

15 July 2003

LICENCE AGREEMENT - MELBOURNE INTERNATIONAL FLOWER AND GARDEN SHOW

Division City Assets & Services

Presenter Vince Haining, Group Manager Parks and Recreation

Purpose

To provide the Finance, Corporate Services and Governance Committee with additional information regarding the various matters associated with the renewal of the Melbourne International Flower and Garden Show Inc. ("MIFGS") Licence Agreement pursuant to the Committee's resolution of May 2003 when Committee resolved to:

"be provided with the results and implication of the soil analysis undertaken following the 2003 Melbourne International Flower and Gardens Show ("MIFGS");

request that the various bodies meet to consider proposal to move high impact usages to hard surface areas during the conduct of MIFGS, such as the Eastern and Western Car Park and the areas around and between the Exhibition Building and Melbourne Museum;

authorise the administration to progress negotiations with the relevant parties including MIFGS Board, The Museum (as Plaza Managers), taking into account the observations of the Carlton Gardens Group, the Carlton Residents Association, the East Enders and the National Trust to ensure that the issue raised by the Committee are reflected in the contract, including the implications of the Master Plan, the Carlton Gardens, different financial structures, the role of the Museum and Plaza Manager and the possibility of input not only for reinstatement but also future development; and

reconsiders these matters at its June 2003 meeting, where a copy of the Terms of Reference of the Master Plan is to be provided."

To seek agreement from the Minister of Crown Land for a three-year licence (with an optional 2 year extension) for the conduct of MIFGS to be awarded.

Time Frame

Expedient approval of the licence agreement will allow the licensee to proceed with operational planning and sponsorship negotiations for the event in 2004 and beyond.

Finance

Council is a major sponsor of MIFGS and provided cash, direct and in-kind support to the value of \$100,000 in 2003. The licence fee paid by MIFGS to the City of Melbourne for the use of the Gardens is \$60,000 annually. A summary of the 'in-kind' support provided to the Show is contained in Attachment 1 and includes, the first \$20,000 of contribution and reinstatement costs, the event launch function, use of city banner sites, public consultation and traffic management planning.

Legal

Legal advice will be provided on the terms of the licence as required.

Sustainability

Connected and Accessible City

Strategic Direction 1.7 – “Build an integrated and connected park system” has the objective to:

“Recognise and protect the significant heritage features and bio-diversity of the City’s parks”

Inclusive and Engaging City

Strategic Direction 3.3 – “Promote, celebrate and further develop the City of Melbourne as a ‘city for the arts’ and as a sporting capital with a rich and vibrant cultural life” has the objective to:

“Support and encourage cultural activity within the public domain”, and

“Support Melbourne as a hub of diverse arts and cultural activity”

Strategic Direction 3.8 – “Increase metropolitan, rural, national and international tourism” has the objective to:

“Increase participation in the City’s cultural, entertainment and sporting life” and

“Foster and support tourism activity in greater Melbourne as well as within the City’s municipal boundaries”

Strategic Direction 3.9 – “Attract, facilitate and maximise benefits of major City events and festivals” has the objective to:

“Facilitate the provision of event facilities and encourage major city events and festivals in a range of public spaces throughout the City”.

Innovative and Vital Business City

There are no significant sustainability impacts.

Environmentally Responsible City

Council is committed to ensuring that events and activities that occur in parklands are not detrimental to the sustainability of the parks and gardens of Melbourne.

Recommendation

The Finance, Corporate Services and Governance Committees recommend that Council:

- notes the results from the Soil Compaction Analysis Assessment undertaken after the 2003 Melbourne International Flower and Gardens Show (“MIFGS”);
- notes that further consultation has been undertaken with relevant parties in relation to a renewal of the licence with the MIFGS Inc.;

- requires that ongoing and inclusive consultation be undertaken on this event through the establishment of an Event Advisory Group, ("the Advisory Group") with representatives from MIFGSI, International Management Group, ("IMG"), Council and the community;
- endorses the Terms of Reference as set out in Attachment 6 for the Advisory Group;
- endorses the renewal of the current funding/sponsorship arrangement with an additional requirement for a sinking fund to be established by the MIFGSI with a required contribution into that fund of \$1 per entry for every entry in excess of 100,000 people attending the Show;
- notes that funds so accumulated will be applied pursuant to the recommendation of the Advisory Group and in a manner consistent with the Carlton Gardens Master Plan;
- endorse the setting of the licence fee in the first year (2004) at \$60,000 and be indexed annually after that at CPI levels;
- requires that the detailed operational planning for MIFGS reflects the need to achieve a suitable integration with Melbourne Museum spaces;
- approves the awarding of a three year Licence Agreement between the City of Melbourne and the Melbourne International Flower and Gardens Show Inc. for the use of Carlton Gardens to stage MIFGS for a period of three (3) years with an optional extension of a further two (2) years.
- by instrument of delegation sealed by the Council pursuant to section 98(1) of the Local Government Act 1989 ("the Act") the Council delegate its powers, duties and functions under the Act, and under the Crown Land (Reserves) Act 1978 to the Chief Executive Officer, or the person from time to time acting in that position:
 - to amend the Terms of Reference for the Advisory Group after consultation with the relevant stakeholders;
 - to negotiate and agree with MIFGS the final terms and conditions of the licence renewal;
 - to seek any necessary approval from the relevant Minister to enter into the licence renewal;
 - to amend the terms of the licence renewal in any way required by the Minister as a condition of the Minister consenting to the licence renewal being entered into;
 - to affix the Common Seal of the Council to the licence renewal;
 - to grant or give all approvals or consents required of Council pursuant to the licence renewal;
 - to do all things ancillary and incidental to the above.
- that under section 98 (3) of the Act the Council authorise the instrument of delegation to the Chief Executive Officer to empower him to delegate any power, duty or function of the Council delegated to him under the preceding dot point to a member of the Council staff.

Attachments:

1. 'In-Kind' Sponsorship support for the Melbourne International Flower and Garden Show
2. Summary of Stakeholder Concerns: Community Consultation
3. Soil Compaction Assessment of the Carlton Gardens Melbourne
4. Specification for Reinstatement Works at Carlton Gardens following the Melbourne International Flower and Garden Show
5. Licence Schedule 5 - Event Plan Conditions
6. Proposed Terms of Reference – MIFGS Event Advisory Group
7. Melbourne International Flower and Garden Show 2004 Submission
8. Terms of Reference – Carlton Gardens Master Plan Reference Committee

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Purpose

1. To provide the Finance, Corporate Services and Governance Committee with additional information regarding the various matters associated with the renewal of the Melbourne International Flower and Garden Show Inc. (MIFGS) Licence Agreement pursuant to the Committee's resolution of May 2003 when Committee resolved to:

"be provided with the results and implication of the soil analysis undertaken following the 2003 Melbourne International Flower and Gardens Show ("MIFGS");

request that the various bodies meet to consider proposal to move high impact usages to hard surface areas during the conduct of MIFGS, such as the Eastern and Western Car Park and the areas around and between the Exhibition Building and Melbourne Museum;

authorise the administration to progress negotiations with the relevant parties including MIFGS Board, The Museum (as Plaza Managers), taking into account the observations of the Carlton Gardens Group, the Carlton Residents Association, the East Enders and the National Trust to ensure that the issues raised by the Committee are reflected in the contract, including the implications of the Master Plan, the Carlton Gardens, different financial structures, the role of the Museum and Plaza Manager and the possibility of input not only for reinstatement but also future development;

reconsiders these matters at its June 2003 meeting, where a copy of the Terms of Reference of the Master Plan is to be provided."

2. To seek agreement from the Minister of Crown Land for a three-year licence (with an optional 2 year extension) for the conduct of MIFGS to be awarded.

Background

3. MIFGS is an annual event held in Carlton Gardens in April each year. The event is conducted under licence agreement between the City of Melbourne and MIFGS Inc, an organisation that represents the Nursery and Garden Industry of Victoria and Flowers Victoria. The event aims to promote the industry to the public and to foster excellence in design, innovation, technology and creativity in the industry. MIFGS is recognised as one of the top five public events of this nature comparing more than favorably with events in England, America and New Zealand. It is the premier event of its type in the Southern Hemisphere.

4. The show operates over five days in April with a 'set up' period of 20 days and a 'dismantle' period of 5 days. The gardens are only closed for general public use for 10 days. The event attracted over 130,000 people in 2003 and over one million local, interstate and international visitors in the eight years that it has been held in Carlton Gardens. The event has State Government 'Hallmark' status, a label that recognises the Show's capacity to attract large numbers of visitors to Melbourne. Other 'Hallmark' events include the Australian Open (Tennis), the Australian Formula One Grand Prix and the Victorian Spring Racing Carnival.
5. The event has a Total Economic Impact for Victoria of between \$8 and \$9 million annually. The event also receives coverage in Melbourne's television, radio and print media and is promoted in Japan, New Zealand and throughout Asia.
6. In 1999, Council granted a licence to MIFGS Inc. to conduct the show in the Carlton Gardens. The duration of the licence was for 3 years (1999 - 2001) and included an option for Council to extend the licence for a further 2 years with agreement between both MIFGS Inc. and Council. Council exercised this option and the licence was extended. The licence expired on 11 April 2003.

Consultation

7. In accordance with the Finance, Corporate Services and Governance Committee resolution of May 2003, meetings were held with a variety of organisations to achieve clarification/resolution of a number of issues related to the proposed renewal of the licence. Details of the meetings held and issues discussed are outlined below.

Community Consultation

8. Pursuant to the Committee's resolution of May 2003, representatives from the Carlton Gardens Group, East Enders, Carlton Residents Association and the National Trust were provided with the following information:
 - 8.1. draft 'special conditions' proposed to be included in the licence to manage the event;
 - 8.2. Terms of Reference for the Carlton Gardens Master Plan Reference Committee;
 - 8.3. specification details for the reinstatement of the Carlton Gardens following the Show;
 - 8.4. specific regulations relating to the permitted use of the Carlton Gardens for the event;
 - 8.5. Committee Report presented to Council to seek an increase of the entry fee in December 2001 and subsequent resolution by Council; and
 - 8.6. Soil Compaction Assessment (2003) of the Carlton Gardens.
9. Council Officers met with representatives from the interested parties to discuss and clarify the content of the information provided and address issues raised by each group individually. The following key responses were noted and a summary of issues are contained in Attachment 2.
10. A further meeting was held with representatives from all interested groups to address specific issues identified by each of the parties.

Specific Concerns from Consultation

11. The agreed outcomes to address the primary concerns that have emerged as a result of consultation are:
 - 11.1. the establishment of an Event Advisory Group;
 - 11.2. the establishment of a sinking fund linked directly to the Show's success;
 - 11.3. the annual licence fee for use of Carlton Gardens be indexed to CPI;
 - 11.4. a process to enable ongoing legacy outcomes to be delivered consistent with the Master Plan;
 - 11.5. agreement between the parties to genuinely and on a best endeavours basis, relocate larger structures to the Museum forecourt;
 - 11.6. revised/augmented site conditions;
 - 11.7. the presence of full time Council Superintendents on site during all phases of the Show; and
 - 11.8. agreement to continually improve the reinstatement specification and contract management practices.

Event Consultation

12. In the lead up to the Show, Council undertakes consultation with residents, businesses and other stakeholders in the vicinity of the show that advises them of Show opening times, road closures and parking changes implemented to minimise the impact of the patron parking in surrounding residential areas.

Issues Identified

Soil Analysis (Compaction) Assessment

13. Over recent years, MIFGS has lifted the standard and quality of displays that are built in the gardens for exhibition at the Show. There is a concern that the presence of these more elaborate displays causes detrimental impacts to the gardens.
14. An independent Soil Analysis (Compaction) Assessment was undertaken after the 2003 Show. The purpose of the assessment was to ascertain the level of compaction and any possible implications for trees and general garden health. MIFGS is the only major event conducted in the Carlton Gardens on an annual basis. The level of activity in setting up, establishing displays and exhibits and general pedestrian flows associated with the Show warrants such an assessment being undertaken in these Gardens.
15. The assessment (Attachment 3) concluded that:

“Although some compaction is evident within the Carlton Gardens, we do not feel that these levels constitute a threat to the existing trees/vegetation or to soil structural quality;

The Gardens exhibit healthy growth and do not display any visible signs of stress, such as those that would result from high levels of compaction. We can therefore confidently state that the compaction levels are within the tolerance level of this park landscape.

We cannot rule out the possibility that event loadings may contribute to compaction within the Southern Carlton Gardens. However, there is no noticeable difference between the compaction levels in the Southern Gardens and the Northern Gardens which are not subjected to this event loading. Thus, we see no reason to curtail events or to assume that they are greatly contributing to compaction.

We do recommend the instigation of an annual compaction testing regime; and

At this time, the compaction levels do not warrant any remedial horticultural activity.”.

16. Nevertheless, Council recognises that there is a potential risk for soil compaction if event organisers do not follow the prescribed conditions that are established for the set up, delivery and dismantling of the event. In order to avoid the potential for compaction to arise in the first instance, a Council Superintendent will be assigned to the site for the duration of the entire event activity to ensure ongoing compliance with Council requirements. Council will fund this role from existing staffing resources.
17. Council also will instigate an annual testing regime to monitor the health of the gardens.

Possible Use of the Melbourne Museum, Eastern and Western Car Parks

18. Council officers initiated a meeting between the Melbourne Museum and MIFGS to explore the potential for incorporating the Melbourne Museum and its surrounds into the design of the Show. This meeting resolved that there were potential opportunities and that the Museum and MIFGS would continue to meet to develop these concepts further.
19. There have been 2 subsequent meetings between MIFGS and the Museum. Initial outcomes are that:
 - 19.1. significant opportunities exist to utilise the Museum Forecourt area; and
 - 19.2. opportunities exist for use of internal buildings of the Melbourne Museum.
20. At this stage the parties are unable to detail the specifics of how these new arrangements will logistically be managed however there is recognition of the need to locate displays that are more elaborate into these spaces.

Reinstatement of the Carlton Gardens following MIFGS

21. Council, as part of its sponsorship agreement for the Show, contributes the first \$20,000 towards the cost of reinstatement of the Carlton Gardens after the Show. (The Event Organiser funds the balance). In addition, Council manages the contract for reinstatement to ensure that the works are completed to Council's specification.
22. Council has a comprehensive specification for the reinstatement of the gardens after the Show. The specification (Attachment 4) has been developed based on knowledge obtained from previous event reinstatement programs and is continually reviewed and improved each year. The key elements of the Reinstatement Plan include four levels of lawn reinstatement dependant on the extent of works required at various locations around the park.
23. The reinstatement works include:
 - 23.1. **Site Preparation and Decompaction** including the removal and disposal of any extraneous materials left as a result of the Show, reinstatement of lawn areas, levelling and topsoiling;
 - 23.2. **Turf Renovations** including seeding, instant turfing and fertilising; and
 - 23.3. **Follow Up Works** including herbicide treatments, irrigation and mowing.

24. Reinstatement works commence directly after event infrastructure is removed from the gardens (5 days after the Show has finished). Works are complete within 12 days, subject to weather conditions. Regular site inspections are undertaken to monitor the health of the gardens after reinstatement and remedial works undertaken as required. A final site inspection is held five months after the completion of the reinstatement works.
25. Under good conditions, the gardens recover well in around 6 weeks. However it is acknowledged that last year (2003) this period has been longer due to prevailing drought conditions.

Revised/Updated Terms and Conditions

26. All major events held in parks are subject to special conditions to ensure that the possibility of damage to parks is minimised. These conditions have been developed based on Council's extensive experience in managing venues in which major events are held and by benchmarking and liaison with similar park agencies throughout Australasia. The previous licence provided for a minimum range of reinstatement requirements consistent with Council's understanding of the Show's impact at that time. The proposed conditions have been the outcome of continued development since the signing of previous licence agreement with MIFGS. It is proposed that these conditions be included in the new licence issued by Council.
27. The proposed terms and conditions (Attachment 5) were distributed to the Carlton Gardens Group, the Carlton Residents Association, the East Enders and the National Trust for consideration.
28. As a result of consultation with these stakeholders, the following additional clauses have been included:
 - 28.1. The floor of all temporary structures built in the park to have protective flooring;
 - 28.2. All excavations required for exhibits to be approved by Council;
 - 28.3. Height restrictions in place to minimise the likelihood of damage to trees;
 - 28.4. Tree protection strategies formalised;
 - 28.5. Increased emphasis on management of vehicles in the parks to reduce risk of damage; and
 - 28.6. Instant turf be utilised in areas where significant re-seeding is required.
29. The event conditions that are agreed by event organisers in the City of Melbourne are the most comprehensive of any conditions applied for any event conducted externally in Melbourne and interstate, (eg. Sydney Royal Botanic Gardens, Centennial Parklands). The proposed new licence will ensure that the opportunity for Council to further improve reinstatement methods or amend requirements resulting from outcomes of the Master Plan process are incorporated as required.
30. The proposed new licence will ensure that the opportunity for Council to further improve reinstatement methods or amend requirements resulting from outcomes of the Master Plan process, are incorporated as required.

Establishment of an Event Advisory Group

31. In order to ensure that a process for ongoing dialogue and continuous improvement is achieved it is recommended that an Event Advisory Group be established. This Group will provide input and advice for the management of the set up, delivery and dismantle of the Show and assist in determining suitable legacy programs over the term of the proposed licence, consistent with outcomes of the Master Plan.

32. The Proposed Terms of Reference for the Event Advisory Group are attached (refer Attachment 6).

Financial Arrangements

33. The licence fee for use of the Carlton Gardens under the previous agreement was \$60,000 annually. Council is also a major sponsor of the event providing a combination of cash and in-kind sponsorship to the value of \$100,000 annually.
34. It is proposed that the new licence fee for the conduct of MIFGS be set at \$60,000 in the first year (2004) and be indexed to annually according to CPI increases (as published by the Australian Bureau of Statistics).
35. Economic benefit valued at \$8 - \$9 million to Melbourne, the event precinct (Carlton and the CBD) and Victoria includes:
- 35.1. retail spend by visitors both at the Show and in the event precinct, (Eg. Hotels and accommodation, restaurants, etc);
 - 35.2. wholesale spend for the horticultural industry to the value of approximately \$1 million; and
 - 35.3. ongoing retail spend after the Show with sales generated from MIFGS.
36. Under the Crown Land Reserves Act, 1978 and the Melbourne Parks and Gardens (Joint Trustee Reserves) Regulations 1994, Council, as Committee of Management, can make recommendations to the Minister for Crown Land for an increase in admission prices for MIFGS. The Minister has ultimate responsibility to approve the pricing structure for the Show. The Melbourne Parks and Gardens (Joint Trustee Reserves) Regulations 1994 specify maximum charges for the show, at \$15.
37. In setting the admittance pricing structure for the Show, the MIFGS Board provides Council with detailed financial information for consideration. Council considers the appropriateness of any price increase that is sought prior to making a recommendation to the Minister.

Funding for parks works

38. As part of the consultation process, the concept of establishing a sinking fund to be operated by the event organiser has been raised. The proposed source of revenue for this fund would be a flat rate levy of \$1 per entry applied to attendances greater than 100,000. (Based upon the 2003 attendances this would result in \$30,000 being applied to that fund). MIFGS will be required to present a report on Show attendances within 28 days of the conclusion of the Show. The attendance report can be audited by the independent ticketing agency, RACV.
39. Application of these funds would be in accordance with the Carlton Gardens Master Plan priorities with the Event Advisory Group recommending specific application.
40. Council's 2003/04 budget also contains the following capital works proposals for Carlton Gardens totalling \$605,000.

Carlton Gardens North Pathways	\$36,000
Carlton Gardens South Chain Walk Shrub Bed renewal	\$55,000
Carlton Gardens North Irrigation	\$354,000
Carlton Gardens Tree Planting	\$10,000

Sponsorship Benefits

41. As premium sponsor of MIFGS, Council and community receives a variety of direct and indirect benefits:
 - 41.1. economic impact on City incorporating visitation, secondary spend opportunities and location of a Hallmark event.
 - 41.2. as a city recognised for its parks and gardens, the Show further demonstrates leadership in the horticultural industry;
 - 41.3. stringent reinstatement techniques developed are promulgated into all of Council's major event locations;
 - 41.4. supporting the tertiary sector to develop the students within the municipality with high profile opportunities (eg. design awards);
 - 41.5. strong brand awareness through City of Melbourne logo placement on all MIFGS advertising and promotional materials (television, newspaper, magazines, outdoor billboards, posters, street banners, brochures, media releases, website, programs, media backdrops, directional signage etc.);
 - 41.6. product displays and exhibitor sites at the Show; and
 - 41.7. corporate opportunities for Councillors and stakeholders.
42. Summary of non-financial benefits of the Show are included in Attachment 7.

World Heritage Listing and Royal Exhibition Buildings

43. The Carlton Gardens (North and South) and the Royal Exhibition Buildings have been nominated for World Heritage listing by the Australian Government. The justification for inscription is based on their universal value as:

"a rare surviving manifestation of the international exhibition phenomenon of the late nineteenth and early twentieth centuries."

44. Within the submission for the listing to UNESCO, the Federal Government has cited the following in relation to the Carlton Gardens and Royal Exhibition Buildings:

"The Building and Gardens, used for the international exhibitions of 1880 and 1888, are unique in having maintained authenticity of form and function through to the present day"

"Once a year the Gardens are utilised by exhibitors for the Melbourne International Flower and Garden Show, one of the most popular events in the precinct".

45. A decision to renew the MIFGS licence arrangement would be fully in accordance with and supportive of the World Heritage Listing of the Royal Exhibition Buildings by the Commonwealth Government.

Carlton Gardens Master Plan

46. A Master Plan for Carlton Gardens will be developed in 2003/2004. The Master Plan will provide an overall vision for the Gardens in line with its heritage significance and will guide capital investment, on going management and ensure that the Gardens are planned and managed in line with community expectations. Interested stakeholders will be invited to participate in a reference committee that will assist with the development of the plan and provide information to the City of Melbourne. A copy of the Terms of Reference and process is attached (refer Attachment 8).

Conclusion

47. MIFGS is a major event for Melbourne that requires significant management and planning. Council will ensure that there is no damage to the Carlton Gardens by application of the following measures in conjunction with the proposed licence:
 - 47.1. Special Event Conditions that will form a schedule of the proposed licence;
 - 47.2. an annual regime of soil compaction analysis to monitor the general health of the gardens and trees;
 - 47.3. improved monitoring of the activities of the MIFGS by Council Officers to ensure compliance with the conditions of the licence;
 - 47.4. ongoing review of the reinstatement specification for restoration of the gardens after MIFGS;
 - 47.5. the opportunity for community input through an Event Advisory Group;
 - 47.6. MIFGS, in consultation with Council and community groups, will continue to negotiate with the Melbourne Museum for the presentation of future Shows, to be incorporated within the Museum Forecourt and internal buildings of the Museum; and
 - 47.7. the Show will leave a legacy for the Carlton Gardens that is consistent with the outcomes of the Carlton Gardens Master Plan.

Time Frame

48. Expedient approval of the licence agreement will allow the licensee to proceed with operational planning and sponsorship negotiations for the event in 2004 and beyond.

Relation to Council Policy

49. Council's Park Policy provides that it will "*facilitate events where it is consistent with the recreation and leisure role of the parks*" and that "*any commercial activity within parks must enhance the experience of park users.*"
50. As part of the 2003/04 budget process, funds are being sought for the development of a Master Plan for Carlton Gardens.

Government Relations

51. The Department of Sustainability and Environment has been involved in the consultation as part of this process.
52. As Committee of Management, Council is able to issue a licence for Carlton Gardens South in accordance with the provisions of the Crown Land (Reserves) Act (1978), the Melbourne Parks and Gardens (Joint Trustees Reserves) Regulations (1994) and the Miscellaneous Acts (Ominibus Amendments) Act (1995).

Recommendation

53. The Finance, Corporate Services and Governance Committees recommend that Council:
- 53.1. note the results from the Soil Compaction Analysis Assessment undertaken after the 2003 Show;
 - 53.2. note that further consultation has been undertaken with relevant parties in relation to a renewal of the licence with the Melbourne International Flower and Gardens Show Inc;
 - 53.3. require that ongoing and inclusive consultation be undertaken leading on this event through the establishment of an Event Advisory Group comprising representation of MIFGS, IMG, Council and the community;
 - 53.4. endorse the Terms of Reference as set out in Attachment 6 for this Advisory Group;
 - 53.5. endorse the renewal of the current funding/sponsorship arrangement with an additional requirement for a sinking fund to be established by MIFGS with a required contribution into that fund of \$1 per entry when Show attendances exceed 100,000;
 - 53.6. note that funds so accumulated will be applied pursuant to the recommendation of the Advisory Group and in a manner consistent with the Master Plan;
 - 53.7. endorse the setting of the licence fee in the first year (2004) at \$60,000 and be indexed annually after that at CPI levels;
 - 53.8. require that the detailed operational planning for MIFGS reflects the need to achieve a suitable integration with Melbourne Museum spaces;
 - 53.9. approve the awarding of a three year Licence Agreement between the City of Melbourne and the Melbourne International Flower and Gardens Show Inc. for the use of Carlton Gardens to stage MIFGS for a period of three (3) years with an optional extension of a further two (2) years.
 - 53.10. by instrument of delegation sealed by the Council pursuant to S. 98(1) of the Local Government Act 1989 ("the Act") the Council delegate its powers, duties and functions under the Act, and under the Crown Land (Reserves) Act 1978 to the Chief Executive Officer, or the person from time to time acting in that position:
 - 53.10.1. to negotiate and agree with MIFGS the terms and conditions of the licence renewal;
 - 53.10.2. to seek any necessary approval from the relevant Minister to enter into the licence renewal;
 - 53.10.3. to amend the terms of the licence renewal in any way required by the Minister as a condition of the Minister consenting to the licence renewal being entered into;
 - 53.10.4. to affix the Common Seal of the Council to the licence renewal;
 - 53.10.5. to grant or give all approvals or consents required of Council pursuant to the licence renewal; and
 - 53.10.6. to do all things ancillary and incidental to the above; and
 - 53.11. that under section 98 (3) of the Act the Council authorise the Instrument of Delegation to the Chief Executive Officer to empower him to delegate any power, duty or function of the Council delegated to him under the preceding paragraph to a member of the Council staff.

MELBOURNE INTERNATIONAL FLOWER AND GARDEN SHOW – LICENCE RENEWAL

Summary of In-Kind Sponsorship Support

The City of Melbourne provides in-kind support to the value of \$100,000 annually to the Melbourne International Flower and Garden Show. The In-Kind sponsorship includes:

Item	Detail
Reinstatement of Carlton Gardens	<ul style="list-style-type: none"> • Council funds approximately 60% of the cost of reinstatement, the balance of which is paid by MIFGS. • Council manages the reinstatement to ensure the outcome of the reinstatement works are completed to Council's specification.
Launch Function	<ul style="list-style-type: none"> • Council manages and funds a launch function presented by the Lord Mayor in a City of Melbourne venue. • The event received strong media coverage and creates media interest in the Show.
City Banner Sites	<ul style="list-style-type: none"> • Council funds the installation and removal of MIFGS Show banners in key city locations. • MIFGS funds the production of banners.
Public Consultation	<ul style="list-style-type: none"> • Council manages and funds the community consultation to alert residents and businesses in the event precinct of the closing of the gardens for the show, the changes to parking conditions and road closures associated with the event.
Advertising and promotion	<ul style="list-style-type: none"> • A variety of advertising and promotional activities aimed at profiling the event to Melbourne residents and businesses, regional and interstate visitors of the event.
Development and Implementation of Traffic Management Plans	<ul style="list-style-type: none"> • Council manages and fund the development and implementation of a plan to manage traffic in the precinct, particularly to ensure residents and businesses' amenity is maintained.

MELBOURNE INTERNATIONAL FLOWER AND GARDEN SHOW – LICENCE RENEWAL
Summary of Stakeholder Concerns

	INDIVIDUAL / ORGANISATION	KEY FEEDBACK / COMMENTS RECEIVED	RECOMMENDED OUTCOME
1	Carlton Gardens Group	<ul style="list-style-type: none"> • Concern about the delay in the decision on the new terms and conditions for MIFGS’s next licence. • Concern that the process has lost its principal focus. • Evidence that specific issues are being addressed • An investigation of alternate sites for MIFGS, particularly Birrarung Marr and Federation Square • Investigation of implications for reducing the terms of the licence, pending the Master Plan • Request clarification of the current financial arrangements • Request a meeting of stakeholders to further discuss issues • Concern that the Gardens are being degraded from the event and that their condition is worsening each year • Exhibits have grown in size and are having a greater impact on the Gardens • Expect that the larger exhibits be relocated to the Museum Forecourt • Concern that Council should reap greater rewards from the event and that any revenue generated from increased licence fees be directed into works to improve the Gardens and the western end of the museum • Expect that dialogue about the Show and use of the Gardens be ongoing 	<ul style="list-style-type: none"> • Delay required to ensure that all parties had been adequately consulted on all issues • Licence Renewal Committee Report provides evidence that all issues are being addressed • Birrarung Marr/Federation Square is not large enough to accommodate the Show in its current format • Council has clarified financial arrangements of the Show with stakeholders • Soil Compaction analysis report recommendations will be adopted • A Site Superintendent (representing Council) will supervise all phases of the Show (set up, event delivery and dismantle) • Establishment of a sinking fund for legacy programs • Proposed that licence fee is indexed to CPI • Proposal to establish an Event Advisory Group for the Show • Agreement from MIFGS Inc. and Melbourne Museum to work towards greater integration with Museum and forecourts

2	Eastenders	<ul style="list-style-type: none"> • Not opposed to the Show in principal but unhappy about the present location • Concern that Council should reap greater rewards from the event • Concern that the Gardens are being degraded from the event and that the condition is worsening each year • Exhibits have grown in size and are having a greater impact on the Gardens • Expect that the larger exhibits be relocated to the Museum Forecourt • Would like to see improvements in the landscape of the western end of the museum through a legacy program 	See outcomes suggested above
3	National Trust	<ul style="list-style-type: none"> • National Trust strongly support the Show • The National Trust would like the Show to leave a legacy and an improved environment for the Gardens • Advised that it is not the Trusts role to get involved in the operational aspects of the Show 	See outcomes suggested above
4	Carlton Residents Association	<p>Request for information on:</p> <ul style="list-style-type: none"> • monitoring the condition of the grass after the show • length of time that the gardens take to recover after the show; • period of time of occupation of the gardens by the licensee 	<ul style="list-style-type: none"> • Initial reinstatement works commence on the Friday after the show has finished. Works take approximately 12 days to complete, dependant on weather conditions • After the initial works are completed, Council undertakes regular site inspections to monitor the health of the gardens and progressive reinstatement is undertaken as required • Final inspection is held five months later to determine any deficiencies. The specification requires the contractor to rectify the areas required to complete the contract

			<ul style="list-style-type: none"> • It is considered that after a period of six weeks, the Gardens have recovered well however prevailing drought conditions are having an impact on the speed at which the gardens recover • The gardens are closed formally for 10 days however, the event set up and dismantle periods require the event organiser to be on site for a longer period
5	Melbourne Museum	<ul style="list-style-type: none"> • Melbourne Museum strongly support the Show in its current location • Melbourne Museum offered the hard surfaces of the Museum forecourt and other horticultural aspects of the Museum as 'exhibition spaces' for the show • There is a willingness to discuss commercial arrangements with MIFGS eg. Dual ticketing (access to both the show and the Museum) 	<ul style="list-style-type: none"> • A process will be established to look at integration opportunities from the Show into the Museum for 2004 and beyond.

SOIL COMPACTION ASSESSMENT
OF
THE CARLTON GARDENS
MELBOURNE

for

Parks and Recreation, Melbourne

Commissioned by:

Parks and Recreation, Melbourne

by

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May 2003

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EXECUTIVE SUMMARY

van de Graaff and Associates Pty Ltd carried out an assessment of the current soil compaction at Carlton Gardens, Melbourne, with respect to possible impact on tree growth and general gardens health. A site visit and field work was carried out on 20th May 2003.

The goals of our investigation are as follows:

- i. To ascertain whether compaction levels in the Carlton Gardens are of immediate concern, particularly with respect to stress on existing trees.
- ii. To ascertain whether the compaction levels are within the expected and acceptable levels for a park landscape.
- iii. To discover what factors may be responsible for compaction within the Carlton Gardens (eg. event loadings), and thus be causing stress to existing trees.
- iv. To develop an annual testing regime to enable Council to monitor compaction within the Gardens, if necessary.
- v. To outline any horticultural works that may be necessary for amelioration, as a result of ascertaining the compaction levels.

Our investigation indicated that:

- i. Although some compaction is evident within the Carlton Gardens, we do not feel that these levels constitute a threat to the existing trees/vegetation or to soil structural quality.
- ii. The Gardens exhibit healthy growth and do not display any visible signs of stress, such as those that would result from high levels of compaction. We can therefore confidently state that the compaction levels are within the tolerance levels of this park landscape.
- iii. We cannot rule out the possibility that event loadings may contribute to compaction within the Southern Carlton Gardens. However, there is no noticeable difference between the compaction levels in the Southern Gardens and the Northern Gardens which are not subjected to this event loading. Thus we see no reason to curtail events, or to assume that they are greatly contributing to compaction.
- iv. We do recommend the instigation of an annual compaction testing regime as outlined in Section 7.1 of this report.
- v. At this time, the compaction levels do not warrant any remedial horticultural activity. However, Section 7.2 of this report outlines possible methods for reducing further possible compaction within the Carlton Gardens.

1.0 INTRODUCTION

van de Graaff and Associates carried out an investigation of the current levels of compaction at the Carlton Gardens, Melbourne, to assess the necessity for any remedial activity and/or soil amelioration procedures. The effects of peak periods caused by event loadings such as the Melbourne International Flower and Garden Show were also to be considered with respect to their impact on the Southern Gardens, using the Northern Gardens as a 'control'.

Figure 1 below shows the layout of the Gardens as well as the locations of our soil compaction test sites.

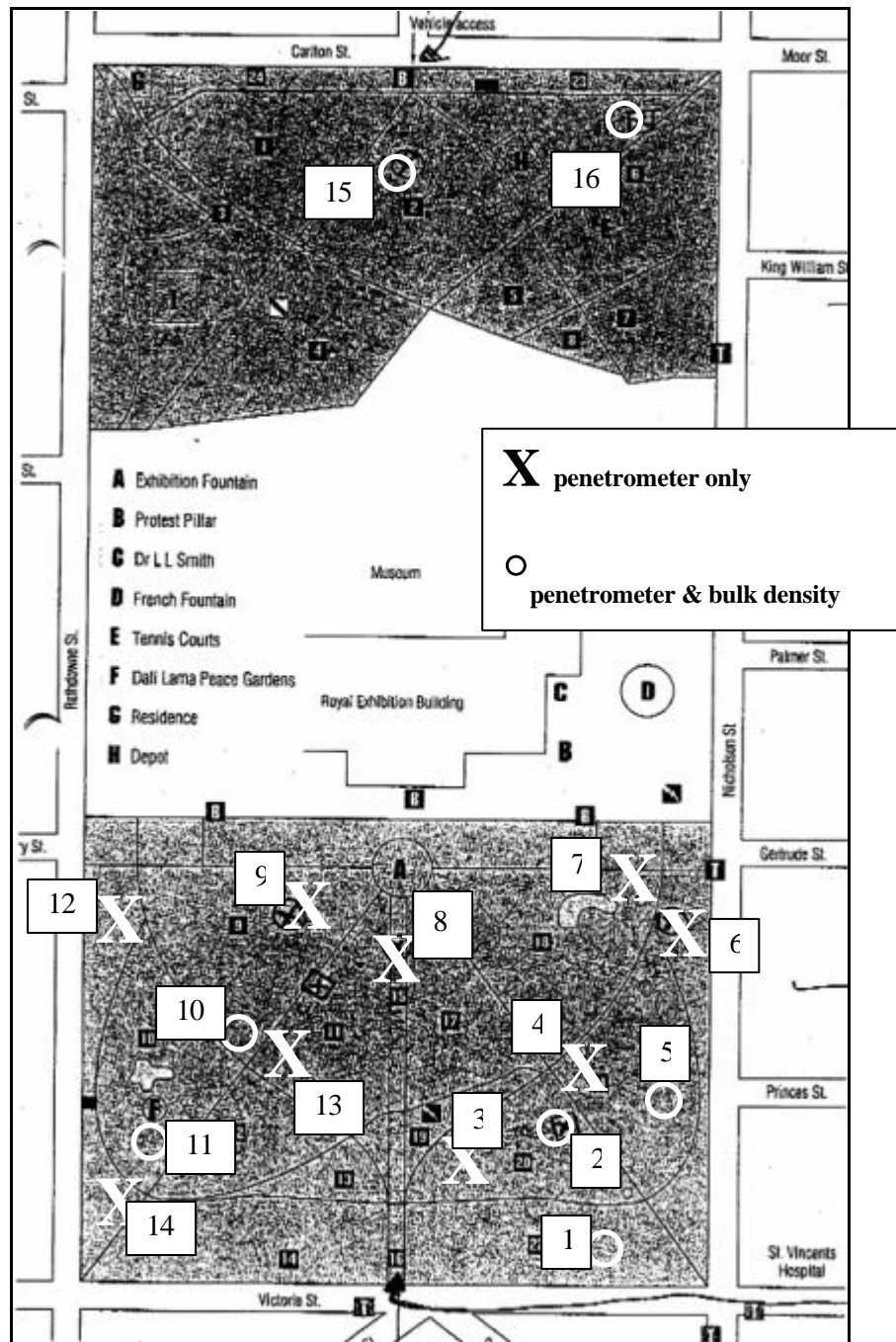


Figure 1 Map of the Carlton Gardens showing the locations of compaction test sites.

2.0 APPROACH AND WORK DONE

Our field investigation was carried out on 20th May 2003. This involved soil bulk density sampling, penetrometer testing, and an assessment of other site conditions. Fourteen separate bulk density samples were taken at seven sites. In addition, eighteen penetrometer tests were carried out at the site to increase the certainty and spread of our investigation. All sites were chosen to provide a range of suspected traffic levels, both under day-to-day usage estimations and for event loadings based upon the map of displays provided by the Melbourne International Flower and Garden Show.

The soil profile compaction was examined via a cone penetrometer to a maximum depth of 0.525 metres, depending upon the level of compaction present.

3.0 BULK DENSITY

Soil bulk density is defined as the weight of a unit volume of dry soil, including the solid and the pore volumes¹. Thus it is easy to see that compaction of soils will directly influence their bulk density. Bulk density is closely related to, and in fact governs, several soil characteristics such as soil strength, infiltration rate and macropore space. All of these soil characteristics have horticultural impacts.

Total pore space in a soil is inversely related to bulk density as shown below:

$$TotalPoreSpace(\%) = 100 - \frac{BulkDensity}{(2.65Mg/m^3 \times 100)}$$

Thus, as bulk density increases total pore space in the soil decreases. This is the basis for soil compaction. In addition, the structural aggregates (peds) of the soil are crushed in a structured soil and the mineral or primary particles are pressed together or rearranged in a coarse-textured soil (ie. clay)². This can have deleterious effects on infiltration rates and soil oxygenation, both of which will impact on plant growth.

4.0 EFFECTS OF COMPACTION ON SOIL PROPERTIES

4.1 Reduction of Pore Space

As pore space is reduced by compaction, the soil structure begins to change. Average pore diameter is reduced, as is the pore space volume. This increases the resistance of the soil to root penetration, as the majority of root channels weave their way through soil pore space as this is the path of least resistance. Depending upon the degree of original pore space, compaction may result in a decrease in waterholding capacity and oxygenation in the profile.

4.2 Shift in Pore Size Distribution

Compaction changes the distribution of pores within the profile. A naturally well-aggregated soil is one where the pore size varies from large air-filled macropores to small micropores that usually contain water³. This allows for rapid movement of air and water

¹ **Craul, Phillip J.** (1992) "Urban Soil In Landscape Design," John Wiley & Sons, Inc. p. 15.

² Ibid p. 225.

³ Ibid p. 226.

throughout the natural profile, providing adequate aeration and transport of water and nutrients to the root zone.

A soil that has undergone compaction may suffer interruption to this transport system through loss of structure. However, limited compaction can actually increase the waterholding capacity of a soil profile, by contributing to the existence of more waterholding micropores as the larger airholding macropores are crushed.

4.3 Reduction of Infiltration

When compaction results in the loss or reduction of macropore space, the profile often suffers from excessive drying. This is due to the fact that the proportion of macropore space with respect to the total pore space within a profile, largely governs the rate of infiltration.

4.4 Reduction in Aeration

Gaseous diffusion within a soil profile can largely only occur in the macropore fraction of total pore space. Thus, when the macropore volume is reduced, and the diffusion pathways made more complex as a result of compaction, there is often a decrease in soil oxygenation, and an accompanying increase in carbon dioxide levels.

4.5 Soil Temperatures

The reduction of pore space as a result of compaction means that the soil particles are put into greater contact with each other. This contact means that the profile as a whole becomes a better conductor of heat.

5.0 INTERPRETATION OF RESULTS

5.1 Soil Bulk Density

Duffy and McClurkin (1974) found that soil bulk density was the most important factor in determining the success or failure of the planting of pine trees.

Table 1 – Relationship between Bulk Density and Lobolly Pine Planting Failure⁴

Bulk Density (g/cc)	Planting Success %
1.25 – 1.34	Successful 100%
1.34 – 1.44	Mostly Successful 60%
1.45 – 1.54	Partial Failure 33%
1.55 – 1.65	Mostly Failure 10%
>1.65	Total Failure 0%

As seen in Table 2 below, the bulk density readings of the topsoil (0-10cm) at Carlton Gardens, nearly 80% of all test locations comply with the 100% Successful rating developed by Duffy and McClurkin.

Table 2 – Bulk Density readings at Carlton Gardens, Melbourne, May 2003.

TEST LOCATION	BULK DENSITY (g/cc)	Duffy-McClurkin Rating
1A	1.06	Successful 100%
1B	1.10	Successful 100%
2A	1.12	Successful 100%
2B	1.05	Successful 100%
5A	0.82	Successful 100%
5B	0.94	Successful 100%
10A	0.85	Successful 100%
10B	0.84	Successful 100%
11A	1.49	Partial Failure 33%
11B	1.47	Partial Failure 33%
15A	1.03	Successful 100%
15B	1.17	Successful 100%
16A	1.14	Successful 100%
16B	1.36	Mostly Successful 60%

Of the three bulk densities that register as higher than this ideal level, one (Site 16B) is in excess by only 0.02 g/cc. The sites with the overall highest bulk densities are Sites 11A and 11B, with 1.49 g/cc and 1.47 g/cc respectively. This site registers as ‘Partial Failure’ on the Duffy-McClurkin scale.

Sites 11A and 11B are located at the first divergence in the pathway near the Victoria Street/Rathdowne Street entrance to the Gardens. From our observations, this entrance seems highly frequented, with many visitors neglecting to keep to the pathways. Site 14, which is located even closer to this entrance, exhibited some of the highest topsoil penetrometer readings taken, at 0.375 MPa (0 – 3.5cm) and 1.201 MPa (3.5 – 7cm).

⁴ After Duffy and McClurkin (1974).

Penetrometer Site 6 also shows quite high readings of 0.600 MPa (0 – 3.5cm) and 1.576 MPa (3.5 – 7cm), which given the tight correlation between bulk density and penetrometer readings seen in Appendix 2, we extrapolate that Site 6 would also display a high bulk density. Site 6 is located at the northern entrance to the Southern Gardens at Nicholson Street.

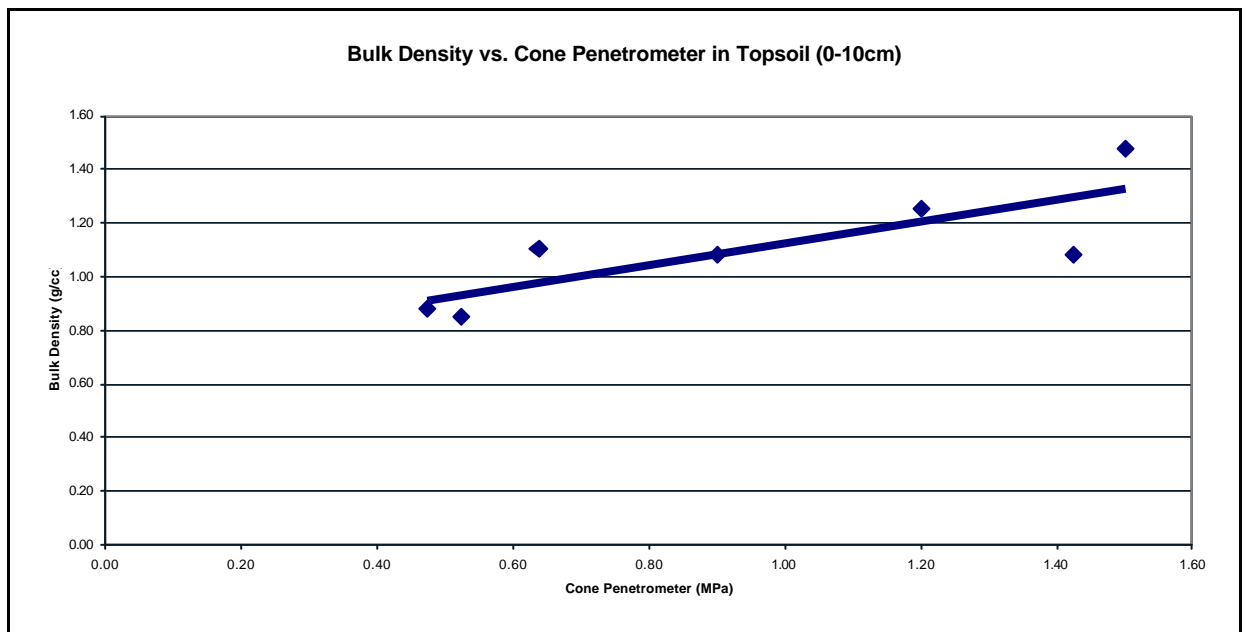
Other sites near entrances, such as Sites 1 and 12 also yielded high penetrometer results, whereas, sites such as 3, 5 and 9, which are all located some distance from entrances and pathways, exhibit much lower penetrometer readings in the order of 0.150 – 0.300 MPa (0 – 3.5cm) and 1.050 – 1.426 MPa (3.5 – 7cm). This clearly shows that everyday foot traffic and/or maintenance vehicle traffic (if vehicles diverge from pathways) is resulting in a degree of noticeable compaction near entrances to the Gardens.

Even given that Sites 11A, 11B and 16B constitute some degree of failure of tree establishment on the Duffy-McClurkin scale, the readings obtained at these sites are by no means extreme. Well-established trees such as those found near these locations would not suffer from this mild degree of compaction. Should new trees be planted near entrances to the Gardens, steps should be taken prior to planting to improve the soil structure and reduce compaction.

5.2 Soil Penetrometer Interpretation

Due to the speed and relative ease of cone penetrometer testing, we were able to obtain larger quantities of data in this manner. As seen in Figure 2 below, there is a strong correlation between penetrometer and bulk density results at this location.

Figure 2 – Correlation between Soil Penetrometer and Soil Bulk Density Results.



As a result, we feel confident that the soil penetrometer readings accurately reflect the comparative bulk density of the soils at Carlton Gardens.

The horticultural industry views a soil requiring less than 1MPa of force to penetrate via cone penetrometer to be ideal, and soils requiring greater than 2.3 MPa of force to penetrate as seriously compacted⁵.

Not one of the penetrometer readings taken at any of the eighteen sites tested within the Carlton Gardens returned a result of 2.3 MPa or greater.

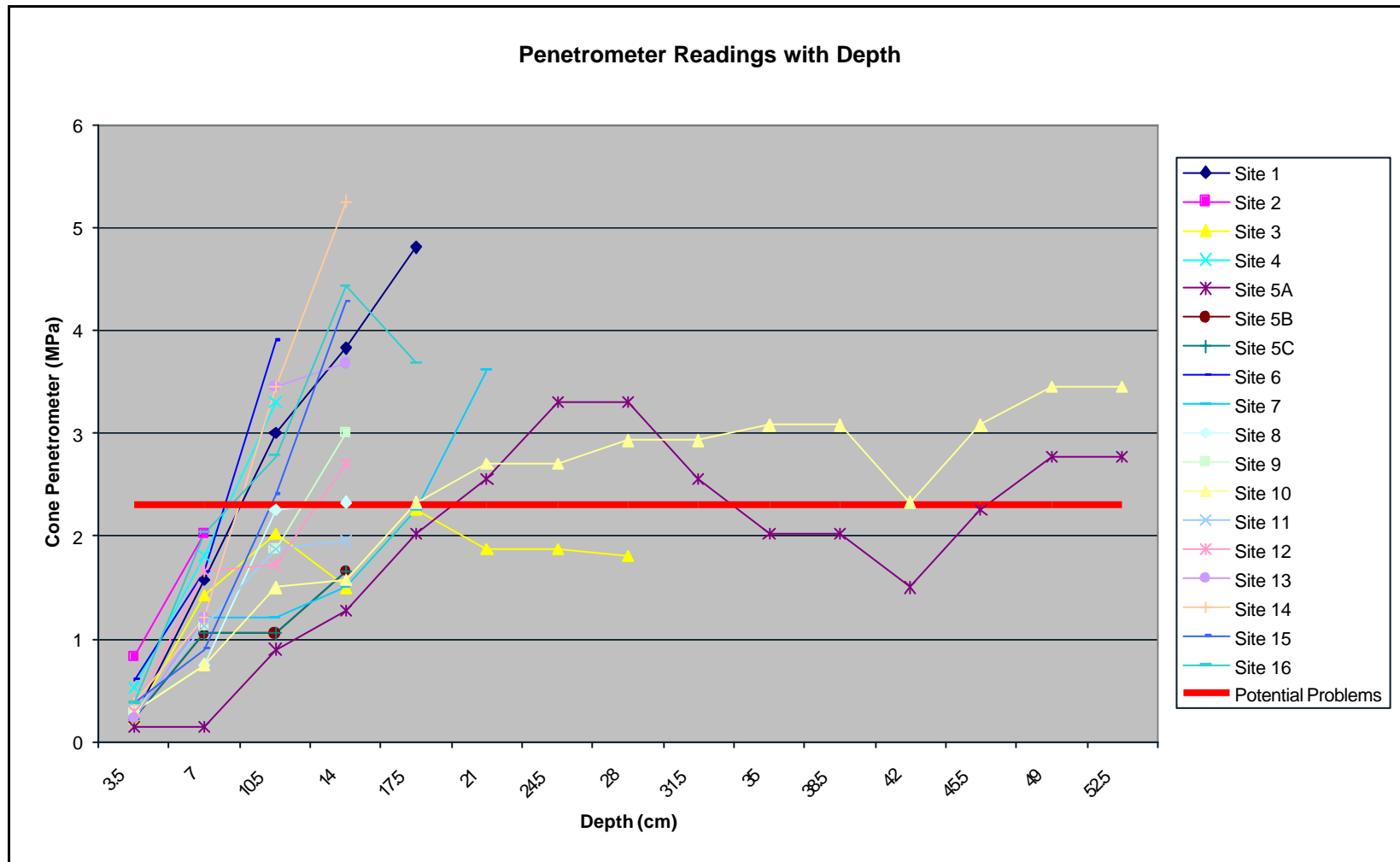
This is a good indication that, even though certain areas of the Gardens are experiencing some compaction as a result of traffic, the current level of compaction is mild. The force required to penetrate deeper into the soil profile is naturally greater. Some profiles, such as those at Sites 3, 5A, 5B, 5C, 8 and 10, display a force requirement of either ideal (<1MPa) or <2.3 MPa.

It is important to note that these sites are either located some distance from an entrance, in the centre of an open space or adjacent to a pathway where a visitor gains no benefit in distance-walked by diverging from the pathway (ie. it is just as easy to follow the path in order to reach their objective). And that these sites also display lower than average bulk density readings.

Figure 3 below illustrates the relationship between force required to penetrate the profile, and depth within the profile. Note the line indicating 2.3 MPa (the limit above which there is cause for concern).

⁵ *Private communication – Dr. Peter May, University of Melbourne, Burnley.*

Figure 3 – Soil Cone Penetrometer Results with Depth.



6.0 SOIL COMPACTION LEVELS

6.1 Are Current Compaction Levels Causing Stress on Established Trees?

There is no evidence to suggest that the current levels of compaction within the Carlton Gardens are having any impact on established tree health. Almost 80% of the soil bulk density readings can be considered ideal for tree establishment, based on the Duffy-McClurkin scale.

Of those that are in excess of this ideal level, only Sites 11A and 11B returned results showing any relevant degree of compaction. The established trees in the vicinity of these sites do not exhibit any outward signs of stress, nor is there ponded surface water (even after several days of rain) that would indicate excessive compaction lower in the soil profile.

Should further planting be initiated, steps would have to be taken to ameliorate soil compaction in areas of high foot/ maintenance vehicle traffic, as young trees do not have the resilience and root-growth capacity of established trees.

6.2 Are the Compaction Levels Within Expected and Acceptable Levels for a Park Environment?

The health of the vegetation within a park environment is the best indicator of whether or not compaction levels should be a concern. If the park is flourishing (as is the case with Carlton Gardens) there is little cause for concern regarding compaction.

All indications are that the vegetation within the Carlton Gardens is extremely healthy. The trees show no signs of stress caused by compaction (such as wilting of new growth, stunted growth or root exposure by erosion caused by increased surface water runoff).

Given that some compaction is evident in the vicinity of entrances and pathway interconnections, it may be advisable to monitor compaction in these areas via bulk density and penetrometer over a period of time to establish whether compaction is increasing with time.

6.3 What Other Factors Besides Event Loadings may be Causing Compaction?

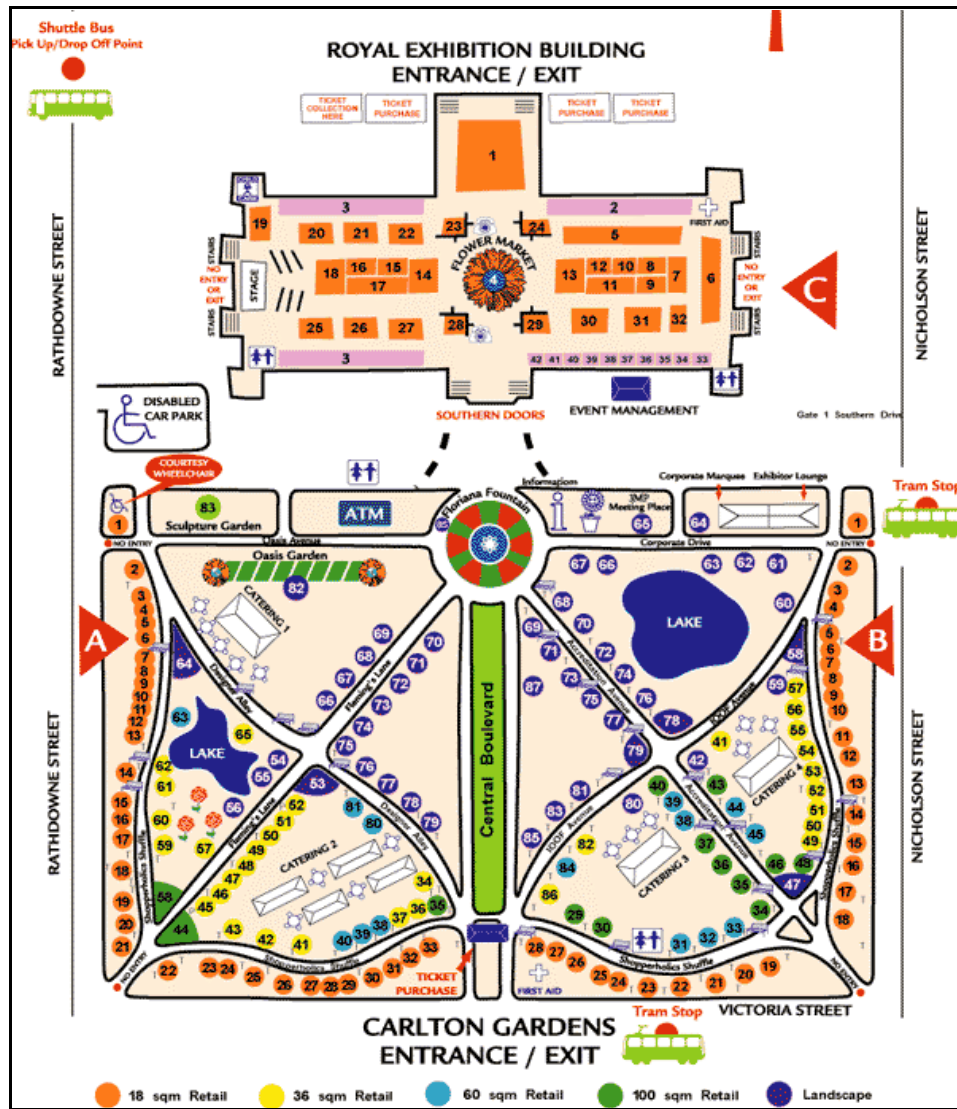
As stated in Section 5 of this report, some profiles, such as those at Sites 11A and 11B, (with 1.49 g/cc and 1.47 g/cc bulk density respectively) and Penetrometer Site 6 which also shows quite high penetrometer readings of 0.600 MPa (0 – 3.5cm) and 1.576 MPa (3.5 – 7cm), display considerably more compaction than the majority of sites tested.

We believe that this is due to their proximity to a major entrance to the Gardens, or a diversion/confluence in pathways within the Gardens. For example, Sites 11A and 11B are located at the first divergence in the pathway near the Victoria Street/Rathdowne Street entrance to the Gardens.

Whereas, sites such as 3, 5 and 9, which are all located some distance from entrances and pathways, exhibit much lower penetrometer readings in the order of 0.150 – 0.300 MPa (0 – 3.5cm) and 1.050 – 1.426 MPa (3.5 – 7cm). This clearly shows that everyday foot traffic and/or maintenance vehicle traffic (if vehicles diverge from pathways) is resulting in a degree of noticeable compaction near entrances to the Gardens.

Figure 4 below is a reproduction of a map indicating the locations of displays during the Flower and Garden Show. Here, by comparing this map to Figure 1 which shows our test locations, it can be sent that there is a definite correspondence between areas utilised in the Flower and Garden Show, and standard or ‘normal-use’ high traffic zones.

Figure 4 – Map of International Flower and Garden Show Displays, 2003.



Given that the Southern Carlton Gardens receive a greater volume of foot traffic and are subject to recurring event loadings such as the International Flower and Garden Show, we used the Northern Carlton Gardens as a ‘control’ to determine whether event loadings are having a negative impact on the Southern Gardens. The results gathered in the Northern Gardens indicated compaction levels that were equal and sometimes in excess (Site 16B) of those levels existing in the Southern Gardens, despite their higher usage.

As a result, we can conclude that events do not noticeably increase the compaction levels within the Carlton Gardens. However, efforts should be made to limit surficial loadings to the soil (foot-traffic, the weight of stalls/displays) on areas that exhibited higher compaction, such as entrances and pathway confluences.

7.0 RECOMMENDATIONS

7.1 Annual Soil Compaction Testing Regime

In order to monitor any potential increase in soil compaction within areas identified within this report as 'high-risk', such as entrances and path diversions/confluences, a simple compaction testing regime should be put in place.

Bulk density and penetrometer tests should be conducted annually, for a minimum of three years. The data should be collected at the same time of year, preferably under similar weather conditions and using the same variety of equipment, in order to avoid misleading results.

The testing regime should target areas of high-traffic, but also include 'control' areas that lie within large open spaces and/or readings from the less-utilised Northern Carlton Gardens.

7.2 Suggestions to Decrease the Risk of Increasing Compaction

Although we feel that the compaction levels within the Gardens at this point do not constitute the need for remedial horticultural works, we have included some suggestions as to how the Gardens may be managed in order to avoid reaching the point where amelioration is required:

- A review of existing pathways, with a view to anticipating short-cuts taken by visitors; or
- Encouraging traffic to disperse throughout the Gardens so as to 'dilute' possible compaction
- As much as possible, using vehicles/machinery within the Gardens only after the soil has dried thoroughly after rain or irrigation
- Monitoring the weight of stalls/displays required by the International Flower and Garden Show

8.0 CONCLUSIONS

Although some compaction is evident within the Carlton Gardens, we do not feel that these levels constitute a threat to the existing trees/vegetation or to soil structural quality. The Gardens exhibit healthy growth and do not display any visible signs of stress, such as those that would result from high levels of compaction. We can therefore confidently state that the compaction levels are within the tolerance levels of this park landscape.

We cannot rule out the possibility that event loadings, such as those created by the displays and increased useage during the International Flower and Garden Show, may contribute to compaction within the Southern Carlton Gardens. However, there is no noticeable difference between the compaction levels in the Southern Gardens and the Northern Gardens which are not subjected to this event loading. Thus, although we recommend that steps be taken to minimise the impact of such events, we see no reason to curtail them, or to assume that they are greatly contributing to compaction.

We do recommend the instigation of an annual compaction testing regime as outlined in Section 7.1 of this report. This will enable any degradation to be recognised, in order to allow sufficient time to ameliorate soils before lasting damage is done, should compaction levels be seen to be increasing over time.

At this time, the compaction levels do not warrant any remedial horticultural activity. However, Section 7.2 of this report outlines possible methods for reducing further possible compaction within the Carlton Gardens.

APPENDIX 1

Bulk Density and Penetrometer Results

Table 2 – Bulk Density readings at Carlton Gardens, Melbourne, May 2003.

TEST LOCATION	BULK DENSITY (g/cc)	Duffy-McClurkin Rating
1A	1.06	Successful 100%
1B	1.10	Successful 100%
2A	1.12	Successful 100%
2B	1.05	Successful 100%
5A	0.82	Successful 100%
5B	0.94	Successful 100%
10A	0.85	Successful 100%
10B	0.84	Successful 100%
11A	1.49	Partial Failure 33%
11B	1.47	Partial Failure 33%
15A	1.03	Successful 100%
15B	1.17	Successful 100%
16A	1.14	Successful 100%
16B	1.36	Mostly Successful 60%

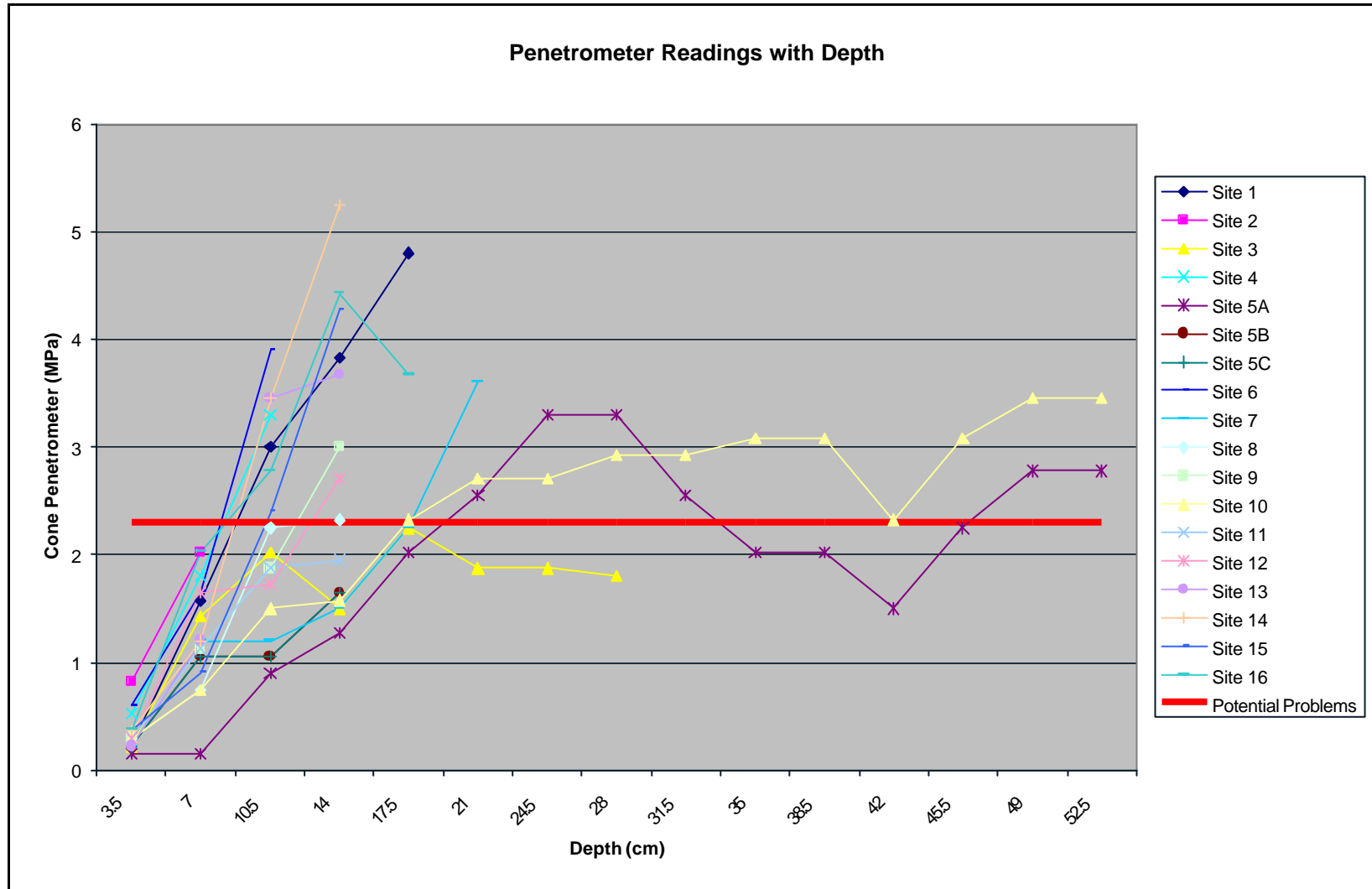
Table 3 – Penetrometer Results at Carlton Gardens, Melbourne, May 2003.

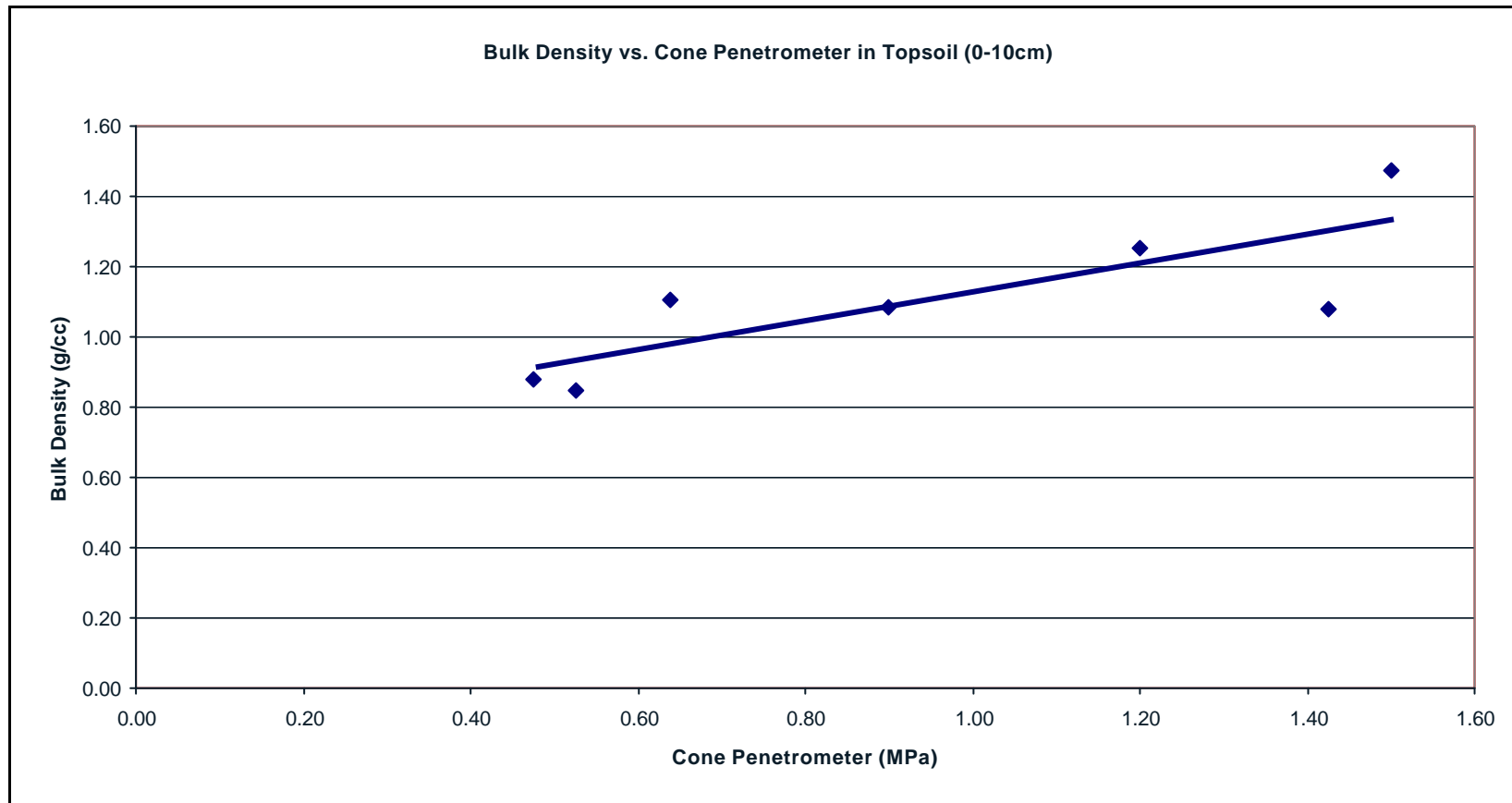
SITE #	Depth (cm)	Force (Mpa)	SITE #	Depth (cm)	Force (Mpa)
1	0 - 3.5cm	0.225099662	6	0 - 3.5cm	0.600265765
	3.5 - 7cm	1.575697633		3.5 - 7cm	1.650730854
	7 - 10.5cm	3.001328825		7 - 10.5cm	3.901727472
	10 - 14cm	3.826694252	7	0 - 3.5cm	0.225099662
	14 - 17.5cm	4.80212612		3.5 - 7cm	1.20053153
2	0 - 3.5cm	0.825365427		7 - 10.5cm	1.20053153
	3.5 - 7cm	2.025896957		10 - 14cm	1.500664412
3	0 - 3.5cm	0.225099662		14 - 17.5cm	2.250996619
	3.5 - 7cm	1.425631192	17.5 - 21cm	3.60159459	
	7 - 10.5cm	2.025896957	8	0 - 3.5cm	0.300132882
	10 - 14cm	1.500664412		3.5 - 7cm	0.750332206
	14 - 17.5cm	2.250996619		7 - 10.5cm	2.250996619
	17.5 - 21cm	1.875830515		10 - 14cm	2.326029839
	21 - 24.5cm	1.875830515	9	0 - 3.5cm	0.300132882
24.5 - 28cm	1.800797295	3.5 - 7cm		1.125498309	
4	0 - 3.5cm	0.525232544		7 - 10.5cm	1.875830515
	3.5 - 7cm	1.800797295	10 - 14cm	3.001328825	
	7 - 10.5cm	3.301461707	10	0 - 3.5cm	0.300132882
-	-	3.5 - 7cm		0.750332206	
5A	0 - 3.5cm	0.150066441		7 - 10.5cm	1.500664412
	3.5 - 7cm	0.150066441		10 - 14cm	1.575697633
	7 - 10.5cm	0.900398647		14 - 17.5cm	2.326029839
	10 - 14cm	1.275564751		17.5 - 21cm	2.701195942
	14 - 17.5cm	2.025896957		21 - 24.5cm	2.701195942
	17.5 - 21cm	2.551129501		24.5 - 28cm	2.926295604
	21 - 24.5cm	3.301461707		28 - 31.5cm	2.926295604
	24.5 - 28cm	3.301461707		31.5 - 35cm	3.076362045
	28 - 31.5cm	2.551129501		35 - 38.5cm	3.076362045
	31.5 - 35cm	2.025896957		38.5 - 42cm	2.326029839
	35 - 38.5cm	2.025896957		42 - 45.5cm	3.076362045
	38.5 - 42cm	1.500664412		45.5 - 49cm	3.451528149
	42 - 45.5cm	2.250996619		49 - 52.5cm	3.451528149
	45.5 - 49cm	2.776229163	11	0 - 3.5cm	0.300132882
49 - 52.5cm	2.776229163	3.5 - 7cm		1.125498309	
5B	0 - 3.5cm	0.225099662		7 - 10.5cm	1.875830515
	3.5 - 7cm	1.050465089		10 - 14cm	1.950863736
	7 - 10.5cm	1.050465089	12	0 - 3.5cm	0.300132882
	10 - 14cm	1.650730854		3.5 - 7cm	1.650730854
5C	0 - 3.5cm	0.225099662		7 - 10.5cm	1.725764074
	3.5 - 7cm	1.050465089	10 - 14cm	2.701195942	
	7 - 10.5cm	1.050465089	13	0 - 3.5cm	0.225099662
	10 - 14cm	1.650730854		3.5 - 7cm	1.20053153
14	0 - 3.5cm	0.225099662		7 - 10.5cm	3.451528149
	3.5 - 7cm	1.20053153		10 - 14cm	3.67662781
	7 - 10.5cm	3.451528149	14	0 - 3.5cm	0.375166103
	10 - 14cm	5.252325443		3.5 - 7cm	1.20053153
15	0 - 3.5cm	0.375166103		7 - 10.5cm	3.451528149
	3.5 - 7cm	0.900398647		10 - 14cm	5.252325443
	7 - 10.5cm	2.40106306	15	0 - 3.5cm	0.375166103
	10 - 14cm	4.276893575		3.5 - 7cm	0.900398647
16	0 - 3.5cm	0.375166103		7 - 10.5cm	2.40106306
	3.5 - 7cm	2.025896957		10 - 14cm	4.276893575
	7 - 10.5cm	2.776229163	16	0 - 3.5cm	0.375166103
	10 - 14cm	4.426960017		3.5 - 7cm	2.025896957
14 - 17.5cm	3.67662781	7 - 10.5cm		2.776229163	
		10 - 14cm		4.426960017	

APPENDIX 2

Graphical Information

Penetrometer Readings with Depth





APPENDIX 3

Maps and Sampling Locations

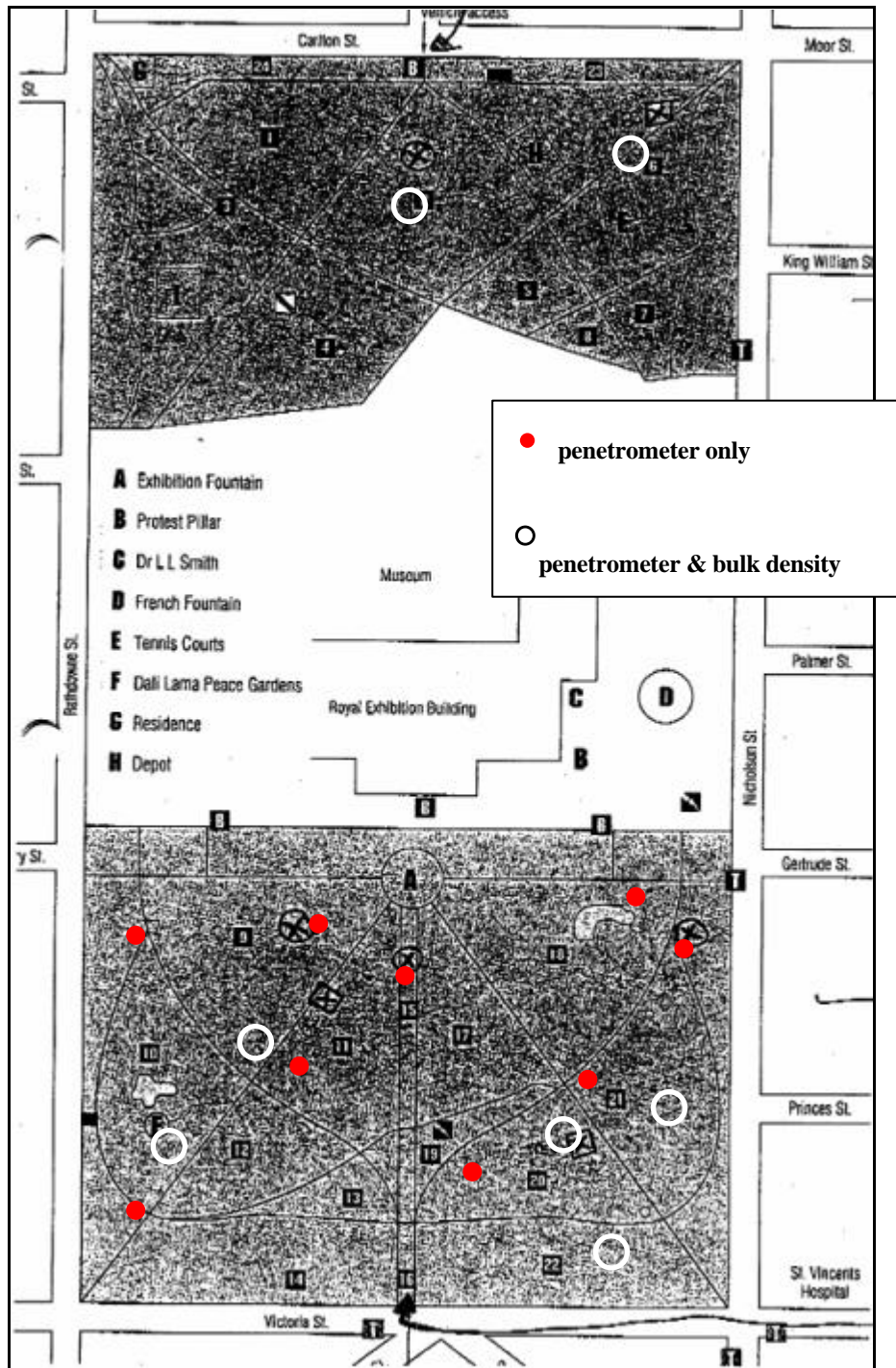


Figure 1 – Map of Carlton Gardens showing sampling locations.

Figure 4 – Map of International Flower and Garden Show Displays, 2003.

