

REDEVELOPMENT OF THE SYDNEY FISH MARKET PYRMONT

Revised Arboricultural Assessment

Prepared for

Context Landscape Design

August 2010

Prepared by

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1.0 INTRODUCTION

- 1.1** The following report has been prepared for Context Landscape Design to provide an updated assessment of the trees within the area affected by the current Sydney Fish Market (SFM) Proposed Redevelopment adjacent to Banks Street, Pyrmont.
- 1.2** The report reviews the current condition and viability of only those trees affected by the current master plan proposals, and compares them to their status in 2002. The trees along the Pyrmont Bridge Rd frontage are unaffected by the current design proposal and are not included in this report.
- 1.3** The report provides an assessment of the suitability of the specimens for retention or relocation. It also provides summary information regarding any apparent defects in the trees, factors that need to be taken into consideration in their retention or removal. An assessment of the six Canary Is. Date Palms adjacent to the waterfront are also included in this report to address issues raised by the Dept. of Commerce – Government Architect.
- 1.4** All of the trees across the site have been reviewed at different stages over the last 12 years. The tree numbering used in the schedule in this report follows the same numbering used in previous reports. This report should be read in conjunction with information and recommendations provided in the following reports:
- Sydney Fish Market Master Plan - Tree Impact Statement - 15th March 2003.*
Prepared by Garry Clubley for Sydney Harbour Foreshore Authority.
- Sydney Fish Market Master Plan - Arboricultural Assessment - 7th November 2002.*
Prepared by Garry Clubley for Sydney Harbour Foreshore Authority
- Assessment of Hills Figs at Sydney Fish Market - 3rd October 1998.* Prepared by Garry Clubley for Context Landscape Design and Sydney Fish Market.
- 1.5** In preparing this report, the following documents have been reviewed:
- Land Survey – 14th April 2010.* Prepared by Hill and Blume Consulting Surveyors
- Sydney Fish Market Redevelopment – Plans Dwg. 10034 SK001 - SK001 and Elevations and Sections Dwg. 10034 SK201-02 & Dwg. 10034 SK301-02 – Prepared by Conybeare Morrison International P/L 2nd June 2010*

- 1.6** The mature *Ficus microcarpa* var. *hillii* (Hill's Weeping Fig) located on the former Banks St. were previously assessed in October 1998. Reference can be made to that report for a detailed discussion of issues relating to the figs at that time. This report provides an updated assessment of their status in the context of the current master plan.
- 1.7** This report only deals with the condition and suitability of the trees at this time. The potential for the trees to be impacted upon as a consequence of any work arising from the SFM Master Plan or any later redevelopment of the site should be assessed at the stage that such information becomes available. Information regarding the current condition of the trees is presented in the following Tree Assessment Schedules.
- 1.8** Refer to Figure 1 "Tree Location Plan" (Page 20 of this report) for the locations of trees identified in the Tree Inventory and Assessment Schedules.

2.0 SUMMARY

2.1 SUMMARY ASSESSMENT & CONCLUSIONS TABLE

Tree No.	Botanical Name	Common Name	Recommended Action	Rationale
9	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Retain	Reasonable specimen. Not affected by current Redevelopment proposal. No conflicts apparent with infrastructure at this stage.
10	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Retain	Reasonable specimen. Not affected by current Redevelopment proposal. No conflicts apparent with infrastructure at this stage.
11	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Retain	Reasonable specimen. Not affected by current Redevelopment proposal. No conflicts apparent with infrastructure at this stage.
12	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Remove and replace with better specimen	Not affected by current Redevelopment proposal. Poor branch structure liable to failure over medium term and young age indicate removal is preferred regardless of design.
13	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Remove and replace with better specimen	Not affected by current Redevelopment proposal. Poor branch structure liable to failure over medium term and young age indicate removal is preferred regardless of design.
15	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Remove	Impacted on by proposed new road alignment. Poor branch structure liable to failure over medium term and young age indicate removal is preferred regardless of design.

Tree No.	Botanical Name	Common Name	Recommended Action	Rationale
16	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Remove and replace with better specimen if adequate planting space available.	Impacted on by proposed new road alignment. Poor branch structure liable to failure over medium term and young age indicate removal is preferred regardless of design.
17	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Remove	Impacted on by proposed new road alignment. Poor branch structure liable to failure over medium term and young age indicate removal is preferred regardless of design.
18	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Remove	Impacted on by proposed new road alignment. Poor branch structure liable to failure over medium term and young age indicate removal is preferred regardless of design.
19	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Consider removal unless more space for crown and rootzone can be provided.	The size of the tree, poor form, branch overhang to SW and ongoing root/infrastructure conflicts indicates that the fig will be in conflict with construction of proposed adjacent building.
20	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Consider removal unless more space for crown and rootzone can be provided.	The size of the tree, poor form, branch overhang to SW and ongoing root/infrastructure conflicts indicates that the fig will be in conflict with construction of proposed adjacent building.
21	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Consider removal unless more space for crown and rootzone can be provided.	The size of the tree, poor form, branch overhang to SW and ongoing root/infrastructure conflicts indicates that the fig will be in conflict with construction of proposed adjacent building.
23	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	Road and ramp design requires removal of fig.	There are limited arboricultural reasons for removal of this fig at this stage, however retention is not possible is not feasible under the current redevelopment proposal.
24	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	May be suitable for relocation. Reassess suitability in context of Master Plan	Reasonable specimen. Requires formative pruning.
25	<i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	May be suitable for relocation. Reassess suitability in context of Master Plan	Reasonable specimen. Requires formative pruning.

Tree No.	Botanical Name	Common Name	Recommended Action	Rationale
26	<i>Eucalyptus saligna</i>	Sydney Blue Gum	Reassess suitability in context of Master Plan	Mature tree. Good specimen. Restricted rootzone on western side.
27	<i>Eucalyptus saligna</i>	Sydney Blue Gum	Reassess suitability in context of Master Plan	Mature tree. Good specimen. Restricted rootzone on western side.
28	<i>Phoenix canariensis</i>	Canary Is. Date Palm	Reassess suitability in context of Master Plan	Mature tree. Good specimen. Readily transplanted.
29	<i>Phoenix canariensis</i>	Canary Is. Date Palm	Reassess suitability in context of Master Plan	Mature tree. Good specimen. Readily transplanted.
30	<i>Phoenix canariensis</i>	Canary Is. Date Palm	Reassess suitability in context of Master Plan	Mature tree. Good specimen. Readily transplanted.
31	<i>Phoenix canariensis</i>	Canary Is. Date Palm	Reassess suitability in context of Master Plan	Semi-mature tree. Good specimen. Readily transplanted.
32	<i>Phoenix canariensis</i>	Canary Is. Date Palm	Reassess suitability in context of Master Plan	Semi-mature tree. Good specimen. Readily transplanted.
33	<i>Phoenix canariensis</i>	Canary Is. Date Palm	Reassess suitability in context of Master Plan	Semi-mature tree. Good specimen. Readily transplanted.

2.2 SUMMARY RECOMMENDATIONS

- 2.2.1 The four mature Hill's Weeping Figs (nos. 19, 20, 21, 23) along the eastern side of the site continue to exhibit good health and vigour and there has been relatively little change in their overall appearance, other than a gradual expansion in canopy spread. Most of the comments made about these trees in previous reports remain relevant.
- 2.2.2 Fig no. 23 continues to be the most dominant tree on the site and its impact on the surrounding infrastructure is not as great as the other mature figs. Under the current redevelopment design it would be affected by construction of the new roadway and require removal. The underlying shallow bedrock would be likely to preclude successful transplantation.
- 2.2.3 The three figs (nos. 19 to 21) continue to cause damage to pavement and other infrastructure. The figs continue to have defects that are of a low to moderate risk of failure over the medium to longer term however the extent of decay in the trunk or branch junctions had not been investigated at this stage.

The current design shows the figs to be retained and incorporated within an enlarged garden bed with pedestrian access and bus parking along the eastern side of the trunks. Although this would allow for the retention of these figs, the restricted space available to construct the new building on the western side, together with the need for crown raising for vehicle clearance on the eastern side, will result in significantly

reduced crowns. A strong argument could be made for the removal of these figs as part of this redevelopment, instead of retaining them.

- 2.2.4 The 2003 report on the four mature figs recommended their removal over a period of 5 to 10 years, once surrounding new figs were established. The smaller figs planted in 1999 have established well, however none of the earlier formative pruning recommendations were carried out. This has resulted in trees with very poor branch structure, prone to failure over the medium to long term. Most of them are now unsuitable for retention for safety reasons.

The rapid growth of the younger fig trees over the past ten years, given suitable growing conditions, clearly shows that suitable replacements for the large figs can be established quickly. If all four figs are removed as part of the redevelopment of the SFM, more appropriate vigorous specimens with better crown structure will rapidly replace the existing figs.

- 2.2.5 The smaller figs (nos.15,16,17,18) will require removal due to the roadway redesign. However this is not in conflict with my recommendation that they should be removed regardless of any design proposals, due to their poor branch structure.

- 2.2.6 The two Sydney Blue Gums (nos. 26, 27) continue to exhibit good health and vigour. There is still no justification for their removal as I have indicated in previous reports.

Both trees have put on significant growth over the last seven years, in terms of trunk diameter and crown spread. Additionally they are providing more amenity than previously. The restricted rootzones on the western side and behind the retaining wall has resulted in the growth of large shallow roots, mostly within the dripzones of the two trees. This factor makes them more vulnerable to significant changes in levels or surface materials. Careful consideration will need to be given to the design of the new pavement close to these trees to avoid impacts on the root systems. Generally, installation of new surfaces and sub-base materials will need to be above existing grades and protection measures put in place to avoid damage to above ground parts of the trees.

- 2.2.7 The six Canary Island Date Palms (nos. 28 - 33), located along the western edge of the site adjacent to the boardwalk continue to exhibit good health and vigour. At this stage the trees do not exhibit signs of the fungal disease *Fusarium oxysporum* (as previously discussed). If relocation is required, the palms could be easily transplanted either within or outside of the site.

3.0 FIELD SURVEYS

3.1 SITE ASSESSMENT

- 3.1.1 Inspection of the trees for this latest tree assessment was carried out on 29/07/2010.

3.2 HAZARD ASSESSMENT

Assessment of trees for this report was carried out by ground based visual inspection only. Where trees are to be retained, a more thorough hazard assessment may be required (including aerial inspection of decay and branch attachment) to determine any other possible defects.

No significant (large diameter) deadwood was identified in the trees at this stage although deadwood in trees 26 and 27 do contain potentially hazardous dead branches that do require removal. It is recommended that as the development proceeds, the retained trees should be reassessed for any changes in tree condition and all deadwood greater than 50 mm diameter in tree crowns overhanging areas that can be readily accessed by workmen on site or the public be removed.

3.3 RECURRENT ASSESSMENT

- 3.3.1 Tree assessment and recommendations are based on the condition of the trees at the time of inspection. As the trees themselves continue to age and decline, further assessment, particularly from a hazard management perspective, may be necessary.
- 3.3.2 It is recommended that a qualified Arborist should conduct a follow up assessment of the trees at least two years following completion of construction and redevelopment works, as part of a responsible tree management program and to fulfil risk management responsibilities on the part of the relevant Management Authority.

4.0 TREE ASSESSMENT

4.1 EXPLANATION OF TERMS

- 4.1.1 The following Tree Assessment schedule categorises the trees by a number of criterion. These include *objective* measurements; height, spread and diameter at breast height (DBH) and *subjective* assessments, which are summarised by the Suitability rating. Note: DBH was measured using a diameter tape and, for simplicity, figures were rounded to the nearest 50mm. The following explains the terms used in the tree assessment table:

Age Range - Based on available information or assessment of the characteristics of the specimen, site conditions and experience with the species growing under similar conditions.

Health - Refers to the overall health and vigour of the specimen. Assessment of tree condition has taken into consideration both known specimens of the same species and age, which are growing under favourable conditions in Sydney, and a comparison with other specimens within this site growing in the same conditions.

Structure - Comments about the structural characteristics of the tree, in particular the presence of any defects that may reduce the viability of the tree or pose a hazard to occupants of the site. Rating 1 = Poor, to 5 = Excellent. In the case of young or semi-mature trees, it may be possible to carry out formative pruning to correct potential defects. If appropriate, recommendations will be made in the "Comments" section.

Horticultural Viability - This is an estimation of the likely viable useful life that can be expected for each tree. It is based on the known lifespan of the species, its present age, its present condition and indicators of vigour, site conditions, stress factors present, and any obvious factors that may compromise the health of the tree (such as the structural stability of the crown, or pests and diseases).

Rating	Description
Good	This rating indicates that the tree is in good health under current conditions and that its health and/or age would suggest that it would have a useful horticultural life over the medium to longer term, depending on the characteristic life span for the species.
Fair	This rating may indicate that a tree has a reasonable useful life at least over the medium. If conditions remain unchanged, the anticipated life, given the age of the specimen or its recent history, is likely to be less than could be expected if a more favourable growing environment were provided. This rating also suggests that the specimen may require more regular assessment of tree health and safety and may require more regular tree surgery or other arboricultural input.
Poor	This rating indicates that the tree exhibits low vigour, is under stress, and is in decline. In some cases structural defects, pathogenic infestation or insect activity might also be present. In most instances these trees would have a useful life span of less than ten years. Remedial work on these trees is not considered to be warranted, and in many cases they should be removed entirely within the next few years. In some cases the poor condition of these trees could constitute a potential hazard, and they have been recommended for removal.

In most cases, trees rated "Fair to Good" are likely to have their useful life extended if tree surgery is carried out or cultural conditions are improved; such as pruning of hazardous limbs, removal of grass from within the dripline, installation of mulch, regular fertilising, watering during extended dry periods, and alleviation of soil compaction (particularly compaction due to vehicle parking / access).

On this site, the viability of trees rated as "Fair to Poor" is unlikely to change. Removal of young trees with a "Fair to Poor" rating is justified as even with more favourable growing conditions these trees will still have a reduced life expectancy.

Suitability for Retention - This categorises the suitability of the tree for preservation, considering the tree health, structural condition, age, size, longevity, ability of the species to adapt to modified growing conditions - particularly in the context of the proposed development, aesthetics and potential to create other problems such as becoming an invasive weed source. Categories are:

Good - Tree is in reasonably good condition (any minor structural or health problems can be mitigated), will survive for many years, and can recover from injury or respond to environmental changes.

Moderate - Tree has health or structural problems that would require considerable treatment, or has a limited life expectancy, or is less desirable for new site use. Such a tree usually tolerates less impact and requires a larger tree protection zone. On this site, a rating of moderate may also reflect future problems with the tree such as its current location.

Low - Tree is in poor condition, has short life expectancy, or has low value in the landscape (e.g. weed species). For trees listed in this category due to structural defects, removal is generally recommended. In the event the tree is to be retained, it may require that any structures or use within the zone in which the tree may fail be avoided.

Transplant Suitability & Cost – The suitability of a specimen for relocation is based on the known characteristics of the species and past experience with how easily the species can be relocated. On this site, the two species identified as "Suitable for relocation" (i.e. Hill's Weeping Fig and Canary Is. Date Palm) are known to transplant easily. However, other factors such as underground services or shallow rock may make relocation of a specimen more difficult due in part to the smaller rootball that can be lifted.

Transplantation costs provided in the schedule are based on recent costs for transplantation of the same species and size and are indicative only. The costs provided here do not take into account other constraints such as costs associated with disconnection of underground services, excavation into rock, boxing up for temporary storage or maintenance. The indicative costs also assume the trees would be relocated on site

Maintenance costs can be assumed to be approximately \$300 to \$500 per month per tree. If a number of trees are relocated and maintained, maintenance costs per tree are likely to be lower.

(Development Impacts) – Not included in this report. No assessment can be made at this stage of potential impacts that redevelopment of the site may have on the trees.

This report does however provide some broad indication of impacts on above ground parts (e.g. pruning) – refer to 4.3.2 below. However, the extent of excavation for buildings and other structures and of utility corridors (above and below ground) is unknown. As this information becomes available, more detailed reassessment and

recommendations may be required to determine whether it is feasible to retain a tree or to avoid adverse impacts on the retained trees.

4.2 TREE INVENTORY AND ASSESSMENT SCHEDULE

- 4.2.1 The following Assessment Schedule provides comparative information on trees within the site using a series of brief descriptions and ratings. Detailed features of individual specimens and recommendations are provided in the “Comments” column.

Tree No.	Botanical Name	Common Name	Height (m)			Age	Health	Structure	Horticultural Viability	Suitability for Retention	Transplant Suitability & Cost	Comments
			Spread ¹ (m)	DBH ² (mm)								
			H	S	D							
	9 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	14	320	Semi-Mature	Good	4	Good	Good	Retain	Planted 1999. Located in garden bed. Generally in good condition. No apparent damage to adjacent footpath. Concrete curb appears to have acted as an effective root barrier / deflector. Crown reduction required on SW side for building clearance.
	10 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	14	350	Semi-Mature	Good	4	Good	Good	Retain	Planted 1999. Located in garden bed. Generally in good condition. No apparent damage to adjacent footpath. Concrete curb appears to have acted as an effective root barrier / deflector. Very poor recent pruning – not in compliance with AS 4373. Poor branch arrangement could be improved by selective pruning.
	11 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	14	370	Semi-Mature	Good	4	Good	Good	Retain	Planted 1999. Located in garden bed. Generally in good condition. No apparent damage to adjacent footpath. Concrete curb appears to have acted as an effective root barrier / deflector. Very poor recent pruning – not in compliance with AS 4373.
	12 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	12	370	Semi-Mature	Good	2	Fair	Poor	Remove and replace	Planted 1999. Located in garden bed. Generally in good health. No apparent damage to adjacent footpath. Very poor recent pruning – not in compliance with AS 4373. Very poor branch structure, typical of trees that suffer major limb failure in maturity.
	13 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	11	370	Semi-Mature	Good	3	Fair	Poor	Remove and replace	Planted 1999. Located in garden bed. Generally in good health. No apparent damage to adjacent footpath. Very poor recent pruning – not in compliance with AS 4373. Very poor branch structure, typical of trees that suffer major limb failure in maturity.
(Original Specimens Removed)	14 <i>Photinia glabra</i> 'Rubens'	Red Leaf Photinia				Young	Good	4	Good	Good		Recently installed hedge of approx. 20 specimens.

¹ **Spread** – Where two measurements are shown, the first is north/south, and the second is east/west.

² **DBH** = Diameter at Breast Height. Measurement of trunk diameter measured at 1.4m above ground level. Where trunk form does not permit measurement at 1.4m, the nearest measurement above or below that height is recorded. For trees located on adjacent properties, an estimate of DBH may be provided.

Tree No.	Botanical Name	Common Name	Height (m) Spread ¹ (m) DBH ² (mm)			Age	Health	Structure	Horticultural Viability	Suitability for Retention	Transplant Suitability & Cost	Comments
			H	S	D							
	15 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	13	460	Semi-Mature	Good	2	Fair-good	Fair	Remove and replace with better specimen in more appropriate location	Planted 1999. Located within parking bay. Very poor branch structure, typical of trees that suffer major limb failure in maturity. Very poor past and recent pruning – not in compliance with AS 4373. Good performance of tree in structural soil. No apparent damage to adjacent bitumen surfaces, however extensive large root break out beneath adjacent footpath where no structural soil was installed.
	16 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10.5	13	460	Semi-Mature	Good	2	Fair-good	Fair	Remove and replace with better specimen in more appropriate location	Planted 1999. Located within parking bay. Very poor branch structure, typical of trees that suffer major limb failure in maturity. Very poor past and recent pruning – not in compliance with AS 4373. Good performance of tree in structural soil. Large root break out at northern edge of parking bay, beneath curb, suggesting faulty installation of curb when the tree was planted.
	17 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	13	480	Semi-Mature	Fair-good	1	Poor	Poor	Remove and replace with better specimen in more appropriate location	Planted 1999. Located within parking bay. Very poor branch structure, typical of trees that suffer major limb failure in maturity. Very poor recent pruning – not in compliance with AS 4373. Recent failure of main scaffold branch has seriously compromised the longer term viability of this tree. The large wound adjacent to remaining limbs will lead to decay and likely failure of those branches over the next 20 years. Good performance of tree in structural soil. No apparent damage to adjacent bitumen surfaces, however some minor root break out between original trachyte kerbstones, where no structural soil was installed.
	18 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	10	11	460	Semi-Mature	Good	1	Fair-good	Fair	Remove and replace with better specimen in more appropriate location	Planted 1999. Located within parking bay. Reasonable specimen but with deep bark inclusion between two codominant leaders. Very poor recent pruning – not in compliance with AS 4373. Good performance of tree in structural soil.

Tree No.	Botanical Name	Common Name	Height (m) Spread ¹ (m) DBH ² (mm)			Age	Health	Structure	Horticultural Viability	Suitability for Retention	Transplant Suitability & Cost	Comments
			H	S	D							
	19 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	15	20	890	Mature	Fair to Good	3	Good	Moderate	Unsuitable for relocation (form, shallow root plate and under ground services)	Large specimen probably planted in the 1960s. No significant changes to this tree since the first review in 1998 other than a marked increase in shallow root uplift of adjacent footpath and an increase in crown spread and trunk diameter. Little or no change in the displacement of the original Bank St. kerb over the last 11 years. There have been no significant changes in the structure of the tree. Appallingly bad recent pruning. Clearly carried out by a contractor who doesn't understand the requirements of AS 4373 or the problems that arise with this species if these requirements are not adhered to.
	20 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	14	20	600	Mature	Fair to Good	2	Good	Moderate	Unsuitable for relocation (form, defect and under ground services)	Large specimen probably planted in the 1960s. No significant changes to this tree since the first review in 1998 other than a marked increase in shallow root uplift of adjacent and an increase in crown spread and trunk diameter. Little or no change in the displacement of the original Bank St. kerb over the last 11 years. There have been no significant changes in the structure of the tree.
	21 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	13	20	710	Mature	Fair to Good	3	Good	Moderate	Unsuitable for relocation (form, shallow root plate and under ground services)	Large specimen probably planted in the 1960s. No significant changes to this tree since the first review in 1998 other than a marked increase in shallow root uplift of adjacent footpath and an increase in crown spread and trunk diameter. Little or no change in the displacement of the original Bank St. kerb over the last 11 years. There have been no significant changes in the structure of the tree.
(Removed)	22 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig										Removed for widening of main entry to car park.
	23 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	14	25	850	Mature	Good	2	Good	Good	Unsuitable for relocation (shallow root plate)	Large specimen probably planted in the 1960s. This Fig remains the best specimen on the site. There has been no decline in its health or viability in spite of restricted root zone conditions. No significant changes to this tree since the first review in 1998 other than a slight increase in shallow root uplift of adjacent footpath, although the recent bitumen appears to have been replaced at least once since the last inspection. Little or no change in the displacement of the original Bank St. kerb over the last 11 years. There have been no significant changes in the structure of the tree.

Tree No.	Botanical Name	Common Name	Height (m)			Age	Health	Structure	Horticultural Viability	Suitability for Retention	Transplant Suitability & Cost	Comments
			Spread ¹ (m)	DBH ² (mm)								
			H	S	D							
	24 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	7	7	270	Semi-Mature	Fair to Good	4	Good	Good	Suitable for relocation (approx. cost \$2000)	Planted 1999. Located within parking bay. This Fig has continued to be a less vigorous specimen. It has the sparsest leaf cover of all of the figs planted in 1999. The tree was not planted into structural soil and the shallow underlying rock and kerb / road have restricted available root zone. Generally the form and structure of the tree is good and it would be suitable for transplanting. The condition and viability of this fig is likely to improve if provided with a favourable root zone.
	25 <i>Ficus microcarpa</i> var. <i>hillii</i>	Hill's Weeping Fig	8	7	225	Semi-Mature	Fair to Good	4	Good	Good	Suitable for relocation (approx. cost \$2000)	Planted 1999. Located within garden bed. This Fig has continued to be a less vigorous specimen. It has more leaf cover than tree 24 but smaller size than the other figs planted in 1999. The shallow underlying rock has led to restricted available root zone. Generally the form and structure of the tree is good and it would be suitable for transplanting. The condition and viability of this fig is likely to improve if provided with a favourable root zone.
	26 <i>Eucalyptus saligna</i>	Sydney Blue Gum	14.5	15.2 5	625	Mature	Fair to Good	5	Fair to Good	Good	Species unsuitable for relocation	There has been significant growth in the crown spread and trunk diameter of this tree since 2003. This mature specimen is located in bitumen pavement however numerous cracks in the bitumen have permitted good water infiltration. Previous observation of this tree suggests that the main factor affecting its condition is whether it is subject to water stress. Although the tree is planted in fill there appears to be sufficient soil volume but restricted soil depth. Roots are further constrained by the retaining wall. If the tree is retained there will have to be numerous root protection measures put in place to avoid root damage or a restriction in the available root zone.
	27 <i>Eucalyptus saligna</i>	Sydney Blue Gum	13.7	12.5	710	Mature	Fair To Good	4	Fair to Good	Good	Species unsuitable for relocation	There has been significant growth in the crown spread and trunk diameter of this tree since 2003. This mature specimen is located in bitumen pavement however numerous cracks in the bitumen have permitted good water infiltration. Previous observations of this tree suggest that the main factor affecting its condition is whether it is subject to water stress. Although the tree is planted in fill there appears to be sufficient soil volume but restricted soil depth. Roots are further constrained by the retaining wall. If the tree is retained there will have to be numerous root protection measures put in place to avoid root damage or a restriction in the available root zone.

Tree No.		Botanical Name	Common Name	Height (m) Spread ¹ (m) DBH ² (mm)			Age	Health	Structure	Horticultural Viability	Suitability for Retention	Transplant Suitability & Cost	Comments
				H	S	D							
	28	Phoenix canariensis	Canary Is. Date Palm	8.5	7	800	Mature	Good	5	Good	Good	Suitable for relocation (approx. cost \$4000)	One of group of three mature palm trees transplanted to this location approximately 15 years ago. Can be readily transplanted.
(See above)	29	Phoenix canariensis	Canary Is. Date Palm	8	7	800	Mature	Good	5	Good	Good	Suitable for relocation (approx. cost \$4000)	One of group of three mature palm trees transplanted to this location approximately 15 years ago. Can be readily transplanted.
(See above)	30	Phoenix canariensis	Canary Is. Date Palm	7.5	7	800	Mature	Good	5	Good	Good	Suitable for relocation (approx. cost \$4000)	One of group of three mature palm trees transplanted to this location approximately 15 years ago. Can be readily transplanted.
	31	Phoenix canariensis	Canary Is. Date Palm	4	7	800	Semi-Mature	Good	5	Good	Good	Suitable for relocation (approx. cost \$2000)	One of group of three young palm trees transplanted to this location approximately 15 years ago. Can be readily transplanted.
(See above)	32	Phoenix canariensis	Canary Is. Date Palm	4	7	800	Semi-Mature	Good	5	Good	Good	Suitable for relocation (approx. cost \$2000)	One of group of three young palm trees transplanted to this location approximately 15 years ago. Can be readily transplanted.
(See above)	33	Phoenix canariensis	Canary Is. Date Palm	4	7	800	Semi-Mature	Good	5	Good	Good	Suitable for relocation (approx. cost \$2000)	One of group of three young palm trees transplanted to this location approximately 15 years ago. Can be readily transplanted.

4.3 CONCLUSIONS & RECOMMENDATIONS

4.3.1 General Comments

- The health and condition of most of the trees affected by the current proposal has not altered significantly since the last review in 2003. The growing conditions have varied over that time; from a period of drought to prolonged high rainfall over the last 12 to 18 months. The trees have generally performed well under these variable conditions.
- There has been marked growth among most of the young Hills Weeping Figs planted in 1999. Of particular interest have been the very fast growth rates of the four Hills Figs (nos. 15, 16, 17, 18) planted into structural soil in the carpark area along the eastern edge of the site. Based on a comparison of trunk diameters, foliage density and leaf colour as guides to performance these trees appear to have grown faster than the adjacent figs planted in garden beds. Normally, it would be expected that trees with access to larger soil volumes would perform better. This suggests that the original tree pits and underlying soil conditions in the garden beds have been less favourable for the other young fig trees compared to the conditions provided by structural soil.
- Most of the young figs planted in 1999 were, at the time, considered to be inferior specimens due to their poor branch structure and pot bound roots. Recommendations for formative pruning were made in my previous reports however these recommendations were not implemented. As a result most of these trees have developed weak branch attachments including deep bark inclusions that will characteristically result in large limb failure over the next 15-30 years (and beyond) if these trees are retained. Very few of these specimens could be improved by selective pruning at this late stage. In spite of 11 years of growth of the remaining young figs, I still recommend the removal of most of these inferior trees to avoid the significant potential hazards that are likely to arise with them over the medium to longer term, regardless of the redevelopment proposals.

The exceptions to this are the figs (nos. 24 and 25) at the northern end of the site. The crown structure of the three figs (nos. 9, 10, 11) adjacent to the existing auction building could be improved through selective branch removal.



Figure 1: Hills Fig No. 12 exhibiting typically poor branch structure among most of these trees.

- The three mature Hills Weeping Figs (nos. 19, 20, 21) adjacent to the Di Costi building display a similar health and condition to that observed in 2003. Their overall dimensions have increased and the problems associated with uplift of the adjacent

footpath by roots has become worse. The increased diameter of trunks and branches of these trees has alleviated some of the potential defects and risk of failure since the inspection 11 years ago however the problems described in 1999 remain and it is not known to what extent decay may have developed in the zones where the main branches attach to trunks. Generally, the form and structure of these trees is poor. This is partly due to poor pruning over recent years, which has resulted in numerous pruning wounds and weaker branch attachment. Their appearance can be described as fair to good and are readily visible from the adjacent approach to Anzac Bridge.



Figure 2: Hills Fig No. 20, together with 19 & 21, has continued to cause significant pavement damage



Figure 3: Hills Fig No. 19 showing proximity to the existing building (and line of proposed Carpark)

- The large Hills Fig (no. 23) at the northern end of the site remains the most prominent specimen on the site due to its size, appearance and good health and proximity to the adjacent approach to Anzac Bridge. The impacts on the adjacent footpath, described in 1999, have not changed significantly since then. In the proposed redevelopment of the site the layout of the new roadway and carpark entry would require the removal of this tree.

The transplantation of this specimen is not considered feasible.



Figure 4 Hills Fig No. 23 is prominent due to its proximity to the raised roadway.

- The two mature Sydney Blue Gums (nos. 26 and 27) have grown significantly in terms of crown spread and trunk diameter and have performed well in spite of the poor soil conditions. The form and appearance of these two trees provide considerable amenity to the site.

The trees are growing in fill retained by a timber retaining wall running along the southern side of the trees. As a result most of the root mass will be contained in the level area of fill to the north east of the trees. It will be essential to minimise impacts on the root zones to ensure a longer term viability of these specimens.



Figure 5 Sydney Blue Gums Nos. 26 & 27 exhibit good form and health.

4.3.2 **Construction Impacts**

- Redevelopment along the eastern edge of the SFM site will require changes to the current alignment of the main entry road and construction of a new roundabout adjacent to the auction building. The design indicates the removal of some of the smaller figs (nos. 15, 16, 17, 18, 24, 25) and the retention of several other figs (nos. 9, 10, 11, 12, 13). Section 4.3.1 describes the poor structural condition of most of these trees and their unsuitability for retention. Where the current design proposal shows removal of some of these specimens, this is not in conflict with my recommendations for their removal. Consideration should be given to the relocation of the smaller figs (nos. 24 and 25) affected by the new road alignment. These trees exhibit good branch structure and would otherwise be suitable for retention if an alternative location can be found.
- The current design proposal shows the retention of the three Hills Weeping Figs (nos. 19, 20, 21). The proposal indicates the construction of a new footpath on the eastern side of the trunks and the construction of a new carpark along the approximate line of the existing building. However the proximity of the new building would require extensive pruning to the branches on that side to permit construction (including the erection of scaffolding) and potential root damage during excavation and construction of footings. The proposed bus bay on the eastern side is also likely to require the removal of large diameter lower branches to provide vehicle clearance.
- It may be feasible to retain these three figs through the construction of a raised walkway on the eastern side, and limiting root damage by decreasing encroachment of the building on the western side. However the likely impact of pruning would further detract from the overall appearance of the trees and would exacerbate existing structural defects, increasing the risk of failure of some branches. The fast growth of the adjacent Hills Figs, planted in more favourable growing conditions 11 years ago, demonstrates that superior, longer lived specimens can be grown in the same location if suitable conditions are provided for the replacement trees.
- The proposed realignment of the main entry road into the carpark will require the removal of the large fig (no. 23). There have been no significant changes in the viability of this specimen since it was reviewed in 1999 and the impacts on the adjacent footpath can be managed if the tree is retained in the current arrangement of the road and footpath. Therefore no arboricultural justification for removal can be made for this tree in its current circumstances.

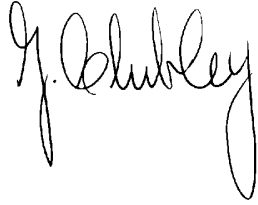
The shallow underlying rock would make the transplantation of this fig unfeasible.

- It is proposed to retain the two Sydney Blue Gums within a hard paved pedestrian area. In spite of the restricted soil conditions that the trees are currently growing in, the existing bitumen pavement is extensively cracked and lifted by shallow tree roots. This has allowed easy infiltration of surface water and air into the existing root zone. Any changes to the levels around the trees, construction of stairs or a change to impervious surface materials should allow for the retention of most of the existing soil surrounding these trees and no significant change to water and air infiltration.

Care should be taken in the design of the new structures to be installed around these Sydney Blue Gums so as to minimise adverse impacts on the roots. To achieve this, consideration should be given to constructing pavements above existing levels and locating stairs beyond the location of the existing timber retaining wall. The area of undisturbed soil and roots around each tree should be no closer than 5 metres to the base of each tree. The open space around the base of the trees should ideally be maintained at a radius of approximately 3.5 metres from the centre of each tree. Installation of structures closer to the trees will increase the potential for significant root damage, loss of accessible root volume and reduction in the trees' viability.

I trust that this report adequately addresses the main arboricultural issues present of the trees on the Sydney Fish Market site. If necessary, please contact me for further explanation of any issues raised in this report.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'G. Clubley', with a stylized, flowing script.

Garry Clubley



Figure 1 – Tree Location Plan