirements this section of the stopbank requires extensive works that will result in the removal of the trees.

The tree asset identification numbers for these trees are: 80991, 80992, 80993, 80998, 81000 and 80001. Other trees within this section of the stopbanks that are identified to be removed for the works are in poor condition.



Figure 1: Example of trees in very poor condition, Avonside Drive.



Figure 2: Example of trees within a section of stopbank on Avonside Drive to be removed (opposite Avon Park).

### 2.1.2 Replacement Tree Planting

Factors that have influenced the replacement planting plan include current site conditions, residential red zone and roads that are now closed, site constraints such as the stopbanks and proximity to roads, the existing tree cover within specific areas, and the appropriateness of existing tree species.

It is proposed that the following tree planting occurs within the Central-Heathcote-Linwood area:

| Location   | Quantity / Species  | Comments  |
|--|---|---|
| Avonside Drive:<br>Fitzgerald Avenue to<br>Stanmore Road                     | 3 x Willow<br>( <i>Salix babylonica</i> )<br>7 x Mixed Native tree<br>species | This will build on the existing willows and mixed native species within this section.   |
| Avonside Drive:<br>Opposite 104 to 112                                       | 2 x Swamp Cypress<br>( <i>Taxodium distichum</i> )                            | A large growing exotic coniferous species suited to wet sites; this will be consistent with existing Swamp Cypress within this section.   |
| Avonside Drive:<br>Woodham Road to<br>Swans Road                             | 13 x Swamp Cypress<br>( <i>Taxodium distichum</i> )                           | A large growing exotic coniferous species suited to wet sites; this will continue and reinforce the existing dominant species from Stanmore Road.   |
| River Road:<br>Opposite 199 to 201   | 6 x Mixed Native trees<br>species   | This will build on the existing mixed native planting on the southern side of the Swans Road bridge.  |
| Avonside Drive:<br>Opposite 450 to 494                                       | 35 x Kahikatea<br>( <i>Dacrycarpus dacrydioides</i> )                         | A large growing native coniferous species suited to wet sites; this is a low damp margin opposite Dallington Terrace, and the trees will be planted in groups.  |
| Avonside Drive:<br>Opposite 630 to 648                                       | 3 x Tupelo<br>( <i>Nyssa sylvatica</i> )                                      | A large growing exotic deciduous species suited to wet sites; this will be consistent with existing exotic deciduous tree species within the vicinity.  |
| Avonside Drive:<br>Gayhurst Road bridge to<br>opposite 670 Avonside<br>Drive | 9 x Kahikatea<br>( <i>Dacrycarpus dacrydioides</i> )                          | A large growing native coniferous species suited to wet sites; planted in 3 groups of 3 trees.  |
| Avonside Drive:<br>Opposite 678 to 738                                       | 8 x Broad-leaved Lime<br>( <i>Tilia platyphyllos</i> )                        | A large growing exotic deciduous species that was dominant in some areas along River Road and Avonside Drive, but many have declined in health since the earthquakes; this will reinforce an existing dominant species within the area.                 |
| Avonside Drive:<br>Opposite 752 and 772                                      | 6 x Kahikatea<br>( <i>Dacrycarpus dacrydioides</i> )                          | A large growing native coniferous species suited to wet sites; planted in 2 groups of 3 trees.  |
| Avonside Drive:<br>Porritt Park (Hockey<br>Lane to Hockey Lane)              | 9 x Willow<br>( <i>Salix babylonica</i> )                                     | A large growing exotic deciduous species that is suited to wet sites; this will reinforce an existing dominant species within the area, and will assist with the replacement of Willow trees that have been removed due to age/condition and EQ damage. |
| Avonside Drive:<br>Opposite 78 Wainoni<br>Road                               | 2 x Broad-leaved Lime<br>( <i>Tilia platyphyllos</i> )                        | A large growing exotic deciduous species; this will be consistent with existing exotic deciduous tree species within the vicinity.  |

Mixed Native tree species include:

- Kowhai (*Sophora microphylla*)
- Cabbage Tree (*Cordyline australis*)
- Ngaio (*Myoporum laetum*)
- Wineberry (*Aristotelia serrata*)
- Kanuka (*Kunzea ericoides*)



## 2.2 Burwood-Coastal

The Burwood-Coastal area includes the sections of the Avon River corridor from Banks Avenue on the northern side of the river and Bickerton Street on the southern side of the river to South New Brighton. For the stopbanks works within this area there are one hundred and thirty-seven (137) trees that will require removal, and it is proposed that two hundred and six (206) replacement trees are planted.

Also, approximately thirty-six (36) trees will require removal of within the pump station site at 205 New Brighton Road. The final design for this part of the project has yet to be finalised, and it is expected that the final design will include replacement tree planting within the site.

### 2.2.1 Tree Removals

During the survey the trees to be removed were found to be in the following condition.

- 2 trees in Good condition
- 50 trees in Fair condition
- 37 trees in Poor condition
- 48 trees in Very Poor condition (including 19 dead/almost dead)

Eighty-five (85) of the trees to be removed are in Poor or Very Poor condition. Whilst most of the trees that are in Poor condition will be removed for design and construction reasons, many of these trees have the potential to affect the integrity of stopbanks due to deterioration of tree trunks or root systems within the stopbanks. The removal of these trees during the stopbanks works programme will allow for the tree stumps and root systems to be removed.

The condition of retained trees that are in a poor condition will be monitored to ensure that a further deterioration in their condition does not affect the integrity of the stopbanks, and further tree removals will be required as trees continue to decline, and this will be coordinated with the Parks Unit.

Some tree species have produced sucker growth within the stopbanks, which can damage the stopbanks.

These tree species include Grey Poplar (*Populus canescens*), Bolle's Poplar (*Populus alba Pyramidalis*), and Tree of Heaven (*Ailanthus altissima*).

Trees are to be removed as part of the stopbanks works programme where the sucker growth that has been produced is causing damage to the stopbanks.

This includes seven (7) trees of the trees to be removed that are in Fair condition.



Figure 3: Example of trees in very poor condition, New Brighton Road (near Pratt Street).



Figure 4: Example of sucker growth from Grey Poplar trees on opposite side of stopbank, Evans Avenue.

The trees assessed as being in Good condition and Fair condition that require removal also include the following thirty-six (36) small trees:

- 1 Cabbage Tree (*Cordyline australis*); 3.5 metres in height in Avonside Drive.
- 4 Kohuhu (*Pittosporum tenuifolium*); up to 4.0 metres in height in New Brighton Road (2 in Good condition and 2 in Fair condition).
- 1 Ribbonwood (*Plagianthus regius*); 4.0 metres in height in New Brighton Road.
- 1 Flowering Cherry (*Prunus x yedoensis*); 2.5 metres in height in New Brighton Road.
- 3 Kowhai (*Sophora microphylla*); up to 2.5 metres in height in New Brighton Road.
- 26 Cabbage Tree (*Cordyline australis*); up to 3.0 metres in height in Evans Avenue.



Figure 5: Example of small trees to be removed for the stopbank works programme, Evans Avenue.

The remaining nine (9) trees that require removal for the works programme are in Fair condition, and are medium to very large size trees. This includes the following:

Three (3) trees require removal for the construction of a new section of stopbank between 935 Avonside Drive and the Wainoni Road intersection; 81162 Corkscrew Willow (*Salix matsudana* Tortuosa), 81170 Caucasian Ash (*Fraxinus oxycarpa*) and 81178 Lombardy Poplar (*Populus nigra* Italica).

In this area the alignment of the new section of stopbank is limited by the available space between the river and the road edge, and the presence of other trees. The proposed alignment has been chosen in order to retain as many trees as possible whilst meeting the project design objectives. It is proposed that the subject trees are removed, and a resource consent will be required for the removal of these trees as a new section of stopbank is to be constructed.



Figure 6: Example of tree to be removed for new section of stopbank; Tree 81170 opposite 918 Avonside Drive.

The following six (6) trees in Fair condition are directly within the existing stopbanks, and these trees will require removal for the works.

Tree 81704 Lombardy Poplar (*Populus nigra* Italica) located opposite 241 Locksley Avenue, Tree 81589 Lombardy Poplar (*Populus nigra* Italica) located opposite 980 Avonside Drive, Tree 81606 Black Poplar (*Populus nigra*) located opposite 1046 Avonside Drive, Tree 81624 Corkscrew Willow (*Salix matsudana* Tortuosa) located opposite 1080 Avonside Drive, Tree 81625 Black Poplar (*Populus nigra*) located opposite 1082 Avonside Drive, and Tree 81629 Lombardy Poplar (*Populus nigra* Italica) located opposite 1090 Avonside Drive.



Figure 7: Example of tree in Fair condition to be removed due to the extent of works that is required; 81625 opposite 1082 Avonside Drive.

In addition to the works required for the management of the stopbanks, the project will involve a new earth bund to be constructed for flood prevention within the pump station site at 205 New Brighton Road.

It is possible that approximately six (6) mature exotic trees and thirty (30) semi-mature native trees (mostly in mixed native species groups) will require removal of within the pump station site.

The final design for this part of the project has yet to be finalised, and it is expected that the final design will include replacement tree planting within the site.



Figure 8: Pump Station site, 205 New Brighton Road.

### 2.2.2 Replacement Tree Planting

Factors that have influenced the replacement planting plan include current site conditions, residential red zone and roads that are now closed, site constraints such as the stopbanks and proximity to roads, the existing tree cover within specific areas, and the appropriateness of existing tree species.

It is proposed that the following tree planting occurs within the Burwood-Coastal area:

| Location   | Quantity / Species  | Comments  |
|--|---|---|
| Dallington Terrace:<br>River Road to opposite<br>53 Dallington Terrace | 11 x Broad-leaved Lime<br>( <i>Tilia platyphyllos</i> )       | A large growing exotic deciduous species that was dominant in some areas along River Road and Avonside Drive, but many have declined in health since the earthquakes; this will reinforce an existing dominant species within the area.   |
| Wainoni Road<br>Opposite 102 to 108                                    | 7 x Hornbeam<br>( <i>Carpinus betulus</i> )                   | A large growing exotic deciduous species with a broadly spreading canopy shape; this will build on the existing street tree planting along Wainoni Road (which is the upright form of the same species).  |
| Avonside Drive<br>Opposite 910 to 912                                  | 2 x Upright English Oak<br>( <i>Quercus robur</i> Fastigiata) | A narrow upright growing exotic deciduous species that has been used extensively in Porritt Park; this will build on the existing trees within the park.  |
| Avonside Drive<br>Opposite 1122 to 1138                                | 4 x Willow<br>( <i>Salix babylonica</i> )                     | A large growing exotic deciduous species that is suited to wet sites; this will reinforce an existing dominant species within the area, and will assist with the replacement of Willow trees that have been removed due to age/condition and EQ damage (also, this area is opposite the Stage 1 site on New Brighton Road where willow trees were removed). |
| Avonside Drive<br>Opposite 1144 to<br>Avondale Road                    | 14 x Totara<br>( <i>Podocarpus totara</i> )                   | A large growing native species that tolerates the site conditions in this area; this species will reinforce the existing native plantings that have occurred within this area in recent years, and will be planted in 4 groups.   |
| Locksley Avenue:<br>Opposite 125 to 159                                | 9 x Willow<br>( <i>Salix babylonica</i> )                     | A large growing exotic deciduous species that is suited to wet sites; this will reinforce an existing dominant species within the area, and will assist with the replacement of Willow trees that have been removed due to age/condition and EQ damage (this area is opposite the Canterbury Rowing Club)   |

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| Location  | Quantity / Species  | Comments  |
|---|---|---|
| New Brighton Road:<br>Locksley Avenue<br>intersection           | 5 x Broad-leaved Lime<br>( <i>Tilia platyphyllos</i> )<br>5 x Almond<br>( <i>Prunus dulcis</i> )  | <i>Tilia sp.</i> are large growing exotic deciduous trees that were dominant in some areas along River Road and Avonside Drive, but many have declined in health since the earthquakes; this will reinforce an existing dominant species within the area.<br>Almond is a small to medium size tree with white blossoms in early spring, and produces edible nuts; to be planted in a group. |
| New Brighton Road:<br>Avondale Road<br>intersection             | 18 x Mixed Native tree<br>species   | This will build on the existing 2 mixed native planting areas, on the eastern and western sides of the bridge.  |
| 350 New Brighton Road<br>(Amelia Rogers Reserve)                | 2 x Sweet Chestnut<br>( <i>Castanea sativa</i> )<br>3 x Common Walnut<br>( <i>Juglans regia</i> ) | Both are large growing exotic deciduous species that produce edible nuts; these trees will be planted within the vicinity of an existing Sweet Chestnut tree.   |
| New Brighton Road:<br>Opposite Barkers Lane                     | 8 x Maungapiko<br>( <i>Metrosideros x</i><br>"Maungapiko")  | Maungapiko is a Rata/Pohutukawa hybrid; this species will reinforce an existing dominant native theme within the area and will be planted in 2 groups.  |
| New Brighton Road:<br>Wainoni Road<br>intersection              | 5 x Kowhai<br>( <i>Sophora microphylla</i> )  | This species will reinforce an existing dominant native theme within the area and will be planted in a group on the western side of the bridge.   |
| New Brighton Road:<br>Opposite Bower Avenue                     | 6 x Maungapiko<br>( <i>Metrosideros x</i><br>"Maungapiko")  | Maungapiko is a Rata/Pohutukawa hybrid; this species will reinforce an existing dominant native theme within the area and will be planted in 2 groups.  |
| New Brighton Road:<br>Opposite Baker Street to<br>Rawson Street | 70 x Mixed Native tree<br>species   | This will reinforce an existing dominant native theme within the area, and the trees will be planted in 3 groups.   |
| Owles Terrace:<br>Pages Road intersection                       | 3 x Pohutukawa<br>( <i>Metrosideros excelsa</i><br>"Maori Princess")                              | A large growing native species that will complement the existing landscape plans for New Brighton; to be planted on the south-eastern side of the bridge.   |
| 24 Admirals Way<br>(Withells Island Reserve)                    | 34 x Mixed Native tree<br>species   | This will reinforce an existing dominant native theme within the area, and the trees will be planted to expand 2 existing groups of mixed native species.   |

Mixed Native tree species include:

- Kowhai (*Sophora microphylla*)
- Cabbage Tree (*Cordyline australis*)
- Ngaio (*Myoporum laetum*)
- Kanuka (*Kunzea ericoides*)
- Maungapiko (*Metrosideros x 'Maungapiko'*)

### **3.0 Tree Protection Requirements**

#### **3.1 District Plan Rules**

The following sections of the Christchurch Replacement District Plan have been considered in relation to the proposed tree and vegetation removals for the implementation of the stopbank works.

- **9.4 Significant and Other Trees**

The stopbanks works will involve the removal of street trees that are more than 6.0 metres in height. The rules outlined in 9.4.4.1, P6 will apply to the removal of street trees that are more than 6.0 metres in height, and a resource consent is required for the removal of those trees. As the trees are within former Category C Special Purpose Road Zone streets, the existing Global Consent (RMA92019127) can be used for the removal of the trees for the stopbank works, and a separate resource consent is not required for the removal of those trees.

A separate resource consent will be required for the removal of any trees that are more than 10.0 metres in height for the works at the Pump Station 205 site (205 New Brighton Road), as the trees are within a park or public open space (and the Global Consent will not apply).

A resource consent is usually required for works within 5.0 metres of street trees that are more than 6.0 metres in height and park trees that are more than 10.0 metres in height (under the provisions of 9.4.4.1 P12). As the works are considered to be hazard mitigation works, the associated earthworks are exempt from the rules in part 9.4.4.1 P12 (as outlined in part 8.5A.3 Exemptions), and a resource consent will not be required for works within the vicinity of the trees.

- **9.1 Indigenous Biodiversity and Ecosystems**

The project will involve works along the edge of the Avon River, which is an area that is identified in the Christchurch Replacement District Plan as a Site of Ecological Significance (SES/LP/24; Avon River and main tributaries). The proposed works will result in the removal of indigenous vegetation within this area (which would normally require a resource consent).

The removal of indigenous vegetation is exempt from the Site of Ecological Significance rules where it is required for activities that are related to flood protection or drainage works undertaken or authorised by the Council. Therefore, a resource consent will not be required for the removal of indigenous vegetation.

- **6.6 Water Body Setbacks**

The project will involve works along the edge of the Avon River, and will result in the removal of vegetation within areas that are identified in the Christchurch Replacement District Plan as water body setbacks (which would normally require a resource consent). As the proposed removal vegetation is permitted (as outlined above) a resource consent will not be required for the removal of vegetation within the water body setback.

#### **3.2 Tree Protection During Construction**

Trees that are retained within the vicinity of the works are to be protected from potential construction related damage. To achieve this, further arboricultural assessments and recommendations will be required during the works to ensure that appropriate tree protection measures are implemented.

The CCC Construction Standard Specification (CSS), Part 1, Section 19.0: protection of natural assets and habitats outlines tree protection requirements and methodologies, and it is recommended that this section of the CSS or any relevant amendments are complied with for the duration of the construction works.

The Contractor that is engaged to carry out the construction works should appoint a Supervising Arborist, and produce a Tree Management Plan that is to be approved by the Council's Arborist before the commencement of the site works. The Contractor's Tree Management Plan should be comprehensive and address all aspects of the works, including any associated infrastructure such as drainage, etc.

#### **4.0 Recommendations**

- 4.1 It is recommended that the tree removals outlined in this report are approved for the implementation of the Stage 2 of the stopbanks programme of works and the works within the pump station site at 205 New Brighton Road.

This will result in the removal of one hundred and eighty-five (185) street and park trees, and approximately thirty-six (36) trees within the pump station site at 205 New Brighton Road.

- 4.2 It is recommended that all trees that are retained within the vicinity of the works receive adequate tree protection to prevent damage during the works. The Contractor that is engaged to carry out the construction works should appoint a Supervising Arborist, and produce a Tree Management Plan that is to be approved by the Council's Arborist before the commencement of the site works within the vicinity of trees.

- 4.3 It is recommended that the condition of retained trees be monitored to ensure that the stopbanks are not adversely affected by the trees, such as where there is a further deterioration in the condition of trees or where sucker growth is produced within the stopbanks.

Further tree removals will be required in the future as trees continue to decline or damage the stopbanks, and this should be coordinated with the Christchurch City Council Parks Unit.

- 4.4 It is recommended that the proposed replacement tree planting is implemented as mitigation for the tree removals. This will include three hundred and nine (309) street and park trees, and landscaping within the pump station site.

- 4.5 It is recommended that the proposed replacement tree planting is carried out during the winter planting season, the replacement trees should receive at least twelve (12) months establishment maintenance, and tree planting sites should be assessed to investigate existing soil quality and appropriate tree pit soil mix should be used where required.

**Laurie Gordon**  
**Consulting Arborist**

AVON RIVER STOPBANKS MANAGEMENT PROJECT

**Central-Heathcote-Linwood Area: Trees in Fair Condition**

| Street         | Number             | Tree ID | Species               | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments  |
|----------------|--------------------|---------|-----------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Avonside Drive | Opposite Avon Park | 80991   | Populus nigra Italica | 30.0   | 4.0           | 1.10 | 3           | 3         | 3                 | Foliage density becoming sparse                       |
| Avonside Drive | Opposite Avon Park | 80992   | Populus nigra Italica | 26.0   | 6.0           | 1.00 | 3           | 3         | 3                 | Foliage density becoming sparse                       |
| Avonside Drive | Opposite Avon Park | 80993   | Populus nigra Italica | 30.0   | 9.0           | 1.25 | 3           | 3         | 3                 | Partially suppressed, foliage density becoming sparse |
| Avonside Drive | Opposite Avon Park | 80998   | Populus nigra Italica | 32.0   | 7.0           | 0.95 | 3           | 3         | 3                 | Foliage density becoming sparse in mid canopy         |
| Avonside Drive | Opposite Avon Park | 81000   | Populus nigra Italica | 29.0   | 7.0           | 0.87 | 3           | 3         | 3                 | Foliage density becoming sparse in mid canopy         |
| Avonside Drive | Opposite Avon Park | 81001   | Populus nigra Italica | 29.0   | 9.0           | 1.30 | 3           | 3         | 3                 | Foliage density becoming sparse in mid canopy         |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

**Central-Heathcote-Linwood Area: Trees in Poor and Very Poor Condition**

| Street         | Number | Tree ID | Species            | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments   |
|----------------|--------|---------|--------------------|--------|---------------|------|-------------|-----------|-------------------|--|
| River Road     | 311    | 69106   | Ulmus x Lobel      | 10.0   | 6.0           | 0.25 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| River Road     | 317    | 100697  | Fraxinus excelsior | 17.0   | 13.0          | 0.90 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| River Road     | 319    | 100698  | Tilia x europaea   | 16.0   | 12.0          | 0.80 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| River Road     | 367    | 43291   | Ulmus procera      | 16.0   | 18.0          | 0.70 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| River Road     | 373    | 43289   | Ulmus procera      | 17.0   | 15.0          | 0.65 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| River Road     | 381    | 43287   | Ulmus procera      | 17.0   | 15.0          | 0.70 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| River Road     | 387    | 43285   | Ulmus procera      | 18.0   | 20.0          | 0.65 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| Avonside Drive | 284    | 69130   | Salix babylonica   | 15.0   | 16.0          | 1.10 | 4           | 4         | 4                 | More than 30% foliage density loss, structural deterioration |
| Avonside Drive | 284    | 69128   | Betula pendula     | 12.0   | 10.0          | 0.60 | 5           | 5         | 5                 | More than 70% foliage density loss                           |
| Avonside Drive | 284    | 69127   | Alnus glutinosa    | 10.0   | 9.0           | 0.50 | 5           | 5         | 5                 | Advanced decline/Dead tree                                   |
| Avonside Drive | 362    | 80749   | Fraxinus ornus     | 5.0    | 4.0           | 0.25 | 5           | 4         | 5                 | Advanced decline/Dead tree                                   |
| Avonside Drive | 378    | 80755   | Fraxinus excelsior | 8.0    | 6.0           | 0.25 | 5           | 4         | 5                 | More than 70% foliage density loss                           |



AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street         | Number | Tree ID | Species            | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments                           |
|----------------|--------|---------|--------------------|--------|---------------|------|-------------|-----------|-------------------|------------------------------------|
| Avonside Drive | 382    | 80757   | Fraxinus americana | 8.0    | 6.0           | 0.20 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 394    | 80763   | Fraxinus excelsior | 12.0   | 14.0          | 0.65 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 398    | 80764   | Fraxinus excelsior | 14.0   | 15.0          | 0.75 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 398    | 80765   | Fraxinus excelsior | 14.0   | 16.0          | 0.73 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 406    | 80769   | Fraxinus excelsior | 13.0   | 15.0          | 0.75 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 418    | 80771   | Fraxinus excelsior | 12.0   | 12.0          | 0.55 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 436    | 80780   | Fraxinus excelsior | 12.0   | 12.0          | 0.50 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 488    | 80801   | Tilia x europaea   | 15.0   | 12.0          | 0.65 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 490    | 80803   | Tilia x europaea   | 14.0   | 12.0          | 0.60 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 492    | 80804   | Tilia x europaea   | 16.0   | 13.0          | 0.65 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 498    | 80806   | Tilia x europaea   | 16.0   | 13.0          | 0.70 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 502    | 80813   | Tilia x europaea   | 17.0   | 14.0          | 0.75 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Avonside Drive | 512    | 80815   | Tilia x europaea   | 16.0   | 15.0          | 0.85 | 5           | 4         | 5                 | More than 70% foliage density loss |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street         | Number | Tree ID | Species               | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments                                       |
|----------------|--------|---------|-----------------------|--------|---------------|------|-------------|-----------|-------------------|--|
| Avonside Drive | 512    | 80828   | Tilia x europaea      | 16.0   | 13.0          | 0.90 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 528    | 80835   | Tilia x europaea      | 16.0   | 14.0          | 0.70 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 532    | 80837   | Tilia x europaea      | 4.0    | 2.0           | 1.00 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 544    | 80843   | Tilia x europaea      | 14.0   | 16.0          | 0.85 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 550    | 80845   | Populus deltoides     | 22.0   | 16.0          | 0.85 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 550    | 80890   | Tilia x europaea      | 13.0   | 17.0          | 0.70 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 560    | 80894   | Tilia x europaea      | 10.0   | 13.0          | 0.50 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 564    | 80895   | Fraxinus excelsior    | 12.0   | 16.0          | 0.55 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 570    | 80897   | Fraxinus excelsior    | 10.0   | 10.0          | 0.40 | 5           | 4         | 5                 | More than 70% foliage density loss             |
| Avonside Drive | 746    | 80978   | Ulmus glabra          | 12.0   | 22.0          | 1.00 | 4           | 4         | 4                 | 50% foliage density loss and significant decay |
| Avonside Drive | 752    | 80980   | Trachycarpus fortunei | 4.0    | 1.5           | 0.18 | 5           | 5         | 5                 | Advanced decline/Dead tree                     |
| Avonside Drive | 772    | 80984   | Tilia platyphyllos    | 4.0    | 4.0           | 0.18 | 4           | 3         | 4                 | More than 50% foliage density loss             |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street                               | Number             | Tree ID | Species               | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments   |
|--------------------------------------|--------------------|---------|-----------------------|--------|---------------|------|-------------|-----------|-------------------|--|
| Avonside Drive                       | Opposite Avon Park | 80995   | Salix fragilis        | 16.0   | 18.0          | 1.68 | 4           | 4         | 4                 | More than 50% foliage density loss                           |
| Avonside Drive                       | Opposite Avon Park | 80999   | Populus nigra Italica | 32.0   | 8.0           | 1.20 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Kerrs Road - Avonside Drive Frontage | 156                | 81019   | Acacia baileyana      | 13.0   | 15.0          | 0.90 | 3           | 4         | 4                 | Some dieback, several included unions and structural failure |
| Avonside Drive                       | 884                | 81102   | Fraxinus americana    | 7.0    | 11.0          | 0.35 | 5           | 4         | 5                 | More than 70% foliage density loss                           |
| Wainoni Road                         | 78                 | 81110   | Eucalyptus nicholii   | 9.0    | 10.0          | 0.35 | 4           | 3         | 4                 | More than 30% foliage density loss                           |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

**Burwood-Coastal Area: Trees in Good and Fair Condition**

| Street            | Number | Tree ID | Species                     | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments  |
|-------------------|--------|---------|-----------------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Locksley Avenue   | 205    | 81698   | Populus alba<br>Pyramidalis | 20.0   | 17.0          | 1.07 | 3           | 3         | 3                 | Potential damage due to extensive sucker growth within stopbank |
| Locksley Avenue   | 241    | 81704   | Populus nigra<br>Italica    | 23.0   | 9.0           | 0.94 | 3           | 3         | 3                 |   |
| New Brighton Road | 219    | 81751   | Pittosporum<br>tenuifolium  | 4.0    | 4.5           | 0.06 | 2           | 3         | 3                 |   |
| New Brighton Road | 227    | 81753   | Pittosporum<br>tenuifolium  | 3.5    | 4.5           | 0.06 | 2           | 2         | 2                 |   |
| New Brighton Road | 227    | 81754   | Pittosporum<br>tenuifolium  | 3.5    | 4.0           | 0.06 | 2           | 2         | 2                 |   |
| New Brighton Road | 227    | 81755   | Plagianthus<br>regius       | 4.0    | 4.0           | 0.15 | 3           | 3         | 3                 |   |
| New Brighton Road | 229    | 81756   | Pittosporum<br>tenuifolium  | 3.5    | 3.0           | 0.25 | 2           | 3         | 3                 |   |
| New Brighton Road | 241    | 81758   | Prunus x<br>Yedoensis       | 2.5    | 4.0           | 0.20 | 2           | 3         | 3                 |   |
| Avonside Drive    | 902    | 81146   | Cordyline<br>australis      | 3.5    | 3.0           | 0.15 | 3           | 3         | 3                 |   |
| Avonside Drive    | 908    | 81162   | Salix matsudana<br>Tortuosa | 13.0   | 11.0          | 0.46 | 3           | 3         | 3                 | Previous structural failures                                    |
| Avonside Drive    | 918    | 81170   | Fraxinus oxycarpa           | 16.0   | 18.0          | 0.75 | 3           | 3         | 3                 | Foliage density becoming sparse, previous structural failures   |
| Avonside Drive    | 926    | 81178   | Populus nigra<br>Italica    | 21.0   | 8.0           | 0.85 | 3           | 3         | 3                 |   |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street            | Number | Tree ID | Species                     | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments  |
|-------------------|--------|---------|-----------------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Avonside Drive    | 980    | 81589   | Populus nigra<br>Italica    | 24.0   | 8.0           | 0.87 | 3           | 3         | 3                 | Foliage density becoming sparse, isolated dieback   |
| Avonside Drive    | 1046   | 81606   | Populus nigra               | 22.0   | 19.0          | 0.93 | 3           | 3         | 3                 | Foliage density becoming sparse, dieback in upper canopy. Sucker growth growing through the stopbank. |
| Avonside Drive    | 1080   | 81622   | Populus alba<br>Pyramidalis | 20.0   | 18.0          | 1.13 | 2           | 3         | 3                 | Extensive sucker growth within stopbank   |
| Avonside Drive    | 1080   | 81623   | Populus alba<br>Pyramidalis | 19.0   | 16.0          | 1.20 | 3           | 3         | 3                 | Extensive sucker growth within stopbank   |
| Avonside Drive    | 1080   | 81624   | Salix matsudana<br>Tortuosa | 6.0    | 7.0           | 0.26 | 3           | 3         | 3                 |   |
| Avonside Drive    | 1082   | 81625   | Populus nigra               | 23.0   | 30.0          | 1.74 | 3           | 3         | 3                 | Foliage density becoming sparse, isolated dieback   |
| Avonside Drive    | 1090   | 81629   | Populus nigra<br>Italica    | 24.0   | 8.0           | 1.10 | 3           | 3         | 3                 |   |
| Avonside Drive    | 1098   | 81633   | Populus alba<br>Pyramidalis | 18.0   | 15.0          | 1.10 | 3           | 3         | 3                 | Extensive sucker growth within stopbank   |
| Avonside Drive    | 1132   | 81660   | Ailanthus<br>altissima      | 6.0    | 6.0           | 0.12 | 3           | 3         | 3                 | Weed species, producing sucker growth within stopbank   |
| New Brighton Road | 409    | 46021   | Sophora<br>microphylla      | 2.0    | 1.5           | 0.03 | 3           | 3         | 3                 |   |
| New Brighton Road | 409    | 46019   | Sophora<br>microphylla      | 2.5    | 2.0           | 0.04 | 3           | 3         | 3                 |   |
| New Brighton Road | 409    | 46017   | Sophora<br>microphylla      | 2.5    | 2.0           | 0.05 | 2           | 3         | 3                 |   |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street       | Number | Tree ID | Species             | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments |
|--------------|--------|---------|---------------------|--------|---------------|------|-------------|-----------|-------------------|----------|
| Evans Avenue | 24     | 81834   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 24     | 81835   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 24     | 81836   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 24     | 81837   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 24     | 81838   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 24     | 81840   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 24     | 81841   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 22     | 81842   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 22     | 81843   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 22     | 81844   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 20     | 81847   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 20     | 81849   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |
| Evans Avenue | 20     | 81850   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |          |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street       | Number | Tree ID | Species             | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments                                |
|--------------|--------|---------|---------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Evans Avenue | 20     | 81851   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 20     | 81852   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 18     | 81853   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 18     | 81855   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 18     | 81856   | Cordyline australis | 1.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 18     | 81857   | Populus canescens   | 8.0    | 14.0          | 0.30 | 3           | 3         | 3                 | Extensive sucker growth within stopbank |
| Evans Avenue | 16     | 81858   | Populus canescens   | 9.0    | 13.0          | 0.40 | 3           | 3         | 3                 | Extensive sucker growth within stopbank |
| Evans Avenue | 14     | 81862   | Cordyline australis | 3.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 14     | 81863   | Cordyline australis | 3.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 14     | 81864   | Cordyline australis | 3.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 14     | 81865   | Cordyline australis | 3.0    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 10     | 81867   | Cordyline australis | 1.5    | 0.5           | 0.05 | 3           | 3         | 3                 |   |
| Evans Avenue | 10     | 81868   | Cordyline australis | 1.5    | 0.5           | 0.05 | 3           | 3         | 3                 |   |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street       | Number | Tree ID | Species             | Height | Canopy Spread | DBH | Tree Health | Tree Form | Overall Condition | Comments |
|--------------|--------|---------|---------------------|--------|---------------|-----|-------------|-----------|-------------------|----------|
| Evans Avenue | 10     | 81873   | Cordyline australis | 1.5    | 1.0           | N/A | 3           | 3         | 3                 |          |
| Evans Avenue | 10     | 81874   | Cordyline australis | 0.5    | 0.7           | N/A | 3           | 3         | 3                 |          |

**Burwood-Coastal Area: Trees in Poor and Very Poor Condition**

| Street                              | Number | Tree ID | Species               | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments  |
|-------------------------------------|--------|---------|-----------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Dallington Terrace                  | 18     | 80882   | Populus yunnanensis   | 16.0   | 20.0          | 0.8  | 5           | 5         | 5                 | More than 70% foliage density loss  |
| Dallington Terrace                  | 7      | 81027   | Platanus x acerifolia | 12.0   | 15.0          | 0.7  | 5           | 5         | 5                 | More than 70% foliage density loss. This tree was included in the tree report for Stage 1, and has deteriorated to the point of requiring removal |
| Locksley Avenue                     | 9      | 81039   | Betula pendula        | 11.0   | 9.0           | 0.42 | 4           | 3         | 4                 | More than 30% foliage density loss  |
| Locksley Avenue                     | 21     | 81046   | Ulmus procera         | 6.5    | 4.5           | 0.23 | 5           | 4         | 5                 | More than 70% foliage density loss  |
| Locksley Avenue                     | 23     | 81047   | Salix babylonica      | 15.0   | 19.0          | 1.08 | 4           | 4         | 4                 | 50% foliage density loss, poor structural integrity and failures  |
| Tilbury Plc - Locksley Ave Frontage | 2      | 81081   | Malus domestica       | 4.0    | 3.0           | 0.25 | 4           | 4         | 4                 | Structural deterioration and multiple failures, and more than 30% foliage density loss - outside of works area but potential risk to river bank   |



AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street            | Number | Tree ID | Species                       | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments   |
|-------------------|--------|---------|-------------------------------|--------|---------------|------|-------------|-----------|-------------------|--|
| Locksley Avenue   | 95     | 81085   | Betula pendula                | 12.0   | 10.0          | 0.47 | 4           | 4         | 4                 | Structural deterioration and 50% foliage density loss        |
| Locksley Avenue   | 177    | 81683   | Betula pendula                | 7.0    | 7.0           | 0.33 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Locksley Avenue   | 197    | 81695   | Salix x sepulcralis           | 4.0    | 6.0           |      | 5           | 5         | 5                 | Stump regrowth from removed tree                             |
| Locksley Avenue   | 233    | 81702   | Betula pendula                | 10.0   | 9.0           | 0.32 | 5           | 5         | 5                 | Advanced decline/Dead tree                                   |
| Locksley Avenue   | 259    | 81708   | Populus alba<br>Pyramidalis   | 12.0   | 15.0          | 0.88 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Locksley Avenue   | 305    | 81728   | Populus alba<br>Pyramidalis   | 10.0   | 7.0           | 0.30 | 5           | 4         | 5                 | More than 70% foliage density loss                           |
| New Brighton Road | 191    | 81740   | Populus<br>yunnanensis        | 15.0   | 16.0          | 0.66 | 4           | 3         | 4                 | Extensive crown dieback possibly affecting 70% of the canopy |
| Avonside Drive    | 948    | 81195   | Populus nigra<br>Italica      | 22.0   | 6.0           | 0.80 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Avonside Drive    | 966    | 81580   | Populus simonii<br>Fastigiata | 13.0   | 10.0          | 0.47 | 3           | 4         | 4                 | Structural deterioration due to decay and radial cracks      |
| Avonside Drive    | 970    | 81582   | Salix babylonica              | 13.0   | 16.0          | 0.80 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Avonside Drive    | 976    | 81585   | Populus nigra<br>Italica      | 26.0   | 8.0           | 0.85 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Avonside Drive    | 986    | 81593   | Fraxinus<br>americana         | 8.5    | 9.0           | 0.32 | 4           | 3         | 4                 | More than 30% foliage density loss                           |
| Avonside Drive    | 1040   | 81602   | Pyrus communis                | 11.0   | 10.0          | 0.55 | 4           | 3         | 4                 | More than 30% foliage density loss. Retaining wall.          |
| Avonside Drive    | 1042   | 81605   | Fraxinus<br>americana         | 9.0    | 11.0          | 0.33 | 5           | 4         | 5                 | More than 70% foliage density loss                           |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street            | Number | Tree ID | Species                 | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments  |
|-------------------|--------|---------|-------------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Avonside Drive    | 1046   | 81607   | Populus nigra           | 22.0   | 19.0          | 1.85 | 5           | 4         | 5                 | More than 70% foliage density loss                              |
| Avonside Drive    | 1062   | 81613   | Populus nigra Italica   | 25.0   | 7.0           | 0.90 | 4           | 3         | 4                 | More than 30% foliage density loss                              |
| Avonside Drive    | 1072   | 81620   | Platanus orientalis     | 13.0   | 8.0           | 0.45 | 4           | 3         | 4                 | More than 30% foliage density loss                              |
| Avonside Drive    | 1088   | 81627   | Populus nigra           | 22.0   | 25.0          | 1.74 | 4           | 3         | 4                 | More than 30% foliage density loss                              |
| Avonside Drive    | 1094   | 81631   | Koelreuteria paniculata | 3.0    | 3.0           | 0.08 | 4           | 4         | 4                 | 50% foliage density loss  |
| Avonside Drive    | 1106   | 81639   | Salix babylonica        | 14.0   | 18.0          | 0.75 | 4           | 4         | 4                 | Structural deterioration and more than 30% foliage density loss |
| Avonside Drive    | 1106   | 81640   | Acer pseudoplatanus     | 4.0    | 4.0           | 0.17 | 5           | 4         | 5                 | Structural deterioration and more than 70% foliage density loss |
| New Brighton Road | 350    | 127982  | Castanea sativa         | 3.0    | 3.5           | 0.20 | 5           | 5         | 5                 | Advanced decline/Dead tree                                      |
| New Brighton Road | 366    | 127969  | Alnus glutinosa         | 5.0    | 2.0           | 0.10 | 4           | 3         | 4                 | More than 30% foliage density loss                              |
| New Brighton Road | 370    | 127974  | Quercus                 | 4.0    | 2.5           | 0.20 | 5           | 5         | 5                 | Advanced decline/Dead tree                                      |
| New Brighton Road | 370    | 127972  | Alnus glutinosa         | 6.0    | 5.0           | 0.20 | 4           | 3         | 4                 | More than 30% foliage density loss                              |
| New Brighton Road | 386    | 127959  | Alnus glutinosa         | 5.0    | 3.0           | 0.15 | 5           | 5         | 5                 | Advanced decline/Dead tree                                      |
| New Brighton Road | 388    | 127957  | Alnus glutinosa         | 10.0   | 6.0           | 0.40 | 5           | 5         | 5                 | Advanced decline/Dead tree                                      |
| New Brighton Road | 401    | 81385   | Acer pseudoplatanus     | 8.0    | 9.0           | 0.38 | 5           | 5         | 5                 | Advanced decline/Dead tree                                      |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street                        | Number | Tree ID | Species             | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments                           |
|-------------------------------|--------|---------|---------------------|--------|---------------|------|-------------|-----------|-------------------|------------------------------------|
| Hulverstone Drive             | 180    | 81239   | Sophora tetraptera  | 4.0    | 1.0           | 0.05 | 5           | 5         | 5                 | Advanced decline/Dead tree         |
| Mervyn Drive - Hulverstone Dr | 36     | 81251   | Plagianthus regius  | 5.0    | 2.0           | 0.17 | 4           | 4         | 4                 | More than 30% foliage density loss |
| Hulverstone Drive             | 143    | 81254   | Plagianthus regius  | 6.0    | 3.0           | 0.16 | 4           | 3         | 4                 | More than 30% foliage density loss |
| Hulverstone Drive             | 135    | 81255   | Plagianthus regius  | 4.0    | 2.0           | 0.10 | 4           | 4         | 4                 | More than 30% foliage density loss |
| Hulverstone Drive             | 131    | 81256   | Plagianthus regius  | 6.0    | 3.0           | 0.17 | 5           | 5         | 5                 | Tree in major decline, 90% dead    |
| Hulverstone Drive             | 131    | 81257   | Salix fragilis      | 11.0   | 16.0          | 1.00 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Hulverstone Drive             | 117    | 81263   | Plagianthus regius  | 5.0    | 3.0           | 0.23 | 5           | 4         | 5                 | More than 70% foliage density loss |
| Hulverstone Drive             | 113    | 81268   | Plagianthus regius  | 4.0    | 2.0           | 0.14 | 5           | 5         | 5                 | Advanced decline/Dead tree         |
| Hulverstone Drive             | 113    | 81269   | Plagianthus regius  | 6.0    | 2.0           | 0.20 | 5           | 5         | 5                 | Advanced decline/Dead tree         |
| Hulverstone Drive             | 103    | 81271   | Plagianthus regius  | 5.0    | 2.0           | 0.15 | 5           | 5         | 5                 | Advanced decline/Dead tree         |
| Hulverstone Drive             | 53     | 81290   | Alnus glutinosa     | 3.5    | 3.0           | 0.08 | 5           | 5         | 5                 | Advanced decline/Dead tree         |
| Hulverstone Drive             | 45     | 81386   | Plagianthus regius  | 4.5    | 5.0           | 0.22 | 5           | 5         | 5                 | Advanced decline/Dead tree         |
| Hulverstone Drive             | 45     | 81387   | Populus yunnanensis | 12.0   | 13.0          | 0.38 | 4           | 3         | 4                 | More than 50% foliage density loss |
| Hulverstone Drive             | 35     | 81392   | Sophora tetraptera  | 3.5    | 3.0           | 0.11 | 5           | 5         | 5                 | Advanced decline/Dead tree         |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street            | Number | Tree ID | Species              | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments  |
|-------------------|--------|---------|----------------------|--------|---------------|------|-------------|-----------|-------------------|---|
| Hulverstone Drive | 27     | 81394   | Pittosporum ralphii  | 4.0    | 5.0           | 0.12 | 5           | 4         | 5                 | More than 70% foliage density loss                          |
| Hulverstone Drive | 22     | 81397   | Plagianthus regius   | 6.0    | 5.0           | 0.26 | 5           | 4         | 5                 | More than 70% foliage density loss                          |
| Hulverstone Drive | 22     | 81404   | Metrosideros excelsa | 1.0    | 0.8           | N/A  | 5           | 4         | 5                 | Tree in major decline, 95% dead                             |
| Hulverstone Drive | 6      | 81413   | Dodonaea viscosa     | 4.0    | 3.0           | 0.15 | 5           | 5         | 5                 | Tree dead and fallen into river                             |
| Hulverstone Drive | 6      | 81415   | Plagianthus regius   | 4.0    | 3.0           | 0.14 | 5           | 4         | 5                 | More than 70% foliage density loss                          |
| New Brighton Road | 487    | 81438   | Plagianthus regius   | 5.0    | 5.0           | 0.25 | 4           | 4         | 4                 | Included stem union, and more than 50% foliage density loss |
| New Brighton Road | 537    | 81939   | Plagianthus regius   | 7.0    | 6.0           | 0.45 | 4           | 4         | 4                 | More than 50% foliage density loss                          |
| New Brighton Road | 538    | 81940   | Quercus robur        | 11.0   | 12.0          | 0.75 | 4           | 4         | 4                 | More than 50% foliage density loss                          |
| New Brighton Road | 539    | 81943   | Quercus robur        | 10.0   | 12.0          | 0.75 | 4           | 4         | 4                 | More than 50% foliage density loss                          |
| New Brighton Road | 539    | 81945   | Ulmus procera        | 6.0    | 4.0           | 0.12 | 5           | 5         | 5                 | Tree dead and fallen into river                             |
| New Brighton Road | 541    | 81947   | Quercus robur        | 11.0   | 18.0          | 1.03 | 5           | 5         | 5                 | Tree dead and fallen into river                             |
| New Brighton Road | 542    | 81948   | Ulmus procera        | 9.0    | 14.0          | 0.59 | 5           | 5         | 5                 | Tree dead and fallen into river                             |
| New Brighton Road | 544    | 81960   | Myoporum laetum      | 5.0    | 10.0          | 0.00 | 5           | 5         | 5                 | Advanced decline/Dead tree                                  |
| New Brighton Road | 544    | 81964   | Quercus robur        | 10.0   | 8.0           | 0.50 | 5           | 5         | 5                 | Advanced decline/Dead tree                                  |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street            | Number | Tree ID | Species                 | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments   |
|-------------------|--------|---------|-------------------------|--------|---------------|------|-------------|-----------|-------------------|--|
| New Brighton Road | 548    | 81966   | Myoporum laetum         | 4.5    | 6.0           | 0.22 | 5           | 5         | 5                 | Advanced decline/Dead tree                                       |
| New Brighton Road | 548    | 81968   | Myoporum laetum         | 6.0    | 9.0           | 0.35 | 5           | 5         | 5                 | Advanced decline/Dead tree                                       |
| Falconwood Grove  | 19     | 81443   | Betula pendula          | 9.0    | 7.5           | 0.40 | 5           | 4         | 5                 | Structural deterioration and more than 70% foliage density loss  |
| Falconwood Grove  | 25     | 81448   | Eucalyptus grandis      | 18.0   | 11.0          | 0.56 | 4           | 4         | 4                 | More than 30% foliage density loss                               |
| Bexley Road       | 73F    | 82004   | Pittosporum ralphii     | 3.0    | 4.0           | 0.12 | 4           | 3         | 4                 | More than 30% foliage density loss                               |
| Bexley Road       | 73F    | 82006   | Pittosporum tenuifolium | 3.0    | 3.0           | 0.18 | 4           | 3         | 4                 | More than 30% foliage density loss                               |
| Wairake Lane      | 4      | 82056   | Hoheria sixtylosa       | 4.0    | 4.0           | 0.20 | 5           | 5         | 5                 | Advanced decline/Dead tree                                       |
| Owles Terrace     | 15     | 81789   | Tamarix ramosissima     | 8.0    | 7.0           | 0.30 | 3           | 4         | 4                 | Poor structural integrity, tree leaning towards road             |
| Owles Terrace     | 25     | 81797   | Myoporum laetum         | 2.0    | 3.0           | 0.15 | 5           | 4         | 5                 | More than 70% foliage density loss                               |
| Owles Terrace     | 25     | 81799   | Myoporum laetum         | 3.0    | 4.0           | 0.22 | 5           | 5         | 5                 | Advanced decline/Dead tree                                       |
| Owles Terrace     | 25     | 81801   | Tamarix ramosissima     | 6.0    | 8.0           | 0.35 | 3           | 4         | 4                 | Poor structural integrity  |
| Evans Avenue      | 22     | 81845   | Ulmus x hollandica      | 4.0    | 5.0           | 0.25 | 4           | 4         | 4                 | Previous branch failures, and more than 30% foliage density loss |
| Evans Avenue      | 20     | 81848   | Ulmus procera           | 2.0    | 2.0           | 0.05 | 4           | 4         | 4                 | Poor structural integrity, more than 30% foliage density loss    |

AVON RIVER STOPBANKS MANAGEMENT PROJECT

| Street        | Number | Tree ID | Species             | Height | Canopy Spread | DBH  | Tree Health | Tree Form | Overall Condition | Comments   |
|---------------|--------|---------|---------------------|--------|---------------|------|-------------|-----------|-------------------|--|
| Evans Avenue  | 16     | 81859   | Populus canescens   | 7.0    | 6.0           | 0.20 | 3           | 4         | 4                 | Poor structural integrity due to inclusion of limb at base                                     |
| Evans Avenue  | 14     | 81861   | Tamarix ramosissima | 5.0    | 8.0           | 0.10 | 4           | 5         | 5                 | Tree in river, failed at included unions near ground level, more than 30% foliage density loss |
| Evans Avenue  | 19     | 81877   | Cordyline australis | 1.7    | 2.0           | 0.30 | 3           | 4         | 4                 | Original tree removed, remaining regrowth from old stump                                       |
| Wairoa Street | 20     | 46173   | Ulmus procera       | 2.0    | 2.0           | 0.02 | 5           | 5         | 5                 | Tree topped, leaving a high stump  |
| Wairoa Street | 20     | 46171   | Ulmus procera       | 2.0    | 2.0           | 0.02 | 5           | 5         | 5                 | Tree topped, leaving a high stump  |
| Wairoa Street | 20     | 46170   | Ulmus procera       | 2.0    | 2.0           | 0.02 | 5           | 5         | 5                 | Tree topped, leaving a high stump  |
| Wairoa Street | 30     | 46168   | Ulmus procera       | 2.0    | 2.0           | 0.02 | 5           | 5         | 5                 | Tree topped, leaving a high stump  |
| Wairoa Street | 32     | 46167   | Ulmus procera       | 2.0    | 2.0           | 0.02 | 5           | 5         | 5                 | Tree topped, leaving a high stump  |
| Wairoa Street | 31     | 81879   | Acer pseudoplatanus | 6.0    | 6.0           | 0.15 | 5           | 4         | 5                 | More than 70% foliage density loss   |
| Parenga Place | 7      | 81891   | Olearia traversii   | 4.0    | 2.0           | 0.20 | 5           | 4         | 5                 | More than 70% foliage density loss   |

## Christchurch City Council Tree Assessment Method

The tree inspections for this report included non-invasive visual tree assessment methods, and the condition of each tree was scored using the Christchurch City Council tree assessment system.

The condition of a tree is scored as Very Good (1), Good (2), Fair (3), Poor (4) or Very Poor (5). This relates to the Health and Form of a tree (Form includes the structural integrity and the shape of a tree). The overall condition rating provided is the worst score for either Health or Form (e.g. if a tree scores Good for Health and Poor for Form, the Condition rating will be Poor).

**Very Good for Health;** where a tree is above average for the species, and has no more than approximately 5% decline.

**Very Good for Form;** where a tree has no structural defects or abnormalities, and no more than approximately 5% of the overall canopy shape is missing or modified.

**Good for Health;** where a tree has no more than approximately 6-10% decline.

**Good for Form;** where tree defects do not affect the structural integrity or continued well-being of the tree, and no more than approximately 6-10% of canopy the shape is missing or modified.

**Fair for Health;** where a tree has approximately 11-30% decline.

**Fair for Form;** where defects are present, but can be rectified in order to maintain the structural integrity and continued well-being of tree, or approximately 11-30% of the canopy shape is missing or modified.

**Poor for Health;** where a tree exhibits approximately 31-70% decline.

**Poor for Form;** where approximately 31-70% of the canopy shape is missing, modified or misshapen, or where tree maintenance is unlikely to improve the framework or the continued well-being of tree, or where defects result in loss of structural integrity that may be mitigated but is unlikely to be rectified.

**Very Poor for Health;** where a tree is in more than approximately 70% state of decline.

**Very Poor for Form;** where more than approximately 70% of the canopy shape is missing, modified or misshapen, or where tree maintenance cannot improve the framework or the continued well-being of tree, or where defects result in loss of structural integrity that cannot be mitigated or rectified.