


# THE CITY OF VANCOUVER BOULEVARD TREE PROGRAM



HISTORY, ANALYSIS AND  
RECOMMENDATIONS FOR MANAGEMENT

**THE CITY OF VANCOUVER**  
**BOULEVARD TREE PROGRAM**

**HISTORY , ANALYSIS**  
**AND**  
**RECOMMENDATIONS FOR**  
**MANAGEMENT**



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**for**

**Board of Parks and Recreation**

**Vancouver , B. C.**

**1980**

THE CITY OF VANCOUVER  
BOULEVARD TREE PROGRAM

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HISTORY, ANALYSIS  
AND  
RECOMMENDATIONS FOR  
MANAGEMENT

EXECUTIVE SUMMARY

## INTRODUCTION

In the preface to a brief outline of the Greater Vancouver Regional District, there is the following:

"Several years ago a survey conducted in the United States revealed that if Americans could live anywhere in the world outside their own country, their fourth choice would be the Vancouver area . . .

Finishing fourth (behind London, Paris and Munich) reflects well on metropolitan Vancouver. It adds weight to the claim that this indeed is 'the liveable region'."

Preliminary results from the recent City of Vancouver survey clearly reveal one reason why Vancouver is perceived as a desirable place to live - people have a strong affinity for trees in the urban setting - and Vancouver has an enviable resource of city trees. A substantial portion of that resource is comprised of trees on city streets.

The City of Vancouver has encouraged or undertaken the planting of trees within street right-of-way since the late 1800's. It is estimated that by 1928 there were 30,000 trees planted, by 1948, 80,000, and by 1978, 150,000, a quarter of which are flowering species. This very considerable civic asset can be conservatively valued at \$50 million in terms of replacement cost and now requires an annual budget in excess of \$400,000 to sustain and improve it. At a time when fiscal constraints are of increasing importance, every effort must be made to ensure that this investment yields the highest return.

Unfortunately the present program does not benefit from clear, concise goals, objectives, policies, planning or records. Consequently it is difficult to assess success. However, arboricultural indices of health, vigor, species and age diversity, mortality and percent stocking on streets already planted indicate a decline in the general condition of the resource. Indications of program efficiency, such as anticipatory maintenance based on a resource inventory, tree establishment or replacement planning, system workload analysis



or detailed budgeting, are lacking and demonstrate the need for additional guidance in the structure, management and future direction of the program.

### The Report Outline

It was recognized by Park Board staff that the increasing cost and complexity of the program, coupled with retirement and replacement of staff responsible for boulevard trees, provided an opportunity to thoroughly review the existing program. In addition, two City Departments, Engineering and Planning, had also requested various changes, additions and improvements to the program, thus providing, in late 1978, a combined impetus for this study.

The report was compiled from extensive interviews with Park Board and City staff, contacts with external agencies concerned with city trees, records provided from City and Park Board files and the considerable published literature on municipal tree management. In addition, a detailed "concerns list" was generated at a modified Delphi session attended by most of the Park Board staff directly involved in the boulevard tree program and many field visits were conducted to examine conditions first hand.

The study report is comprised of three volumes. Volume I contains the historical review, analysis and recommendations, Volume II consists of 71 detailed appendices that document or illustrate particular points from the text of Volume I, while Volume III consists of over 150 colored photographs that illustrate the conditions found during the field studies.

Volume I consists of a Preface and Summary of Recommendations accompanied by fourteen sections arranged in order of precedence. The conclusions drawn from each substantive section are summarized here in the following paragraphs.

### Report Conclusions

#### Historic Perspective

The management of urban trees requires a long term planning horizon. Decisions made three to five decades ago directly affect the appearance and maintenance cost

of present trees. Similarly, decisions made today will dictate benefits, cost and condition of the city street tree resource in the next century.

The history of the existing boulevard tree program has had a consistent pattern since its inception in 1912 - it has been underfunded and it has lacked direction from City Council or the Board of Park Commissioners. Consequently the program has not evolved in a cohesive manner, nor developed an appropriate framework of policies, planning, organization, training and staffing necessary to manage a resource of over 150,000 trees. In particular, the program has suffered from insufficient fiscal support to carry out essential maintenance, especially on very young and very old trees when they are most in need of help. This situation has been aggravated since detailed records have not been kept of tree numbers, or of the costs of operation for the many tasks involved in tree establishment, maintenance and replacement. Past budget submissions have tended to be weak and lacking the detailed rationale necessary to argue the case for appropriate support.

In recent years, upwards of 3,000 trees have been planted each year but too much emphasis and support has gone to these new tree plantings, many of them requiring intensive maintenance, while the balance of the resource has suffered and will continue to decline unless a planned city-wide maintenance program is instituted.

### Policies

In order to ensure a clear, orderly, written guide for the management of the Boulevard Tree Program, it is essential that important policies be identified and discussed. Various calls have been made over the years from 1917 for formal tree program policies. Few such policies have been forthcoming and none have provided the necessary framework for all aspects of the program.

The report suggests that policies are necessary at five levels, from City Council, jointly between City Council and the Board of Park Commissioners, policies from the Board of Park Commissioners alone, public policies concerning the boulevard tree program, and internal policies to govern the day to day operations

of the program. Policy recommendations are made concerning Council in the areas of program recognition, funding, assignment of responsibilities, By-Laws, scope of visual improvement and civic pride in the City. Joint policies are suggested in the area of controlling private tree planting and citizen responsibilities for tree lawn maintenance, while Park Board policies are recommended for safety, records, tree planting and replacement, liability, program standards, program organization, public participation, and Park Board supervision. In the area of Public Policies, it is envisaged that policies concerning the relationship of the Boulevard Tree Program to other City programs, the goals and objectives of the Boulevard Tree Program, quality of work, safe and appropriate trees, procedures for removal planting or protection of trees effected by private development or requests, public education and communication and co-operation with agencies or other municipalities would be outlined, where appropriate, in a publication readily available to the general public.

Since present operating policies are not compiled for internal program control, it is suggested in the report that a Policy Manual be developed starting with policies in the areas of management strategies, organization, standards, responsibilities, safety, tree establishment, maintenance and replacement.

#### Powers and Legislation

The City has had municipal By-Laws regulating trees in the City since the late 1800's. A Boulevard Tree By-Law for example was passed in 1896 and last revised in 1917. Although much of the intent is still appropriate this By-Law should be reviewed and updated. Since the City receives delegated powers from the Province as set out in the Vancouver Charter any By-Laws Council may wish to make must be clearly supported by the Charter. The City passed a Tree Destruction By-Law in 1892. This ByLaw too has not been updated recently and would be more useful if it embraced wider powers including the preservation of urban forest land and the regulation of trees on private property. The latter power is available to other B. C Municipalities but would require an alteration to the Vancouver Charter.

A number of existing City By-Laws, for example the Park By-Law, the Sign By-Law and the Street and Traffic By-Law impinge upon the administration of the existing boulevard tree operations. Various provision of these By-Laws require updating or clarifying in order to match the intent of this study.

The City's Tree program is also effected by various pieces of Provincial and Federal legislation. Examples are the Provincial Pesticides Act, the Worker's Compensation Board Regulations and the Federal Plant Quarantine Act. It is apparent this type of legislation may have a direct bearing on the Park Board's operations but that responsibilities under such legislation have not been well understood by staff. In addition, the use of some powers which would assist in protecting the tree resources such as the Provincial Motor Vehicles Act concerning accident reporting and the Federal Criminal Code as it applies to vandalism should receive greater attention. A critical element in ensuring that any tree program is operated at full efficiency and provides as high standard of work as an example to the community, is that of employing skilled and conscientious staff.

Pride of workmanship is, in part, related to training and opportunities. At present, there is no Provincial program that recognizes arboriculture (the management of single trees) as a skilled trade. The City has an opportunity to approach the Provincial Department of Labour and initiate discussion to that end.

#### Organization and Responsibilities

This section has been subdivided into four parts; division of responsibilities, relationships with other City Departments, relationships with other agencies and arboricultural group organization. It is concluded that greater clarification is required between the role of the Park Board, the City Engineering Department and the City Planning Department. The report suggests that for the most part, working relationships with City Departments function well except where lack of standards or planning creates conflict. Relationships with agencies outside the municipal level of government have been extremely limited and could be substantially improved.

The Arboricultural group has not been reviewed in terms of staffing or organization for some considerable time and it is strongly recommended that the Board consider a more refined assignment of responsibilities within the Boulevard Tree Program and the appointment of a trained City Arborist.

### Training and Education

Staff training, both at the management level and at the working level, has been badly neglected and, consequently, no formal training programs that prepare staff for the changes and complexities of modern management or arboricultural practice have evolved. Further, the areas of supervision, work safety and training documentation require substantial improvement. In addition to these areas, specific recommendations are made concerning apprenticeship programs and the eventual appointment of a Trades Training and Safety Officer for all arboricultural, forestry, and horticultural activities.

### Procedures and Practices

These two areas have the greatest influence on day-to-day operations of the program. For field work to be accomplished in an orderly, efficient manner, meeting the standards and expectations set out in the overall program goal, it is essential to have a simple, explicit framework of reference points. Although the present program has functioned to date with a minimum of written procedures and practices, the scope and extent of the present program dictates the need for consistent, ascertainable guidelines.

The report documents areas of need for explicit procedures in the categories of planning, finance, procedural systems, procedural documents, communications and resource management. Present work practices vary considerably and require careful scrutiny. Certain current practices, such as tree tying and severe tree pruning, are detrimental to the tree resource. Recommendations are made in the areas of supervision, crew standards and pride, work methods and arboricultural equipment.

### Program Standards and Specifications

Written standards for planting and establishment, small tree maintenance, general tree maintenance, tree moving and tree replacement have not been found during the course of the study. In addition, guidelines for construction protection, preventative maintenance, tree surgery and safe practices do not appear to have been prepared. Recommendations are made to remedy this situation.

Specifications are normally prepared when any work of a contract nature is either done for, or by, the Park Board. Although such activities do, and will, occur for the Boulevard Tree Program, detailed specifications

### Constraints

A number of important safety, engineering and physical constraints impinge upon or limit the use of trees within the street right-of-way since the basic purpose of streets is to expedite the movement of people, commodities and utilities. In order to integrate tree planting into the complex web of activities, it is necessary to examine and establish the prime limitations that restrict tree use on streets. It is concluded in the report that this has not been done for Vancouver and is a necessary precursor to developing any Design Guidelines.

### Inventory

Effective management of urban trees requires an inventory of the resource that is sophisticated enough to provide information essential for program planning and project scheduling, simple enough to be readily understood by staff, yet at the same time cost effective. Without some sort of inventory it is not possible to realistically or efficiently manage a large tree program. The City of Vancouver does not have any type of street tree inventory and it is recommended that this priority project be instituted and undertaken in stages. With an accurate inventory it is suggested that work priority will be evident from assessments of tree condition and location while, in time, with comprehensive work records it will be possible to compile a detailed workload analysis that will predict work scheduling, staff and budget requirements at least five years ahead.

### Community Relations

Good community relations play a fundamental role in a city tree program. Without public interest and participation there will not be adequate public support for the program and without appropriate information for the public as to policies, reasons for maintenance work or tree replacements, program limitations and opportunities, or individual responsibilities, there will be constant public conflict and misconception. In addition to adult information, there is considerable scope for child education and participation through a street tree and civic improvement program.

The Board has not availed itself of any of the opportunities that can develop around a comprehensive community information program on the City's trees. A number of publications, handouts and school events are discussed in the report, as are suggestions for an improved identity for the program.

do not seem to exist. The preparation of general specifications is suggested in conjunction with the development of new standards.

### Principal Report Recommendations

The management of trees in the urban setting is a science that requires a time horizon of at least four to six decades, depending on species, from the time of establishing a tree on the street until it may require replacement. Many City Councils and elected Park Boards come and go in this time. Thus continuity, so essential to the management of the resource, is rarely present apart from long service staff in the Board's employ. Many of these staff have now retired or are about to retire.

This report suggests that it is essential that a comprehensive strategy for management be prepared to ensure long term stewardship of the boulevard tree resources of the City. The central recommendations of the study address that need.

The following recommendations constitute the crux of this report are considered essential in providing the fundamental mandate and long term stewardship necessary for an effective Boulevard Tree Program in the City of Vancouver. Leadership for this program must come jointly from City Council and the Park Board Commissioners.

The major recommendations, therefore, are for the City and Park Board to publicly:

1. set a clear and concise goal for a formal Boulevard Tree Program;
2. endorse principal objectives for the Boulevard Tree Program;
3. adopt an appropriate strategy for executing the Boulevard Tree Program;
4. make a commitment for funds to embark on the strategy; and
5. implement the major recommendations of this study as part of the strategy.



The recommended Goal for the City of Vancouver Boulevard Tree Program is:

to provide, in perpetuity, appropriate, healthy and beautiful boulevard trees throughout the City of Vancouver.

The recommended Program Objectives of the Boulevard Tree Program are:

to create and maintain an attractive central business district, peaceful residential streets and an improved commercial and industrial environment to a standard that supports a strong City economy;

to revitalize Community Pride and encourage public and business contributions to the Boulevard Tree Program as part of a broader initiative to improve the appearance of the City, such that Vancouver becomes a showplace in the Pacific Northwest;

to choose appropriate tree species and use the Boulevard Tree Program to maximize the many benefits that can be obtained from trees on arterial roads and in residential, commercial and industrial sections of the City; and

to encourage a Boulevard Tree Program that is efficient, effective, comprehensive and that is both fiscally and technically competent.

The recommended Strategy is:

the adoption of a twenty year plan with clear, attainable targets for each five year interval.

The recommendation for Commitment is:

approval of sufficient financial resources for the Park Board to embark on the first five year phase of the strategy in 1980.

The recommendation for Implementation is:

that the major recommendations of this study form part of the twenty year plan which, in turn, would be incorporated in a Boulevard Tree Master Plan by 1985.

The major program recommendations are contained in Summaries at the front of this report and have been compiled under specific headings condensed from the more detailed recommendations discussed in each section of the report.

In order to allow an orderly implementation of the detailed recommendations a span of twenty years has been chosen as appropriate for full implementation. As each five year period passes, it is possible for the recommendations in the following stage to build on the gains made in preceding years.

The main recommendations of the report are, therefore, also condensed into very brief paragraphs in a section on Politics and a Twenty Year Plan in order to outline the program staging envisaged for implementation.

### General Conclusions

The history of the existing boulevard tree program has had a consistent pattern as recorded in successive annual reports of the Park Board - the Program has been underfunded and lacking in political direction. The Program has not grown in a consistent manner since firm goals and objectives were not developed or endorsed and, consequently, the detailed infra-structures of planning, organization, and management have not developed. In particular, the program has suffered from insufficient fiscal support to carry out essential maintenance over the years, especially on the very young and very old trees when they are most in need of help.

Substantial reliance has been made on the Utility Companies for pruning funds for larger trees. Yet no concerted long term plan has evolved to remove and replace heavily pruned trees, nor to encourage relocation of utility services into back lanes or underground.

Over the years, new planting has often had the glamour, while maintenance work has suffered. The workload has grown as the resource base has expanded, yet true costs of operation have not been accumulated, making budget submissions weak and without the detailed rationale or justification necessary to argue the case for appropriate support. Even with those monies spent, many newly planted trees lacked aftercare and have an apparent short survivability, again underscoring that essential link between initial investment and long term maintenance.

If City Council and the Board of Park Commissioners are willing to provide the leadership and financial support necessary to establish a sound City of Vancouver Boulevard Tree Program there is every reason to expect that by the year 2000, the City of Vancouver will be the beneficiary of a tree program equal to, or surpassing, any in the Pacific Northwest.

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The Difficulties Encountered in Widening Streets  
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## PREFACE

Are the citizens of Vancouver getting their money's worth from the existing boulevard tree program? The answer is no, not yet. This report sets out to explain why, and recommends how the circumstance can be remedied. The remedies are neither difficult, nor very expensive; they require a plan, joint financial commitment from City Council and Park Board, and prudent implementation.

Why are public funds spent to plant and maintain trees in the City of Vancouver? Presumably, citizens perceive that trees contribute some benefits to our urban environment - a contribution which outweighs the considerable cost of operating the program. Since there has been no call to cease planting and reduce maintenance - in fact the constant clamour is for increased planting and improved maintenance - it can be assumed that the general desirability of a Boulevard Tree Program has been established.

However, scarce public money must not be spent needlessly, and it must return the maximum welfare for the minimum investment. It must be spent fairly, wisely and effectively, such that the return can be clearly seen and appraised. This assessment must be then compared with our civic expectations to see if the overall goal has been reached, surpassed, or remains to be attained.

After many years of difficult development, the Vancouver Boulevard Tree Program has reached a stage and cost that warrants setting clear criteria and directions for future management.

The present program does not benefit from clear, concise goals, objectives, policy, planning or records. Consequently, it is difficult to assess performance. Arboricultural indices of health, vigor, species and age diversity, mortality and percent stocking on streets already planted indicates a decline in the general condition of the resource. Indications of efficiency such as programmed maintenance based on a resource inventory, workload

analysis or detailed budgeting are lacking and show the need for additional guidance in the structure, management and future direction of the program.

Boulevard trees, to give of their best, must receive trained, individual attention on a consistent basis. The heritage we offer the future is one of mediocrity if there is not a concerted effort to improve design, management and standards of care for our trees.

A time of fiscal constraint is historically a time when maintenance budgets are cut back. There is a re-defining of essentials and programs such as parks, recreation and landscape, which suffer more than most. It may be a false and foolish economy. Psychologically and economically, it is wiser to sustain, improve or emphasize the factors which help constitute the salvations of urban life. Retrench, but not at the expense of environmental quality. A dirty, dingy, drab city will have a lot further to return than a clean colourful and proud city. As noted before, the commitment is small, especially in comparison with other City services, yet the returns can be exceptional.

Boulevard trees, as part of a beautiful city, contribute then, unrivalled benefits in attaining a thriving, healthy place to live and work. Perhaps too much emphasis, though, has been placed on appearance and too little known of other benefits. It is now clear, however, that City trees contribute economic benefits in the form of inner City appeal to shoppers and tourists, higher property values in residential areas, physical benefits in reducing air pollution, noise, and modifying City climate, psychological benefits in terms of scale, stability, and mental health, social benefits in the context of education, social involvement, pride and historic values, as well as aesthetic benefits of unity, variety, texture, form, mass and color.

The object of this report is to suggest ideas which will maximize these benefits in a cost-effective program built on sound political, social and technical tenets. The following recommendations highlight important areas for consideration in a comprehensive Twenty Year Plan but these recommendations are not in themselves a twenty year plan; nor is this report.

It remains for the general public, City Council, the Park Board Commissioners, the City Manager, City Departments and the staff of the Park Board to evolve the final plan.

## SUMMARY OF MAJOR RECOMMENDATIONS AND PROGRAM RECOMMENDATIONS

### Introduction

This report has covered almost every facet of boulevard tree operations undertaken by the City of Vancouver Parks Board. The study has also been conducted over an extended period of time. Consequently, there are numerous recommendations, each of which has been placed in approximate order of priority in the appropriate report section.

In order to provide each suggestion with sufficient background on which to judge its merits, many of the report recommendations contain a considerable amount of information. These recommendations are, in general, too lengthy for brief review and appraisal. A very condensed version of each recommendation has, therefore, been reproduced for easy reading in this summary.

The Summary is broken into two segments; a brief synopsis of the Major Recommendations that form the fundamental basis for developing a continuing, viable Boulevard Tree Program in Vancouver, and a condensed version of each of the Program Recommendations from the main body of the report.

In addition to the Summary contained in this section, readers who do not intend examining the report in greater detail are, nevertheless, urged to look at the section entitled Politics and a 20 Year Plan where the staging for the majority of the principle recommendations in the report are outlined in appropriate five year intervals. In this way, the program can evolve in an orderly pattern with the most urgent suggestions being implemented within the next four years so that a detailed Boulevard Tree Master Plan, coupled with upgrading of work methods and a full knowledge of the tree resource, will allow a major benchmark to be obtained by 1985. After that time, intensive management of design, planting, replacement, replanting and work standards, will allow Vancouver to have one of the best Tree Programs on the continent.

The basic tree resource is already in place. All that is required for a major step forward is to recognize the opportunities that skilled arboricultural management will bring to the program and the importance of a commitment by the Park Board and City Council to support a formal City of Vancouver Boulevard Tree Program.

## MAJOR RECOMMENDATIONS

1. City Council and the Park Board should set a goal for a formal City of Vancouver Boulevard Tree Program.
2. City Council and the Park Board should endorse clear objectives for the Tree Program.
3. City Council and the Park Board should adopt a strategy for executing the Tree Program.
4. City Council and the Park Board should make a commitment of funds to embark on the strategy for implementing the Tree Program.
5. City Council and the Park Board should progressively implement the recommendations of this study.

## SUGGESTED GOAL:

To provide in perpetuity, appropriate, healthy and beautiful Boulevard Trees throughout the City of Vancouver.

## SUGGESTED OBJECTIVES:

- (a) To create and maintain a City environment that supports a strong City economy.
- (b) To revitalize City Pride and make Vancouver an outstanding city in the Pacific Northwest.
- (c) To choose appropriate tree species for City streets that provide the maximum benefits coupled with minimum disadvantages.
- (d) To develop a Tree Program that is physically and technically competent.

## SUGGESTED STRATEGY:

Adoption of a 20 year plan for City Tree Management.

## SUGGESTED COMMITMENT:

Approval of a 1981 Budget that will allow initiation of the first five year segment of the 20 year plan.

## SUGGESTED IMPLEMENTATION:

A start should be made now on should be made now on those specific recommendations that will allow a Boulevard Tree Master Plan to be completed by 1985.

## PROGRAM RECOMMENDATIONS

### PROGRAM RECOMMENDATIONS - POLICY FOR CITY COUNCIL

1. City Council should formalize the present street tree activities as the City of Vancouver Boulevard Tree Program. Clear goals and objectives should be set for the Program.
2. To ensure Program continuity, a commitment should be made to Program funding. Major funding should be from General Revenue. Funds from senior levels of Government and private sources should be fully utilized. External costs imposed on the Program should be fully recovered whenever possible. A Trust Fund should be established for public or corporate gifts to the Program. All expenditures occasioned by the Tree Program should be consolidated under one Program Budget.
3. City Council should formally reaffirm that the Park Board is the Lead Agency responsible for the Program but that the Board must consult with other City Departments in executing its duties.
4. City Council should establish (a) design panel(s) to specifically assist the Board in examining major tree planting or replacement programs in the City.
5. City Council should become involved in contentious tree issues only after the Park Board has been unable to resolve such issues after a full and thorough effort.
6. City Council should support the initiation of those programs that will provide the groundwork for a complete Boulevard Tree Master Plan by 1985.
7. By-Law 940 concerning boulevard trees should be replaced with an updated Boulevard Tree By-Law. By-Law 1525 concerning Tree Destruction should have a broadened scope to cover Urban Trees and Forest Lands in the City.
8. The Tree Program should be viewed as only one component in a broader scheme of City improvement. City Council should provide leadership by requiring improved maintenance of City properties, enforcing landscape maintenance agreements on encroachments, improving litter programs and initiating an award scheme for well kept properties in the City. "Vista Vancouver" could be the theme of an overall City improvement scheme.
9. City Council should designate specific Aldermen, an existing Committee, or a new Committee to

10. City Council should rescind the present policy of requiring all proposed tree removals west of Burrard Street to be submitted to Council for approval. City Council should consider the West End and Downtown the first areas for a designated Design Panel.

PROGRAM RECOMMENDATIONS - POLICY JOINTLY ADOPTED BY  
CITY COUNCIL AND PARK BOARD

It should be Council and Park Board Policy to allow no tree planting in the street right-of-way where that planting does not meet initial or completed Boulevard Tree Master Plan designs, street safety requirements, or Park Board maintenance requirements. All private use of plant material in the street right-of-way should be subject to an Encroachment Agreement. All tree work in the street right-of-way carried out by other than Park Board employees should be the subject of a Permitting Procedure (except in emergency situations).

There should be specific provision in the revised Boulevard Tree By-Law to require adjacent property owners to cut the grass and otherwise keep tidy their tree lawn areas of the street right-of-way. Failure to do so should result in City costs being added to the appropriate property taxes.

PROGRAM RECOMMENDATIONS - POLICY OF THE BOARD OF PARK  
COMMISSIONERS

1. The Board should ensure that safe trees on City streets and safe arboricultural practices predicates all policy considerations in administering the City Boulevard Tree Program. Inspection of trees should be a formalized procedure.
2. The Board of Park Commissioners should require a full annual accounting on the activities of the Boulevard Tree Program.
3. All beautification planting in the City should be de-emphasized until the Arboricultural Group is reorganized, staff training has improved, first drafts of the design recommendations for each area are available and appropriate tree species can be located.
4. Individual tree replacement should be given initial priority over large area tree replacement. Trees used for such replacements should be of the larger caliper sizes and in the former case, consistent with those species already planted if these species were appropriate.
5. The Board Should determine its and its employees extent of liability in administering the Tree Program.



6. The Board should work with other street users (especially B. C. Hydro and the Transit Authority) to minimize conflict with utilities and services. B. C. Hydro should rely heavily on the Park Board for boulevard tree pruning within the City limits. Any contract work on City trees should meet City standards and be inspected and approved by City staff.
7. Proper detailed choice of species for tree planting and replacement programs should be a clear program policy.
8. Reactionary maintenance should be replaced with a detailed anticipatory maintenance program based on a street by street inventory and workload analysis.
9. No trees on City streets should be destroyed without formal concurrence of both the Superintendent of Parks and the City Engineer where City forces are involved or by the Superintendent of Parks in the case of all other trees. Except in emergency situations, 20 days consideration time should be required prior to any tree removal. Park Board should receive full appraised compensation or appropriate replacement for any tree lost from the tree resource.
10. Planter boxes should be managed on an organized establishment and maintenance program.
11. The Board should encourage public input to the Tree Program and require a significant improvement in the handling of public concerns including better records and written replies to all requests for tree work.
12. Once the Board's Boulevard Tree Policies are established, the Board should require a three quarters majority of the full Board to change such policies.

PROGRAM RECOMMENDATIONS - POLICIES THAT SHOULD BE  
COMPILED FOR PUBLIC DISTRIBUTION

1. In time, the Boulevard Tree Master Plan should form one part of a broader Vancouver Urban Forest Management Plan that would enable the public to ascertain all aspects of tree management on public lands within the City boundary.
2. The Tree Program should be properly integrated with all other City programs aimed at improving the appearance of the City. The staff of the Board should work on a co-operative basis with other City Departments to ensure such integrations.

3. Trees of visual or historical importance in the City should be identified and a program developed for their preservation.
4. The goals and objectives of the Boulevard Tree Program should be formally adopted by the Board and the Board's support of the Program should be evident to the general public.
5. The Board should ensure that safe trees and a high standard of arboricultural workmanship are trademarks of the City of Vancouver Boulevard Tree Program.
6. Trees should not be heavily pruned or removed as a result of individual complaints. Thorough investigation and assessment of particular trees as a hazard may allow some relaxation of this policy for trees of an undesirable or unsafe nature. Some limited pruning of trees should also be allowed to minimize costs to private owners that might occur from excessive street tree growth.
7. The Board should employ a properly qualified City Arborist and a City Urban Horticulturalist.
8. The Board should make every effort to employ qualified field staff in arboriculture and the Board should support the establishment of a Provincial Accreditation Program for an Arborist Trade.
9. The Board should establish a list of approved tree contractors whose work has been inspected and judged of high calibre and who are suitable for employment as contractors on City projects.
10. The use of "evergreen" trees on City streets should be kept to a minimum. Design criteria should be established to ensure that flowering species are used appropriately, given their advantages and constraints.
11. An initial list of approved large, medium and small trees suitable for planting on City streets should be compiled and available to City Departments, the public, developers and their professional advisors.

12. The present procedure for approval of trees requested by developers should be formalized. The role and responsibilities of the City Engineer and the Park Board should be clearly defined. A publication outlining the full procedure and the responsibilities for establishment and maintenance of plant material covered by an encroachment agreement should be prepared and supplied to City developers or their professional advisors and be made available for private citizens.
13. A Procedure Guideline for Protection of Trees in Construction Zones should be developed in conjunction with the Permits and Licenses Department and performance bonds should be required to ensure that city builders follow these guidelines.
14. Where trees on private property interfere with trees on City streets or otherwise encroach on the street right-of-way, property owners should be approached to have such trees properly pruned by reputable tree companies. Where no action is forthcoming, Park Board staff may undertake the work and have the incurred cost recovered. The City Arborist should have the discretion to leave private trees if they contribute significantly to the street treescape.
15. View pruning at the request of individual owners should not be undertaken. A 70% approval of all property owners on both sides of a block should be required before petitions for view pruning or other measures are considered.
16. Tree topping of City trees should only take place where a professional opinion suggests a tree or trees to be unsafe. A formal procedure for handling requests and decisions should be established.
17. Guidelines should be developed for release of tree inventory information from the Park Board. Costs of information should be borne by those parties requesting information.
18. The Board should support the preparation of a publication concerning the outstanding esthetic, historical or botanical features of specific trees in various parts of the City.

19. The Arboricultural Group should be readily accessible to the general public with appropriate telephone numbers adequately publicized. A 24 hour telephone number for tree problems should be instituted.
20. The Board of Park Commissioners should only deal with problems when they are not covered in the proposed policy document or where resolution by the Board's staff has been tried and failed. Board staff should be given formal opportunity to respond to concerns raised before the Board by citizens with tree problems. Resolution of problems raised by members of the public should be forwarded in writing to the individuals concerned.
21. Major arboricultural work in residential areas should be indicated to individual property owners prior to work initiation.
22. Board field staff in the Arboricultural Program should be courteous, informed and well presented. They should be able to assist the general public in resolving questions that may arise as result of tree maintenance activities.
23. The Board should sponsor public lectures on the benefits and management of trees in the City.
24. Arbor Day should be properly recognized with an Arbor Day Program and with various City dignitaries adding to the City tree resource.
25. Arbor Day should be properly recognized in City schools with a Board sponsored program.
26. Reduced vandalism of trees should be the subject of a concerted program with all authorities involved.
27. All external but recoverable costs to the Boulevard Tree Program should be assessed and remitted directly to the Tree Program or to the proposed Trust Fund.
28. The Board should support a limited program of applied research and development into problems associated with tree management techniques, tools, equipment and supplies. An Approved List of Arboricultural Supplies should be developed.
29. The Board should support co-operation with other Municipal Park Boards into mutual problems of an arboricultural nature. A Lower Mainland Boulevard Tree Research Committee is recommended.

30. Proven methods of Integrated Pest Management that assure the minimum use of toxic pesticides should form the basis of the approach to insect and disease control on boulevard trees. The Board should work with Federal and Provincial agencies to identify and plan for possible pest problems.
31. More emphasis should be made to ensure that qualified professionals participate in, or contribute to, the Boulevard Tree Program.
32. The Board should work with the G.V.R.D. in establishing basic standards for Boulevard Tree Management and arboricultural staff job descriptions and assessment.

PROGRAM RECOMMENDATIONS - POLICIES INTERNAL PROGRAM  
OPERATIONS

1. All relevant policies pertaining to the Boulevard Tree Program should be compiled in a Policies and Procedures Manual. All such policies should be subject to an annual review.
2. The boulevard tree resource should be managed in a manner that is responsive to the needs of individual trees and to individual locations depending on their uses and needs.
3. The Board should instruct staff to work closely with the City Engineer and his staff to ensure that maximum consideration is given to the needs of trees in new street and sidewalk designs. Minimum standards should be developed in conjunction with the City Engineer.
4. All designs prepared either by City staff or developers, that involve "beautification" plantings should be reviewed by Park Board staff to ensure that expensive maintenance is not a by-product of the design. All "beautification" plantings should be maintained on a separate costing program and a separate budget element prepared each year.
5. A permanent site should be found for growing on young tree stock to sizes suitable for difficult locations, or where immediate effects are desired. Contract growing of desired species and sizes by selected nurseries should be explored.

6. Wherever possible working agreements with those City Departments that interact with the Boulevard Tree Program should be set down in writing and circulated to all departments for their information.
7. Any new tree plantings should be directly linked to an increase in maintenance funds at a level commensurate with the costs of maintenance as determined from the detailed budgeting and workload analysis recommended in this report.
8. A program to identify and replace individual trees that have been lost to the resource or that should be removed from the resource is needed. Later general replacement programs of undersirable or gerontic trees should be planned. Tree replacements should be budgeted for on a separate basis from the maintenance program at least until the resource workload analysis is completed.
9. A full safety program should be instituted. All arboricultural accidents throughout the Province or reported by Worker's compensation Board should be reviewed for possible changes in City work practices. All safety equipment used in high climbing or pruning near live electrical conductors should be regularly tested, the latter for dialectic capability.

#### PROGRAM RECOMMENDATIONS - POWERS

1. It is recommended that a revised Boulevard and Street Tree By-Law, delegating the responsibility of the Boulevard Tree Program to the Park Board be prepared by the Park Board staff in conjunction with the City Engineer's office. The proposed By-Law should be vetted by the Board of Park Commissioners and submitted to City Council for consideration and adoption.
2. It is recommended that the present Tree Destruction By-Law (1525) be redefined as an Urban Forestry By-Law to provide appropriate management of all trees within the City boundaries.
3. The City Council should make application to the Government of British Columbia for an amendment to the City Charter (similar to section 868 in the Municipal Act of B. C.) in order to clearly establish a basis for an appropriate, comprehensive, By-Law to manage trees on all property within the City boundaries.

4. It is recommended that the present Park Board By-Law be amended to reflect the suggested Park Board role in full management of the Boulevard Tree Program and the general City tree resource.
5. It is recommended that a new subsection to section 71, part II of the Street and Traffic By-Law (2849) be drawn up by the City Engineer's Department in conjunction with the Legal Department and the Park Board in order to clearly define the engineering and traffic safety role of the City Engineer vis a vis boulevard trees. A communication procedure that ensures that all boulevard tree projects are referred to the City Engineer should be developed. The role of the City Engineer should also be defined in the proposed revision to the existing Boulevard Tree By-Law.
6. It is recommended that the revised Boulevard Tree By-Law incorporate a specific provision defining tree vandalism and providing appropriate police powers, penalties and restitution procedures to discourage this problem.
7. It is recommended that the City petition the appropriate Ministries of the Provincial Government for provincial legislation to regulate the qualification and licensing of arborists in British Columbia. Such legislation should be linked to a Trades Training Accreditation scheme for practicing arborists and arboricultural companies.
8. It is recommended that the City document and take particular note of, and comply with, any Federal or Provincial legislation that may affect the operations of the Boulevard Tree Program.
9. It is recommended that a specific subsection be added to the existing sign By-Law (4810) outlining interference with boulevard trees, responsibilities of the Park Board, restrictions governing sign placement in relationship to trees and appropriate construction for signs and canopies.
10. The present development permit procedures and Encroachment Agreement requirements concerning boulevard trees desired by developers should continue to be executed and approved by the City and the City Engineer. However, a Park Board consultative role should be specifically delineated. Transfer of any trees planted with the street right-of-way by parties other than the Park Board should be formally transferred to the Boulevard Tree inventory.

## PROGRAM RECOMMENDATIONS - COMMUNICATIONS AND LIASON

1. The City Engineer should be asked to prepare minimum standards for tree use in the street right-of-way for each of the engineering jurisdictions under his responsibility.
2. All City departments who presently budget monies for work related to the Street Tree Program should be urged to relinquish this responsibility to allow a complete Boulevard Tree Program budget to be prepared by the Park Board.
3. The Board should explore the possibility of co-operating with the Operations Research Group at City Hall in the development of a Boulevard Tree Inventory Program.
4. The Board should ensure that staff follow all possible avenues to reduce the problems of tree roots in City sewers.
5. A closer liason should be maintained between the Arboricultural Group staff and the City Utilities Engineer to ensure that maximum advantage is made of the detailed records maintained on above and below grade service locations.
6. All appropriate City departments should be included in the pre-planning process and the final development of the proposed Boulevard Tree Master Plan.
7. Where leaf problems exist in the fall, the Board staff should work closely with Sanitation and Parking Control to ensure that leaf pickup problems are minimized. A study should be done to identify problem areas and problem tree species.
8. Closer communication should be maintained with the City Medical Officer concerning poisons or allegenic tree species and with the City Health Officer concerning pesticide use on City trees.
9. The proposed City Tree Wardens should work closely with Permits and Licenses to ensure that adequate tree protection around construction sites is obtained.
10. The City Planning Department should be involved in, or appraised of, all major street tree developments.
11. The Board staff should work closely with the Vancouver Police Department to reduce vandalism. The police should be encouraged to keep records about tree vandalism.



12. The Board should encourage a better dialogue between the City of Vancouver and other Lower Mainland Park Boards. A greater emphasis on collective problem solving is urged.
13. A planned program should be initiated with B. C. Hydro to identify those areas where electrical distribution conductors conflict with boulevard trees. A co-operative scheme for tree replacement and/or line relocation is strongly recommended.
14. A planned program should be initiated with B. C. Hydro Transit (or the Transit Authority) to identify and reduce conflicts between trolley system feederlines and boulevard trees.
15. The Park Board should work closely with the Worker's Compensation Board of British Columbia to develop a recognized arboricultural safety program.
16. The Arboricultural Group should foster closer ties with the British Columbia Ministry of Agriculture. Any staff managing or carrying out pesticide work should obtain the appropriate Pesticide Applicator Certificates through the B. C. Ministry of Environment.
17. The Board should review the programs and funding responsibilities of appropriate Provincial Ministries to see if there are any contacts that might yield information, expertise or monies that will support the City Boulevard Tree Program.
18. The Board should also review Federal Government Departments to see if improved contacts might yield information, expertise or funding support.
19. The Arboricultural Group should specifically improve its contact with Federal Government staff in the Departments of Health and Welfare as well as Agriculture and Forestry, as these Departments may be able to assist in problem solving through applied research. Federal Committees that have administrative responsibilities such as the Plant Protection Advisory Council should be approached concerning membership for a number of the Board's staff.
20. Greater contact with teaching and research institutions, such as U.B.C., Simon Fraser and B.C.I.T. is recommended, particularly as these institutions may provide a resource for arboricultural problem solving. Small applied research contracts are suggested.

21. No formalized courses specializing in applied arboriculture are available in B. C. It is recommended that the Vancouver Park Board approach appropriate technical colleges with a view to starting such a program, preferably in the Lower Mainland.

#### PROGRAM RECOMMENDATIONS - ARBORICULTURAL GROUP ORGANIZATION

1. It is recommended that the position of City Arborists be re-established in order to provide professional and legal responsibility for the Boulevard Tree Program.
2. It is recommended that there be the appointment of two full-time Tree Wardens. Principle responsibilities for these positions would include collections of tree inventory data, inspection of general boulevard trees, inspection of priority and high-maintenance areas and school programs.
3. It is recommended that the management unit name should be the Arboricultural and Forestry Group and that there be two distinct sections with separate responsibilities for forestry and arboriculture.
4. The arboricultural section of the renamed Forestry and Arboricultural Group should continue to operate from the Sunset Nursery and to report to the Manager Grounds Construction and Maintenance until that position is redefined.
5. The present position Arboricultural Supervisor should be retained and the job responsibilities in the area of program planning should be emphasized.
6. In order to free the Supervisor of Arboriculture and Forestry for planning, consultation and management functions, it is recommended that a position of Foreman III be established, with full supervisory responsibility for all arboricultural and forestry crews.
7. It is suggested that there should be a secretary/clerk shared between the positions of Foreman III and the Group Supervisor.
8. Reporting to the Foreman III there should be a Foreman II Arboriculture and a Foreman II Forestry.
9. Reporting to the Foreman II Arboriculture it is recommended that there be a Foreman I - Small Tree Maintenance and Tree Surgery and a Foreman I - Establishment and Maintenance, and a Foreman I - Pruning and Removal.

10. Reporting to the Foreman Small Tree Maintenance and Tree Surgery it is recommended that there be four Sub-Foremen responsible for Maintenance, Pest Management, Tree Surgery and Priority Maintenance Areas respectively.
11. Reporting to the Foreman responsible for Establishment and Replacement, it is recommended that there be a Sub-Foreman responsible for Central Boulevard Maintenance, Replacement Planting and New Planting respectively.
12. Reporting to the Foreman responsible for Pruning and Replacement, it is recommended that there be a Sub-Foreman for General and Safety Pruning, Utility Pruning, as well as a Sub-Foreman for Tree Removal and Site Preparation.
13. The Surrey Nursery should be transferred to the Nurseries and Floriculture Group and operate on a self-sustaining basis. The ongoing scope of tree/nursery operations should receive much closer scrutiny.
14. It is recommended that an organizational and workload analysis be undertaken for the Forestry Section in a manner similar to the study completed here for Arboriculture.
15. It is recommended that the position of Manager, Grounds, Construction and Maintenance, be reviewed in light of expanding and separate responsibilities. Thought should be given to replacing or supplementing the position with two full-term professional positions; one being that of City Arborist suggested in this report and the other that of a City Horticulturalist responsible for City property and Horticultural maintenance.

#### PROGRAM RECOMMENDATIONS - RESPONSIBILITIES

1. Full responsibility for the City Boulevard Tree Program should be vested in the Park Board with the exception of those function factors that directly affect engineering or traffic safety in the street right-of-way.
2. The City Engineer should retain the right to veto tree planting or removal plans where they affect engineering or traffic safety.
3. A Boulevard Tree Management Plan Workgroup chaired by the Director of Maintenance Operations and with membership from all appropriate City Departments should be formed to assist in the tree planning and formulation stages of the proposed Master Plan by 1985.

4. The Arboricultural Group responsibilities should be extended to include both the boulevard trees and their immediate planted area including the maintenance of tree pits and tree lawns.
5. A small boulevard tree Design Committee under the chairmanship of the proposed City Arborist should be established with membership from appropriate City Departments.
6. The responsibility for giving advice to the general public concerning operating policy should rest with supervisory staff of the Board only. The responsibility for giving formal policy advice or decisions concerning the Boulevard Tree Program should rest with the Board of Park Commissioners.
7. The responsibilities of the City Arborist should include:
  1. professional advice to all City Departments
  2. chairmanship of the Design Guidelines Committee
  3. co-ordination with other agencies
  4. resource inventory
  5. program workload analysis
  6. master plan development
  7. inspection and condemnation of hazardous trees
  8. preparation of work standards
  9. applied research
  10. containers with trees
8. All trees planted on City property adjacent to road rights-of-way should be the responsibility of the Arboricultural Group. Other trees should be the responsibility of the Forestry Group.

#### PROGRAM RECOMMENDATIONS - CONSTRAINTS

1. As a prelude to preparation of overall Design Guidelines for the Boulevard Tree Program a comprehensive set of design constraints should be prepared.
2. The City Engineering staff and the Park Board staff should meet to establish a draft of the design constraints prior to adoption as standards.
3. The final standards should reflect the constraints imposed by all other users both above and below grade in the street right-of-way and the street category or use.
4. A full analysis of all major constraints effecting the boulevard tree program should be undertaken in order to establish a viable forward plan over each 5 year planning period.

## PROGRAM RECOMMENDATIONS - INVENTORY

1. The City should give high priority to a computerized inventory of City trees to be undertaken in stages starting with the West End and Downtown.
2. The two Tree Wardens suggested in the section on Organization should be able to collect tree data for the inventory.
3. Inventory work that includes information on tree condition should only be collected from May to September.
4. The final survey should collect both locational and tree information. A second tree condition inventory should be done in 1990 and in the year 2010.
5. The tree inventory should be constantly updated as maintenance work or new tree additions change the resource base.
6. The data collected from the computer inventory should be eventually available on a form readily understandable by management and field staff.
7. The first computer program should be prepared for the Board with advice from the Engineering Operations Research Group and an outside computer consultant. Commercial computer facilities should be considered on a time sharing basis if the City does not have data processing time available.
8. A terminal for inputting and access to tree inventory information should be considered at the Sunset Nursery. A similar terminal may also be considered at the Park Board office.
9. All planters under the jurisdiction of the Arboricultural Group should be considered for a computerized management system.

## COMMUNITY RELATIONS

1. The Boulevard Tree Program should have a graphic symbol to provide clear public identity.
2. The provision of badges for the arboricultural group staff would provide meaningful identity for work forces.
3. Complaint handling should be upgraded to a more formal level.

4. A formal and consistent procedure for handling petitions should be developed.
5. A high quality color publication outlining trees of special important, historic areas, walks and views of interest should be prepared as a general promotion of the City with civic pride and tourism in mind.
6. A bulletin outlining goals, objectives, policies, legal obligation, constraints, benefits, history and premises should be prepared for distribution on request or when complaints are received.
7. A slide/tape show describing the Program including good quality pictorial or graphic examples should be available for loan.
8. The VanDusen Garden should offer courses in lay terms on general Arboriculture information in the urban environment as well as outline the City's part in improving our living environment.
9. Liason with the Vancouver School Board should be strengthened and tree oriented information for school teachers provided or developed.
10. An Arbor Day package and activities should be developed for each school in the City.
11. Innovative programs which involve children in an understanding of the value of trees in the City should be developed.
12. Prior to major arboricultural work in residential areas, residents should be informed of the nature and purpose of such work.
13. Developers and their professional advisors (engineers, architects, landscape architects, planners) should be provided with an outline of City policy requirements and procedures where developments may affect City trees in any way.
14. A graphic leaflet, possibly in a number of languages, concerning the City's policy, requirements and practices for tree protection during construction activities should be distributed to City Workstaff and construction companies.
15. (a) A greater range of press releases should be developed throughout the year concerning trees in the City.

- 15 (b) Any publicity concerning the Boulevard Tree Program should be dovetailed with any other similar publicity on the City Environment, or programs for City improvement.
16. A speakers kit that would allow Park Board employees to give talks at Service Clubs and similar gatherings should be developed.

#### PROGRAM RECOMMENDATIONS - TRAINING AND EDUCATION

1. Specific provision should be made for Tree Program management staff to take courses in Public Administration and Business Administration.
2. Specific provision should be made for Tree Program management staff to become conversant with new advances in arboriculture, especially through working contacts with other jurisdictions.
3. Specific provision for Tree Program management staff to attend major North American Arboricultural conferences should be made.
4. A member of the Tree Program management staff should be seated on the Worker's Compensation Board Tree trimming committee.
5. A Trades Training Safety Officer should be appointed before 1983 and shared within the Board between arboriculture and forestry and the horticultural sections.
6. A detailed safety program for the Arboricultural Group should be developed in conjunction with the Worker's Compensation Board and the proposed training officer.
7. A Safety Practices Manual should be developed for the Arboricultural Group.
8. Staff from the Arboricultural Group should attend the Worker's Compensation Board utility line clearing course.
9. Appropriate management, supervisory and field staff involved with the application of pesticides should hold at least a Provincial Applicators Certificate in category 4.
10. Staff should be encouraged and supported financially to improve trade skills and technical competence.

11. The Board should require appropriate training aids for arboricultural courses.
12. Foreman and Sub-Foreman should receive formal instruction on training techniques in order to assist the existing staff and new apprentices to improve their work skills.
13. A formal training facility should be designated and developed for arboricultural, forestry and horticultural trades training within the Park Board.
14. A full arboricultural training manual should be developed.
15. All staff who have direct contact with the public concerning the Boulevard Tree Program should receive formal training on interpersonal communications. Staff answering phone calls about boulevard tree problems should receive basic training about arboriculture.
16. A formal Arboricultural Apprenticeship Program should be established in conjunction with the B. C. Department of Labour.
17. Apprentices should be recruited into the Arboricultural Program and rotated through all appropriate Park Board jobs.

#### PROGRAM RECOMMENDATIONS - PROCEDURES

1. A start should be made in 1980 to collect the data necessary to complete a full Boulevard Tree Master Plan by 1985.
2. A 20 year plan with specific targets in each five year period should be adopted by the Board. As each year passes, the Plan should be reviewed, modified and improved.
3. A Program of planned maintenance for new trees, young and semi-mature trees and for mature trees should be developed. Existing funds from each year's budget should be targeted to areas of most need.
4. Some streets, by reason of location, character, type or usage patterns or by reason of the type or design of the tree resource should be designated for Priority or High Maintenance Frequencies.



5. A program of planned replacement of severely mutilated or gerontic trees should be developed. Public information and various types of removal strategies will be required to mitigate adverse public reaction.
6. A program of planned maintenance for planter boxes should be introduced in 1981.
7. An applied research program should be developed to determine the most appropriate tree species for adoption into the City of Vancouver Tree Program.
8. A program of applied research should be developed for testing arboricultural supplies, tools and equipment.
9. A program of applied research should be developed to assess the most appropriate arboricultural practices and methods for use under Vancouver conditions.
10. Staff planning that aims at stabilizing staff turnover and minimizing the impact of staff retirements should be instituted immediately.
11. A Boulevard Tree Trust Fund that allows for private or corporate donations for City tree planting or maintenance should be established.
12. Careful attention should be paid to Government reorganization at both the Federal and Provincial levels. Every effort should be made to be aware of, and utilize, Government Programs or direct or indirect funding for tree programs.
13. Every effort should be made to recover costs such as construction induced tree loss for preventable damage to the boulevard tree resource.
14. By 1982 the Boulevard Tree Program budget should reflect the current trend toward full and complete justification for all capital and operating expenditures.
15. All costs and expenditures which result from the Boulevard Tree Program should be a part of the Park Board budget.
16. Program funding alternatives, particularly for maintenance expenditures, should be the subject of a further study in conjunction with the City Finance Department.

17. Adequate and specific provision should be made in the Arboricultural Group Budget for expert consulting services when required skills are not part of existing Park Board staff expertise.
18. A careful review should be made of the opportunities, benefits and problems associated with contracting some arboricultural field operations.
19. Capital and Maintenance budgeting should be separated. Five and ten year budget forecasts should be developed each year.
20. Unit costing and cost information by task, task method and location should form the basis of a revised accounting data collection system.
21. Roles, job descriptions and decision making responsibilities of existing staff should be reviewed and updated as required.
22. Each employee of the Board at a Management or Supervisory level should be given a clear understanding of their legal liabilities in conjunction with arboricultural work.
23. A workload analysis should be conducted for each arboricultural management unit in the City over the next four years. This workload analysis should start with those areas of greatest concern and activity.
24. Supervisory training and acquisition of management skills should be undertaken on a regular basis and be a prerequisite for advancement through the arboricultural group organization.
25. Senior staff and individual members of the Board of Park Commissioners should be better acquainted with all facets of arboricultural work in the City.
26. Job incentive schemes which are aimed at improved productivity should be investigated.
27. Work scheduling should be undertaken on an organized, coherent, planned basis.
28. Planting needs of appropriate species should be developed some considerable time before actual planting takes place. Options for tree supply given a longer lead-time for known quantities and species should be pursued.

29. A permanent facility for holding and growing-on boulevard trees should be established. The possibility of shared facilities with other Municipalities should be considered.
30. The Boulevard Tree Program should be using metric measure by the end of 1981.
31. Communications from the Boulevard Tree Program to support services and client Departments should follow normal business practice such as being typewritten, circulated and prepared with appropriate file copies.
32. An organized approach is needed to develop a system of records, publications and manuals to support a technically sound arboricultural program.
33. A new record system should be instituted as soon as possible for work undertaken, resource inventory information, complaints and identification of problem areas.
34. Each month the Arboricultural Group should publish a brief internal news sheet to inform City and Board staff of boulevard tree operations, accomplishments and problems.
35. Formal bi-weekly meetings between the senior supervisory and management staff of the Tree Program should be initiated.
36. Detailed design guidelines that take account of physical, social and historic needs in each neighbourhood should be developed for all areas that require new tree planting or tree replacement. In time, guidelines should be developed for all areas throughout the City.
37. Large scale beautification programs should be sharply de-emphasized until the proposed area workload analysis and design guidelines are completed. All tree placement for the reduced Tree Planting Program envisaged should be a joint activity of the Park Board Staff and City Engineering Department.
38. Adequate tree lawn or cut-out provisions should be made as an integral part of street designs prepared by the Engineering Department. Standards for sizes and locations should be developed jointly between the Park Board staff and the City Engineering staff.

39. A detailed procedure for tree choices that recognizes area design guidelines, environmental, as well as physical and social constraints for specific locations in the City should be developed as soon as practicable.

#### PROGRAM RECOMMENDATIONS - PRACTICES

1. Crew Foremen should be more completely briefed on work prior to job start-up. Job planning and scheduling should be improved. It is strongly recommended that job supervision should be more intensive.
2. There should be a formal Arboricultural Supervisor, Foremen and SubForemen meeting at least every two weeks.
3. Crew Formen and Sub-Foremen should provide more opportunities for crew discussion of task methods, task method options, standards of performance and work practices.
4. The opportunities for skill improvement amongst individual crew members should be considerably expanded as discussed in the section on training.
5. In order to improve pride of workmanship amongst staff, greater recognition should be given to good work practices and high productivity.
6. The practice of temporarily advancing staff to higher supervisory categories during particular seasons should be kept to an absolute minimum.
7. Individual staff should be given an annual review and interview concerning their contribution to the Arboricultural Group. Good workmanship should be actively encouraged and poor workmanship discouraged.
8. Safe practices for both existing and new tasks (resulting from increased mechanization) should be of constant concern and ongoing review.
9. An Apprenticeship Program that includes women should be established for the Arboricultural Group.
10. The Board should review establishing basic clothing and safetywear standards for the Arboricultural Group. An allowance for approved safety clothing should be considered.

11. Foremen, Sub-Foremen and crew members should be given an opportunity to participate in, or comment on, the development of standards of work practice before these are finalized and instituted.
12. Present field practices (listed in detail in the main recommendations) that are contrary to good arboricultural practice should be curtailed as soon as possible.
13. A number of field practices (listed in detail in the main recommendations) but not presently used by the Arboricultural Group should be adopted as and when practical.
14. All materials used by the Arboricultural Group should be tested and formally approved for use in City operations. Once found satisfactory, these materials should be placed on an Approved List to become the basis for purchasing of supplies.
15. Hand tools used in arboricultural operations should be issued to, and become the personal responsibility of, each crew member.
16. The Board should purchase an insulated trim-lift for utility and high tree pruning operations. Appropriate hydraulic tools for use with the lift should also be purchased.
17. Proper methods of diagnosis for tree problems should be established. Equipment for accurate diagnosis, particularly of tree cavities and rot, should be purchased.
18. A study should be made of needs for new arboricultural equipment (as listed in the major recommendations).
19. Arboricultural practices and condition of equipment originating from the Sunset Nursery should be thoroughly reviewed.
20. Nursery practices and condition of equipment originating from the Surrey Nursery should be thoroughly reviewed.
21. The practice of bare root planting of large tree stock should be investigated to see if the physiological impact on the trees outweighs the benefits from this type of planting.

22. Considerably more thought should be given to choice of species in all locations, given the severe physical constraints, streets and vandalism apparent on many City street trees.
23. The Arboricultural Group vehicles should be equipped with two-way radios to improve operating efficiency and emergency response.

#### PROGRAM RECOMMENDATIONS - STANDARDS AND SPECIFICATIONS

1. Detailed standards or specifications should be prepared for all major arboricultural tasks undertaken by the Board.
2. The Arboricultural Group should develop specifications for any work it contracts to other City Departments or to Commercial Arborists.
3. City Departments (particularly City Engineering) whose operations are affected by boulevard trees should develop standards for the guidance of the Park Board in the preparation of maintenance documentation.
4. Other users of the street right-of-ways (such as Utility Companies) should develop approved minimum standards for the guidance of Park Board during maintenance operations.
5. The Park Board, in conjunction with the Worker's Compensation Board of British Columbia, should develop minimum standards of work practice in order to ensure safe arboricultural operations.

#### PROGRAM RECOMMENDATIONS - LIBRARY

1. Park Board should establish a small Arboricultural reference library for staff and Board Members with limited access for interested members of the public.
2. Park Board should pay the subscription for a member(s) of staff to join the major North American Arboricultural Societies.
3. All journals received by the Board concerning Arboriculture should circulate to staff on an organized basis.

4. A complete filing system should be developed for all arboricultural matters at the Board's offices. This system should be adopted by the Sunset Nursery and mesh with the City Hall files and the City Archives.
5. All correspondence from the Arboricultural Group should follow normal business practice and have sufficient copies to allow adequate filing in all appropriate locations.
6. A glossary of technical arboricultural terms and their meanings should be developed and made available to any City staff who interact with the Boulevard Tree Program.

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## REPORT INTRODUCTION

The City of Vancouver Boulevard Tree Program has grown progressively since the late 1800's. By 1928 it was estimated as including 30,000 trees; by 1948, 80,000 trees; and by 1977, 150,000 trees, of which 40,000 were reportedly flowering species.

In recent years, as many as 3,000 trees have been added to the resource annually. These trees require individual attention in their early years to ensure survival and later, minimal maintenance. In addition, many of the trees planted in the first 40 years of this century are now at maturity and require experienced attention.

Continued growth of the City has resulted in development and social pressures that have diminished the inner city boulevard tree resource, while growth and improvement in suburban residential areas has caused the overall resource base to grow substantially as a result of new planting.

The older tree resource of larger species will continue to decline and will require progressive replacement. The flowering trees planted in the 1950's have a shorter life span than the larger shade species and will also require replacement in the next decade.

Management of the now younger, yet considerably larger resource than in the past, requires sophisticated operating techniques in order to maximize the physical, psychological and aesthetic benefits attributable to street trees, while minimizing their cost of maintenance and replacement.

Present management techniques and staff are not adequate to respond effectively to public demand for, and requirements of, a large resource of well maintained and safe boulevard trees. However the very existence of the present street trees is a tribute to the dedication of a few staff labouring under exceedingly difficult conditions over many years with inadequate funds, poorly trained staff, and minimal support services.

The present program is further constrained by continuing fiscal limitations, particularly on maintenance expenditures, insufficient policy and procedural

guidance, and conflicting goals of different City and private groups.

The number of City divisions for example, interested in, or influenced by, decisions concerning the street tree resource are substantial and growing. Comprehensive and informed communication, on an ongoing basis within and between departments, is difficult and has been complicated by external development pressures.

Periodic political and public involvement in the appearance and liveability of the City, coupled with uncoordinated private and civic programs of development and enhancement, has caused some conflict with the general aims, priorities, capabilities, and responsibilities of the Park Board. This circumstance is already reflected in the deteriorating condition of many trees on Vancouver City streets.

The City boulevard trees can be conservatively valued at \$50 million in replacement dollars alone. Continuing budget constraint on maintenance must be considered a false economy which diminishes the equity value of the resource, yet will require major maintenance expenditures in the future.

In a time when fiscal constraints are of increasing importance, every effort must be made to determine small investments which will yield a high return. Appearance of the City and a sense of "Civic Pride" in the community can readily produce such returns for both residents and from visitors. The City of Vancouver can further capitalize on its unique setting by substantially improving the long term appearance of many arterial roads and the central business district. Lack of ongoing maintenance and continued planting of inappropriate sized species has blunted the expectations accorded previous programs.

A study of the existing program was undertaken during the summer and fall of 1978, in order to update and clarify the responsibilities and roles of those directly or indirectly concerned with the street tree program, to formalize policy, procedures and practices, and to prepare an organizational structure which will allow for planned maintenance of the boulevard tree resource.

### STUDY METHODOLOGY

A specific search and documentation technique was used to ensure that as much relevant information as possible was gathered for the study, and that all parties with a specific input were canvassed for their concerns.

The study may be broken into ten steps for the purpose of this explanation, although it should be understood that it is not necessarily a linear process. New information constantly required a re-examination of steps and decisions previously taken, in order to build a complete analytical framework.

- Step 1. Park Board staff and the Consultant prepared a general outline of the apparent problems with the street tree program and prepared terms of reference for the study.
- Step 2. In order to appraise and record the concerns of management and field staff directly or partially involved with the street tree program, two meetings were held in order to prepare "random concerns lists". The technique used here was simply to ask the participants in unstructured format to express their concerns with all aspects of the program. These concerns were concurrently listed for all team members to examine and use as stimulators for their own thoughts.
- Step 3. Using a similar format to Step 2, a communications network was developed by listing all those parties contacted by the team members during the course of their work and identifying the nature and scope of these contacts.
- Step 4. The Consultant then used the information generated by the team meetings and identified the major subject areas of concern. The random concern lists were then structured under each of the major headings.

- Step 5. Draft subject outlines were then prepared for each major topic, providing an orderly explanation of the objectives, rationale, priority, methods of study and expected results of the analysis.
- Step 6. After thorough review with the client, a search was begun for appropriate resource references. In this study, the City Archives, Park Board Annual Reports, various City reports, and appropriate files from the City Engineer's Office and from the Park Board were consulted and often photocopied. A collection of appropriate references from other jurisdictions was also made.
- Step 7. Initial work was begun on analyzing the questions raised from the major subject outlines and concerns list in order to develop an adequate portfolio of questions for Step 8.
- Step. 8. Interviews were conducted with individual Park Board staff members at both management and field levels of responsibility. In addition, extensive interviews were conducted with staff in appropriate City of Vancouver departments and with most surrounding municipalities. The information generated during these interviews is reflected in the text and recommendations for each section of the report.
- Step 9. A detailed alphabetical listing of all concerns, suggestions, and program problems was prepared prior to developing the report conclusions and recommendations.
- Step 10. After review of the draft findings and development of the report outline in consultation with the client, the final report was prepared.

A more detailed step-by-step review of the analysis technique is contained in Appendix 1. A listing of the major subject areas, which is similar to the sections used in this final report, is given in

Appendix 2. The detailed headings used in the subject outlines during the analysis are given in Appendix 3.

### Report Layout

The approach taken in preparing this report has been to simplify the information wherever possible and provide a condensation of recommendations at the beginning of the report.

The scope of the report is considerable as it touches on a wide assortment of topics that are part of, or infringe upon, any comprehensive boulevard tree program. Since many readers are not concerned with the detailed information contained in each chapter, the report has been organized in such a manner as to allow ready referral to the principal conclusions and recommendations. These have been summarized from each chapter and follow on from the program goal, objectives and timetable as an integrated package of program recommendations.

The major recommendations have been incorporated, by priority, in a Twenty Year Plan allowing ready assessment of the most pressing needs, as well as future proposals for managing the City's boulevard tree resource.

A basic background has been provided as a very brief summary of the present boulevard tree program. The information has been compiled from existing information. A section on Historical Highlights provides an insight into the development of the program since the early 1900's.

The detailed discussion on each subject area is presented in the main body of the report. The study examines ten major concerns that were identified in the early stages of this review. The sections are arranged in order of importance as determined by the client. Each section follows a similar format with a brief introduction, a discussion of findings on individual topics, conclusions, and detailed recommendations.

Wherever possible, photographs have been taken from City locations in order to illustrate points made in the body of the report. A number of other reports, principally prepared by the staff of City departments, have been utilized as major references throughout the study, and these documents are appropriately cited at the end of the report.

## BASIC BACKGROUND ON THE PRESENT BOULEVARD TREE PROGRAM

In order to illustrate the scale and management of the present Boulevard Tree Program, a brief resumé of the most pertinent information has been prepared in listed form.

Accurate records on some parts of the program do not exist. In those cases, information is either shown as estimated or indicated as unknown.

Total number of trees on City boulevards:  
between 100,000 and 150,000

Proportion of the total which are flowering trees:  
between 20,000 and 40,000

Value in replacement dollars:  
between \$40 million and  
\$60 million

Total City investment since 1914:  
\$2,600,564 to 1970, \$2,287,954, 1971-1978

Total Utility investment since 1926:  
\$964,989 to 1970

Number of botanical families represented:  
15, possibly 18.

Number of Genera represented:  
23, possibly 25.

Number of Species: unknown

Species Distribution: unknown

Age Class Distribution: unknown

Survival Rates: unknown

Life Expectancy: unknown

General Condition: fair to good. Young, mature, and gerontic trees are generally in need of attention.

Miles of City Streets: 881

Miles of Major Streets: 194

Miles of Local Streets: 688

Miles of Major Streets with Curbs and Sidewalks: 160(82%)  
(35 miles to complete)

Miles of Local Streets with Curbs and Sidewalks: 450(65%)  
(230 miles to complete)

Ownership of Streets: full title vested in the City of Vancouver

Potential Full Stocking if all Streets Planted: Approximately 600,000

Probable Present Stocking: 125,000(21%)

Annual Direct Budget for Boulevard Trees: now exceeds \$400,000

Approximate Amount Spent per Treated Tree per Annum: \$215.

Amount Spent per District: unknown

Amount Spent per Task: unknown

Unit Cost per Task: unknown

Staff Size Summer: around 40

Staff Size Winter: around 60

Policy: no explicit written policy

Powers: Boulevard and Shade Tree Bylaw written 1909, amended 1917, and still in force. Arbor Day Bylaw written 1917 still in force. Tree Destruction Bylaw written in 1922, amended 1950, still in force.



Resource Inventory: none

Community Relations Program:  
relies heavily on personal  
contact by Supervisor of the  
Arboricultural Group.

Training Program: none

Procedures, Specifications or Safety Bulletins:  
none

Tree Master Plan: none

Records: few of a management nature

Applied Research: none

## HISTORICAL HIGHLIGHTS

### Introduction

The management of urban trees is a long-term proposition, a fact often forgotten in the pace of city living. Decisions made three to five decades ago directly affect the cost, quality, and appearance of today's city streets. Similarly, decisions made today will dictate the acceptance, benefits, and condition of the city tree resource in the next century.

Examining the long-term perspective is a critical function in reviewing the status quo and future direction for the City Boulevard Tree Program. To attain the proposed goal of an efficient, effective, and comprehensive street tree program, it is instructive to examine the progress of the resource since 1900. Fairly complete records are available since 1914 in the formal Annual Report of the Park Board. Other records come from minutes of meetings, reports, and personal recollections. This information has been collected, edited and condensed into a brief paragraph for each year. In addition, extensive documentation has been included in the appendices for reference in future studies, and for preparation of the proposed Master Plan.

### Summary

Since 1896, with the adoption of a boulevard tree bylaw, there has been a legal framework for the management of trees in the City. This bylaw was improved upon until 1917 when the current bylaw was formulated. It has never been rescinded, but apparently fell from active use in the mid 1920's. Similarly, an Arbor Day bylaw requiring the Mayor to proclaim an Arbor Day has been dormant, though in force, for about the same period.

Apart from calls in 1919, 1965 and 1978, for a clear concise policy from City Council and the Park Board regarding the boulevard tree program, little planned direction has evolved especially from the political level of city government. In 1923 Mayor Owen specifically mentioned improvement of boulevards with tree planting, and in 1926, after a visit to Victoria, City Council supported the establishment of a model

boulevard program, but this had disappeared by the early 30's.

Incorporation in 1929 brought an additional burden of responsibility to the Park Board, with many older trees being added to the overall boulevard tree resource. Calls for a clear delineation of the Park Board role came in 1916, 1919, 1961, 1977 and 1978, but the problem has remained unresolved.

Planting programs have been spasmodic over the years, though more consistent since the mid 1960's. The appointment of a City Arborist in 1961 saw a substantial improvement in work co-ordination, planning and record-keeping, but after the Arborist left, the position was not re-advertised. Planning, in particular, has suffered since.

The most pervasive theme throughout the history of the Boulevard Tree Program has been a reluctance throughout the years on the part of successive Councils to provide sufficient maintenance funds. In recent years, Park Board staff have not kept accurate enough records to be able to argue for appropriate funding on a rational basis.

ANNUAL REVIEWS

- 1896: This year saw the first passing of a boulevard bylaw to: regulate the enclosing of street side property; ensure that boulevards conformed to the proper grade, seeded with grass and clover seed, free of noxious weeds; regulate the piling of any material on the boulevard; prohibit "silver poplar, balm of Gilead, cotton tree or willow"; and encourage the planting of approved species with a 50 cent per tree incentive. Provision was also made to control the planting distance, to prohibit vandalism and damage by horses or other animals, and to stipulate that the owner or occupier of a lot or parcel of land was responsible for the pruning of trees. The duty for ensuring the provisions of the bylaw was vested in the City Engineer. Penalties allowed for fines up to \$50.00, and "those convicted who failed to pay could have costs and the fine levied by distress and sale of goods and chattels of the offender. In the case of there being no distress found out of which penalty could be levied, the convicting Magistrate could commit the offender to the common Gaol of the City of Vancouver, with or without hard labour, for 21 days."
- 1899: This year saw an amendment to Bylaw 246 with Bylaw 343 which repealed the section of the 1896 Bylaw that allowed for incentives for tree planting.
- 1909: In this year, the Park Board recognized the need for systematic planting of trees and maintenance of boulevards, and a resolution to that effect was sent to City Council in early February.
- 1912: Little appears to have taken place in the intervening years and in February of 1912, at a joint meeting of the City Board of Works and the Park Board, the following resolution was adopted and sent to City Council:

"THAT certain streets be provided with permanent curbs and that the boulevards be surfaced and made ready for the planting of trees and that when accomplished, the Park Board be asked to take over the same for purpose of beautifying and maintenance, the funds for which to be derived from a frontage tax.

ALSO that the City Engineer be instructed to have the boulevards of all streets with permanent sidewalks and curbs put in shape immediately."

- 1913: As a result of the action in 1912, the City Charter was amended (see Appendix 4.) to provide for the control by the Park Board of such boulevards, as and when the City Council directed by resolution. The funds were to be derived from a frontage tax, not to exceed ten cents per front foot, to be assessed by the City Council by resolution.

At the time, it was noted as very unfortunate that the word "constructing" crept into the clause, because the joint committee from 1912 had made the point very clear in their report that maintenance only was to be covered by the frontage tax. It was noted as obvious that the maximum amount of ten cents per foot would scarcely be sufficient to cover maintenance charges, to say nothing of construction. Funds for construction, such as grading, soiling, seeding and planting would have to be provided from an entirely independent source such as Local Improvement or Special Grant.

From this date onwards, much of the historic information is contained in the Park Board Report for each year. Additional sources have been obtained from City Archives.

- 1914: In this year, City Council adopted the following resolution:

"THAT the following boulevards and triangular plots (as annexed) be transferred to the Board of Park Commissioners for maintenance, and the City Solicitor requested to take steps to have the necessary arrangements made to assess the fronting property for a cost of the work for this list, and also for the list previously transferred."

The list contained 49 streets or portions of streets as shown in Appendix 5. The accounts from the Annual Report for this year indicate that \$140 was spent for the care of boulevard trees held in the City Nursery. It is not possible to tell how much money was spent specifically on boulevard trees in this year, as Gores, Street-Ends, Intersections and Boulevards were reported together.

- 1915: This year the third Annual Report by Superintendent W. S. Rawlings was deeply concerned with the reduced

funds available to the Park Board. The appropriations granted by the City Council for maintenance for the various civic departments was heavily cut and the appropriation voted for the maintenance of the park system was viewed as being the most heavily pruned. Again, in the accounts, boulevards were included with Gores, Street-Ends and Intersections.

- 1916: Funding was still a particular problem and, in 1916, City Council voted the smallest appropriation for a number of years. The Superintendent doubted that any other Civic Department had been so heavily handicapped. Notwithstanding this problem, in October of 1916, the City Council adopted the following resolution:

"THAT the Park Board be given full jurisdiction over all tree planting and maintenance of trees on the City Boulevards; the Boards to ascertain from the City Engineer's office before any tree planting is done, as to whether the boulevards are to the permanent grade."

This resolution, unfortunately, carried no funds with it. To enable work of an urgent nature to be carried out, such as removing dead or dangerous trees, and pruning those trees that were now becoming a menace to traffic, the Park Board was given a Special Grant of \$228.

By 1916, the large number of trees in the nursery for boulevard planting had grown to such a size as to render their transplanting urgent. As a result, the Board decided to grant these trees to property owners on application for planting on the boulevards, under the direction of the Park Board. An example of the request cards is given in Appendix 6. Over 2,000 trees were supplied, and a further 2,000, mainly ash, birch, Norway maple, horse chestnut and elm, remained to be either transplanted or heavily pruned.

- 1917: Reports for this year indicate the drafting and adoption of a bylaw regulating the planting, care and control of trees on boulevards. In fact, Archive records show that only Bylaw 1293, (which amended Bylaw 940 originally passed in 1909, which in turn had superceded Bylaws 343 and 246 from 1896 and 1899 respectively) was passed.

An Arbor Day Bylaw, providing for a definite period of tree planting by citizens of Vancouver, was also framed and adopted at the same time and, as a result, the first Arbor Day was held.

An appropriation of \$500 was granted by the City Council for the pruning of trees. This work was carried out in the early part of the year but, owing to the small amount, only the most urgent cases were attended to.

Concern was expressed about the care of trees in the City Nursery. It was stressed that the first few years of growth are the most important. Trees of this age require careful attention to spraying and pruning if they are to become shapely and an ornament to the streets. Neglect in the early stages, it was noted, generally results in permanent injury. The Superintendent noted that streets were already beginning to show ungainly and unshapely trees.

It was stressed that the object of tree planting was not only to provide shade, but also ornamentation for the City. "A well-trained tree has a value as an ornament, without which the full meaning of a 'City Beautiful' cannot be understood. The educational advantages to be derived are also important."

When approached by a Committee of the Park Board regarding funds for boulevard maintenance, the City Solicitor advised that it would be illegal to utilize funds voted for park purposes for boulevard operation.

1918: In this year, a thorough inspection was made of all the trees recently supplied from the City Nursery and planted on various boulevards. All necessary pruning was attended to. In a number of cases, it was noted that owners had not fulfilled their requirements in staking trees.

A number of dead and dangerous boulevard trees were cut down and removed under a Special Grant of \$355 from City Council.

1919: The Superintendent expressed the concern that the problem of boulevard trees was becoming increasingly difficult. City Council again allowed a Special Grant, this time \$227 for pruning and dangerous tree removal.

An extract from the Park Board minutes for November 26th, 1919, laid out seven concerns (see Appendix 7) and resolved:

"THAT this Board recommends the City Council to determine a definite policy on the matter of boulevard trees, and to make such financial arrangements as will enable the Park Board to undertake the systematic planting, care and attention of boulevard trees to ensure their proper growth, and to deal with the various matters which constantly come before them requiring immediate attention."

1920: The difficulties that the Park Board and Superintendent Rawlings had experienced so far in obtaining funds from City Council to ensure adequate management of boulevards was causing considerable concern. Superintendent Rawlings prepared a historical review for the Board of Park Commissioners. The six major recommendations of this report are contained in Appendix 8. Of principal importance were the suggestions:

1. that if City Council did not provide funds to exercise jurisdiction over the boulevards, then the Board repudiate all responsibility for them,

and

2. that a committee from the Board be appointed to take up the whole question with City Council and to arrive at a definite policy regarding boulevard management.

The Annual Report noted that 106 applications for tree planting had been received (using the form shown in Appendix 9). In addition, it was reported that the City Claims Department had required the removal of dead and dangerous trees, and a specific arrangement had been reached with the British Columbia Electric Railway Company for the pruning of a large number of trees in various parts of the City ordered by the Provincial Government Inspector of Electrical Energy. It was expected that at least \$2,500 would be spent on this work.

1921: During this year, 922 permits of various kinds were issued, covering planting, pruning and removal of



trees. Many trees were examined at the urgent request of property owners, and \$724 was spent to remove dead or dangerous trees as authorized by the City Claims Department.

- 1922: The Superintendent again expressed concern about the small appropriation for the park system as a whole. Under the circumstances, it was noted that the Park Board could not maintain the standard of upkeep necessary for economical operation, and it was suggested that the time would come "when the City will have to pay dearly for this policy of delay".

Despite every effort to have the City Council take action with a view to putting into effect the provisions of the City Charter as to the systematic development of the boulevards under the frontage tax clause, nothing was accomplished.

A survey was made of Georgia Street and plans and estimates were prepared and submitted to the City Council in the hope that finances would be found to undertake the improvement and planting of at least five blocks.

The supply of trees in the City Nursery for boulevard planting was now exhausted and all requests from property owners for trees were refused. In a number of cases, the owners purchased trees themselves, but the Park Board always undertook the survey and staking after issuing the necessary permits. Some pruning was continued, as was the removal of dead and dying trees.

- 1923: The Annual Report noted that 1923 was the most important year in the history of the Department. Not only was it a year of record progress in acquisition and development, but there was considerable satisfaction about the almost 20 percent increase in the appropriation voted by City Council. Notwithstanding the improvement in the overall picture, it was noted that another year had passed without better control and financing of maintenance for City boulevards. Two other encouraging factors, however, were apparent. Public opinion had reached a level of political recognition and Mayor Owen's inaugural address to City Council urged a definite start to boulevard improvement and the appointment of a committee to look into the question.

Anticipating the time when a planting scheme would be started, the Nursery was stocked with several thousand trees for boulevard purposes.

- 1924: Despite the expectations of the previous year, nothing further developed. Pruning and removing of trees was still demanding some Special Funds.
- 1925: The situation continued much as before. However, an additional \$1,071 was appropriated for spraying trees. The nature of this infestation was not mentioned in the annual report.
- 1926: After many years of endeavour on the part of various Boards, definite progress began in this year. Members of the Board and its officials, the Mayor and Council, together with the City Comptroller and City Engineer, visited Victoria and made an inspection of the boulevard system in that city. It is recorded that this trip made an indelible impression on members of City Council, who later voted \$5,000 for the establishment of model boulevards in each Ward of the City, except Ward 2. It was hoped that this example would establish a 'City Beautiful' movement.

A complete survey was made of all the boulevards in the City where the streets had permanent curbs and sidewalks, along with records of the street trees. (As far as can be ascertained, these records have not survived.) A list of the model boulevard improvements was included with the Annual Report and is found in Appendix 10 .

- 1927: In this year, the model blocks were completed and a substantial number of trees planted. (See Table 1 and Appendix 11 )

At the request of the Boulevard Committee of the City Council, a report was submitted by the Superintendent on dead and dangerous trees in the West End. Sixty trees were suggested as being in this category and requiring \$650 for removal.

Renewed conflict on the financing of boulevard improvement again appeared:

"It would appear that unless, and until, the Bylaw authorizing work of this nature to be done under the

local improvement plan is adopted, no very great progress in this line of City development can be looked for. Even with the adoption of the bylaw, it remains for a property owner to petition for the improvement to be made, and whether much demand under this system will be made is very problematical. It occurs to me that unless funds are forthcoming by direct grant from the City Council or through the medium of money bylaws, progress in this direction will be very slow indeed. Two years ago, I submitted for your consideration a full and detailed report on this whole subject, so that it is unnecessary to go further into the matter in this report."

Note: It would appear that this report was prepared in 1925. However, this researcher has not found any currently available record of it.

1928: Planting, pruning and removal of trees continued at a steady rate in this year. A special vote of \$1,500 was passed by City Council for improvement of 10th and 12th Avenues. An extensive spraying program was undertaken to combat Lecanium Scale, which affected older and larger trees, particularly in the West End.

1929: This year saw three very significant developments in the evolution of the City's street tree program:

1. in 1929, the municipalities of Point Grey and South Vancouver were incorporated into the City of Vancouver;
2. the Special Committee on maintenance and operation of boulevards prepared two reports, which resulted in the adoption of a definite policy by the City Council for the development of boulevards throughout the City. It provided for annual appropriations from General Revenue voted by the City Council for certain streets to be maintained and permanently planted with trees; and
3. the town planning commission for the City of Vancouver had a detailed "plan ("plan for the City of Vancouver, British Columbia, including Point Grey and South Vancouver, and a General Plan of the Region"), prepared by Harland Bartholomew and Associates.

Almost \$10,000 was spent on boulevard improvement and is recorded in detail in that year's Annual Report (see Appendix 12).

The minutes of the Special Committee on maintenance and operation of boulevards, after considerable discussion, proposed three recommendations:

1. that Council include in the general Local Improvement Bylaw provision for constructing boulevards as a local improvement;
2. that wherever practicable, streets be graded to permanent grade;
3. that Council adopt a policy of general boulevard improvement, paying the cost of construction out of general revenue or bylaw funds.

Details of committee minutes are given in Appendix 13.

The Town Plan Report made detailed recommendations concerning tree planting on City streets. Examples from other jurisdictions were examined. In the section dealing with civic art, specific recommendations were made concerning (i) appointment of a trained City Forester or Arborist, (ii) the passing of a bylaw for a comprehensive street tree planting and boulevard program under the supervision of the Park Board, with provision for the assessing of the cost against the abutting property. Detailed information from this report is contained in Appendix 14.

1930: There was again a shortfall in the City's appropriation for boulevard work. In particular, pruning work in Point Grey, and maintenance of newly planted trees, suffered. It was observed that for every year delayed, the future cost and amount of work would increase proportionately.

Considerable tree pruning was carried out in co-operation with the B. C. Electric Railway Company and the B. C. Telephone Company.

A survey of the 12.2 miles of streets planted during 1929 and 1930 was appended to the Annual Report. It was calculated that slightly over 38 miles of boulevard, or some 4,500 trees, would be required to complete the City's planting program (at an approximate 40' spacing).

- 1931: Planting and pruning continued as before, as did co-operative work with B.C.E. Railway and B. C. Telephone. Continued spraying for Laconium Scale was required. Removal of poplar trees on Denman Street was paid for by a Special Grant from City Council.
- 1932: The boulevard tree program again had financial problems, receiving only one-half the amount appropriated in 1930. It was estimated, however, that the number of trees under the care of the Department was then 30,000.
- 1933: In this year, the Board suffered severe fiscal constraints, to the extent that all of the bedding stock (93,838 plants) were planted out voluntarily by the gardening staff. The appropriation for the boulevard program was reduced to \$2,000. A heavy windstorm in October caused a great deal of damage and 1,770 trees required attention. A special additional grant of \$500 was made available by Special Grant from the City Council.
- 1934: Maintenance work was reduced to the barest minimum because of the greatly reduced appropriation. The utility companies provided over \$5,000 for pruning trees, without which very little work would have been undertaken.
- It was noted that unless City Council made a more adequate appropriation for the following year, a large number of young trees planted in the past three years would suffer considerably.
- 1935: The situation continued much as before; however, some new planting was undertaken on 25th Avenue, between Quesnel and Wallace Streets.
- 1936: As a result of an improved budget position, over 4,000 trees were planted along City streets, with a special grant from Council. An additional \$5,000 was made available for tree pruning. Utility tree pruning also continued as in previous years.
- 1937: Planting and maintenance continued and the Works Project Scheme was used to improve many centre boulevard strips within the City. It was noted that special arrangements would be required for maintenance funds from City Council for centre boulevards.

- 1938: The planting and maintenance programs continued with an additional \$400 supplied by the City for centre boulevard maintenance and payment of Relief Labour.
- 1939: Rather more work than usual was done this year on pruning of boulevard trees. In addition to the work carried out under the City appropriation and the grants from the utility companies, three months of pruning were undertaken as a Works Project.

In addition, more than 3,500 trees were planted out as a Relief Project. Although there were some 4,000 additional trees ready for planting, this could not be done as Relief work since that program provided no monies for material, trucking or skilled labour.

- 1940: The Annual Report noted that the same unsatisfactory condition prevailed as in the past with regard to the proper maintenance of trees on City streets. It was suggested that it was not the responsibility of the Park Board, except insofar as it acts as an agent of the City, to take care of younger trees planted by the City itself or the former Point Grey Council. The limit of the annual appropriation granted by the City was usually a meagre \$5,000.

The Annual Report went on to express the concern that: "on the streets stand thousands of large trees, many of quite unsuitable kinds for street use, planted by the frontagers, for the care of which no funds are available, and these form the principal source of trouble, and it is only in a very few of the lighter cases we are able to do anything for them. Permits are frequently given to the frontagers, if requested, to carry out the pruning themselves.

The matter is further complicated by the fact that each winter we carry out for and at the cost of the two utility companies, a considerable program of tree pruning where the branches interfere with the electric wires.

These are usually on one side of a street only and no funds are available for dealing with the trees on the opposite side of the street."

Concern was also expressed regarding the lawn areas of the City streets (maintained or otherwise). Suggestions for public maintenance did not consider that the original laying out or construction, including planting and irrigation, was usually carried out as a Local Improvement and that this had already been undertaken in a few areas of the City.

1941: The boulevard section of the Annual Report for this year was identical to that of 1940, with an additional paragraph noting that an application to the City for a grant to plant out boulevard trees from the Sunset Nursery was turned down. Council made the suggestion, however, that a frontage tax - \$2.00 per 33 ft. lot, \$3.00 per 50 ft. lot, \$3.50 per 60 ft. lot and \$4.00 per 66 ft. lot - be used to finance tree planting.

1942: The Annual Report commented on the inadequacy of the \$5,000 annual grant from the City and suggested that a more appropriate sum would be in the region of \$20,000.

1943: A similar situation persisted as in previous years. The Board, however, in an effort to arrive at some workable solution, recommended that an agreement be entered into whereby each year for the succeeding three years, the B. C. Electric and the B. C. Telephone Co. each grant \$10,000. This would be added to a separate appropriation of a similar amount by City Council.

In addition to this suggestion, a Special Grant of \$2,000 was set up by the City to eliminate low hanging branches on boulevard trees in the West End, which had become a safety hazard to the Fire Department.

1944: An unofficial agreement was reached concerning the B. C. Electric, B. C. Telephone and City Council \$30,000 tree-pruning fund. Hope was expressed that it would go beyond the three-year trial period and, in addition to a capital sum for the removal of large numbers of overgrown trees, would form the nucleus of a permanent policy for the proper care of boulevard trees.

1945: The \$30,000 fund for tree pruning was confirmed and the monies contributed in this year. Reference was made to a recent report to the Board and the Council suggesting that the aim was for an annual appropriation from the City of \$20,000 over the next ten years, coupled with a capital expenditure for the removal of several thousand overgrown trees. It is apparent that some of that money was already in hand, but it has not been possible to document the amount.

- 1946: The City appropriation was raised in this year to \$15,000. The Annual Report noted:"the folly of trying to economize on this type of work has been very thoroughly demonstrated, as a reasonable amount of money spent each year over the past 20 years would have kept the trees under control and save consequent embarrassment to the Board and its officials. The figures indicate that the appropriation was exceeded by something over \$700."

Over \$14,000 of the \$100,000 authorized by the 1945 bylaw for tree removals was spent mainly in the West End. It was planned to replant with flowering species.

B. C. Electric and B. C. Telephone pruning continued. It was observed that some 1,600 blocks of the City had electric power lines on the boulevards.

- 1947: Work continued at an increased rate, but the total appropriations, including those from B. C. Electric and B. C. Telephone, only allowed some 50 cents per tree for the 80,000 trees estimated on City streets. The Annual Report observed:"if all the trees were trimmed each year it would probably cost at least \$3.00 each, but when trees are left 10 or 15 years, without attention, the cost amounts to possibly \$20 each. Piled upon the amount of work which is facing the Park Board at present, in that probably one-third of the trees in the boulevards have not been touched for 10, 15, and in some cases 20 years. In view of the foregoing, it is not difficult to see why the staff has to be arbitrary about dealing with the requests of individual householders in different sections of the City . . . When the miracle happens and we have funds to take care of some of the older trees, they are confronted with the problem of pruning them without cutting them back so far that their appearance is spoiled, but there is often an alternative. This whole boulevard tree problem is in its present sad state because of inadequate funds in past years and the only answer is more generous appropriations in the future."

- 1948: The Annual Report noted that with rapid tree growth on the West Coast and increasing labour rates, little headway was being made against a troublesome problem.
- 1949: Despite the appropriation by the City, which now reached over \$26,000, and a substantial sum from the two utility companies, allowing 70 cents per tree, this sum was



still thought to be totally inadequate for the 80,000 trees on City streets. In 1949 the Board approached the City Council with a possible solution to the problem, namely a frontage tax, in residential areas, of 10 cents per lineal foot per year to cover the cost of taking care of trees. City Council did not give approval to a plebiscite to assess the wishes of the general public. The approach to Council on this item, however, apparently convinced some Alderman that a small appropriation was not nearly sufficient to do a creditable job.

1950: Although this year saw a small increase in the City appropriation, the utility contribution was less than half that of previous years. In 1950, the last monies were spent under the 1945 tree removal bylaw.

1951: A quotation from this year's Annual Report is as follows:

"Although the appropriation of boulevard work has increased over the past few years, wages have increased just as fast and, at the present rate, we are not really gaining on the problem. The service we are able to give does not nearly cope with the demands of householders for attention to their trees and this is therefore the most troublesome problem with which we have to deal. It would be a good public relations gesture on the part of the City and the Board if the budget for this work could be doubled as we would then, perhaps, be able to satisfactorily carry out the work."

1952: After a lapse of some 12 years, planting was started again on some boulevards. Cherries, Prunus, Hawthornes, and Hard Maples were reported planted out. The older, large trees in the West End, Kitsilano, Point Grey and Shaughnessy Districts still presented a troublesome problem. Insufficient funds were available to cope with the problem, although half of the \$20,000 from the 1951 bylaw was spent, along with a similar amount from the 1952 bylaw.

1953: The pruning and planting program continued, as did the removal program, in an effort to reduce the number of Elms, Maples, Chestnuts, Acacias, and similar species that grow to large size.

1954: This year Vancouver hosted the British Commonwealth games, with 600 athletes from 24 nations visiting the City. Boulevard tree maintenance continued unchanged despite public calls for improved appearance in the City generally.

1955: Despite the assertion in the Annual Report that planting had been continuing for eight years, the 1952 report indicated that planting was again started after a number of years delay...10,200 trees were reported set out on City boulevards, whereas nursery records indicate that, in fact, 5,892 trees were set out.

A number of the new trees were caught in a severe frost in early November of 1955, but damage estimates were not thought to be possible until the following year.

1956: Wording in this year's Annual Report was almost identical to that of the preceding years and did not adequately reflect any accomplishments or progress in the boulevard tree program.

1957: In addition to the normal boulevard tree report, reference was made to a credit from the City Electric Dept. for pruning and removal of trees around street lights. Apparently 1,300 trees were removed throughout the City at an average cost of \$25 per tree.

1958: This year saw the inclusion of the first full report from landscaping and horticulture in the Annual Report. Introduction of smaller, ornamental flowering trees to replace large, fast-growing varieties (which had been mutilated by many years of pruning) and clearance for overhead electrical conductors was discussed. Planting of trees on Georgia Street at the request of the Technical Planning Board was noted.

It was observed that further expansion of either boulevard tree plantings or ornamental areas would necessitate enlarging the present Nursery facilities.

There was a sharp increase in the number of requests for removal of trees because of plugged sewers.

Foliage was exceptional in 1958.

1959: The report by William Livingstone on landscaping and horticulture for this year noted that boulevard trees

continued to be one of the most difficult problems, with no early solution in sight. It was recorded that some 35,000 trees were planted, of which 90% were slow-growing, flowering species. It was calculated that an average of 1,500 trees, or approximately 1-1/2% of the trees growing on City streets, had been removed annually. It was suggested that this was considerably less than the minimum average of 2% based on a survey of other cities with over 100,000 street trees.

The report noted that a pattern of spacing to conform with ornamental street lights and traffic safety had been established.

The difficulty in obtaining trees suitable for boulevard planting was noted and a reliance on the City Nursery for 85% of the plant material was observed as sorely taxing the Sunset Nursery. A suggestion was made that thought should be given to a new nursery outside the City boundaries on an area zoned for farming.

City concern regarding the removal of large trees on City streets had been expressed to the Park Board Commissioners and to City Council.

1960: The landscape and horticultural report noted that over 2,000 trees were supplied from the Sunset Nursery, valued at \$65,422, for planting on City streets. In addition:

"Boulevard trees still retained the undisputed first place in the mail received. Replies to 237 letters were sent out, and over 1,500 phone calls were checked by the District Supervisors during the year. 1,317 trees were removed for various reasons, many of them victims of old age and excessive pruning by property owners."

Utility plants dropped substantially to one-third the level of previous years.

1961: A direct quotation from the Annual Report illustrates the developments in this year:

"In 1961, the Board employed its first full-time Arborist. This has resulted in greater efficiency in recording and expediting public enquiries. The City

is now divided into ten separate areas with a filing system covering planting, pruning, spraying, removals and miscellaneous information. All jobs are issued on a work memo that is filed on completion of the job.

An extensive tree selection program was initiated, with a number of different species and varieties being planted throughout the City to determine their adaptability to climate and growing conditions. Selections from these will be propagated at our newly-acquired tree nursery. A total of 2,500 trees were planted, consisting mainly of flowering and smaller growing species. Tree planting in the downtown area was continued to include Burrard Street from Pacific to Hastings.

During the pruning season, crews took care of 10,000 or approximately 1/10th of the boulevard trees. Considerable line clearing was done for the two utility companies, chargeable to their account. Over 5,000 were sprayed to counteract heavy infestations of aphids and caterpillars. Some 170 wasp's nests were destroyed and experiments with a new systemic insecticide proved its value in the control of insects difficult to reach with contact sprays.

Over 1,300 trees were removed for the following reasons: 590 were dead; 443 for installation of street lighting; 126 for better spacing; 152 for re-planting; and 52 for sewer complaints. Correspondence accounted for 157 letters and there were more than 1,300 telephone calls regarding trees."

1962: A new format in the Annual Report, which provided pictures but no text for each section, was initiated in this year.

The stumper (purchased in 1958) was pictured chipping stumps and it was recorded that 10,000 boulevard trees were pruned and 3,782 telephone inquiries were answered.

1963: Detailed information for this year's work program is contained as an example in Table 2 of this report.

1964: An estimated value of the 30,000 flowering trees and 80,000 medium and large trees on the City streets was \$23,000,000. This figure apparently assumed a value of approximately \$200 per tree. Detailed information on the work of the department on street trees was given to illustrate the responsibility in helping maintain Vancouver's reputation as a beautiful city.

- 1965: In addition to the normal information supplied, it was reported that several thousand trees were sprayed to combat aphids, which caused a troublesome "honey" drip.

Watering and feeding of downtown trees, and all newly planted trees, was also reported carried out through the summer.

The Park Board's street tree program was suggested as continuing to preserve the image of Vancouver as a city of beautiful trees and as a "Blossom City".

- 1966: Normal maintenance work continued as usual. City Council endorsed the planting of trees along main thoroughfares, particularly in the eastern sector of the City.
- 1967: Of special interest in this year was the allocation of \$40,000 to permit the planting of desirable species of trees on main thoroughfares and residential streets, when new installation of curbs and street lights had been completed.

In addition, co-operation of the Downtown Businessman's Association resulted in the planting out of 128 new exposed, aggregate-type containers in the downtown area.

- 1968: The only new information for this year described the planting out of trees in "Theatre Row".
- 1969: In addition to the normal maintenance, an extensive spray program for scale and insect infestation was carried out on over 17,000 trees.
- 1970: In addition to normal maintenance, over 20,000 trees were sprayed during 1970.

Apparently, no money was forthcoming from the Downtown Businessmen's Association for maintenance of planters in the central core of the City, as had been the case in preceding years.

This year saw the first time in the history of the street tree program that the City spent \$150,000 on street tree maintenance alone.

- 1971: This year's Annual Report noted an obvious improvement:

"In co-ordination with the City Engineer's Department street tree curbing and paving program, over 2,500 street trees were planted. Supplemental funds provided for a co-operative program with the City Electrical Department to improve street light efficiency through selective pruning of low, interfering branches on street trees.

An accelerated spraying program on 16,262 trees, using non-toxic materials, helped to curtail aphid and scale infestations.

General improvement in the quality of our street trees is reflected in the fact that less than 200 of the 100,000 trees on City streets had to be removed during the year.

These factors have substantially decreased the number of letters and telephone complaints concerning street trees."

- 1972: In addition to the normal planting, removal and pruning program, large tree planting was carried out in Maple Tree Square in Gastown.
- 1973: In addition to normal work and continuation of the downtown planting, programs on Hastings Street, Blood Alley and Strathcona were included.
- 1974: In addition to normal work, planting was carried out on Granville Mall.
- 1975: Special planting projects included Water Street in Gastown, West End mini parks and West Broadway.

Maintenance work continued as in the past. The extremely dry spring of that year necessitated an appeal to Vancouver residents to assist Park Board crews in watering street trees.

- 1976: The Annual Report noted the following for this year:

"Surrey Nursery is Vancouver's tree farm! Many of the lovely specimens lining our City streets today were started on Surrey Nursery's twenty acres.

Cool spring weather extended the planting program of our young minor trees and approximately 4,000 Birch, Ash, Gleditsia and Plane were planted for future use in parks and on streets. 4,000 Mazzared Cherries were budded with selected varieties and a high success rate is anticipated. 1976 was the most productive year to date, with a shipment of quality large 2"-3" caliper trees to the downtown and other areas. Outstanding specimens produced this year are the line trees (*Tilia euchlra*), which have excellent root systems and strong straight trunks, making it a practical choice for areas frequently vandalized. A total of 2,822 were shipped to parks and streets for an estimated value of \$98,770.

Current estimates placed the total street tree population at: 145,000 with 60,000 flowering.

All districts of Vancouver received new plantings this year."

- 1977: Arbor Day was observed with the Park Board Chairman accompanied by the President of the B. C. Nursery Trades Association, planting a tree at the VanDusen Gardens. The Arboricultural Group of the Park Board received over 100 telephone calls, pruned 1,136 trees, planted 3,642 trees, removed 100 trees and sprayed 2,000 trees.
- 1978: A complete review of the boulevard tree program was initiated in the summer of this year. It is expected that the final report will be completed by late fall or early spring of 1980. The objectives of this study are to update and clarify the responsibilities and roles of those directly or indirectly concerned with the street tree program, to formalize policy, procedures and practices, and to prepare an organizational structure for planned maintenance of boulevard trees.

## POLITICS AND A TWENTY YEAR PLAN

### Introduction

Over the years since 1914, trees have been actively planted on City boulevards in an effort to ensure that residential streets throughout the City received similar benefits. In the past two decades, this planting has normally followed the curb and gutter program initiated as part of local improvement procedures.

Some new planting has also been supported by City Council to improve specific areas in a cost-sharing neighborhood improvement program with the Federal Government. A separate tree planting program initiated in 1971 at the apparent request of the Downtown Businessmen's Association has seen the establishment of many trees in the City central core. This planting program has been completed, although many of the trees are now in need of maintenance attention or replacement.

Older trees in the City, predominantly in the more expensive areas, now, or in the past, have been removed at a slow rate, although most in the West End have largely gone. The pace of removal has been far outstripped by small tree additions. Small trees, newly planted, require considerably more care in the first eight years of establishment than at any other time except when damaged in middle life, or when gerontic and in need of conservation tree surgery or outright removal.

The management of trees in the urban setting is a science that requires a time horizon that spans at least six decades - a person's working lifetime. Many City Councils and elected Park Boards have come and gone in this time. The principal and stable factor over the years has been a small nucleus of dedicated Park Board staff who have struggled through lean times to create the extensive legacy of boulevard trees that we have today. Yet, no City Council nor Park Board have had the foresight to recognize the need for an overall long term strategy for the boulevard tree program, despite it being one of the major attributes of the City. It is a major resource however viewed, in terms of capital value, (\$50 million) or in dollars invested, (some \$2.6 million up to 1970 and over \$2 million since by the City alone, with a further



\$1 million by the Utility Companies), or in aesthetic and environmental terms by providing an acknowledged "liveable" city.

What of the politician's role in the management and assessment of the boulevard tree program? Surely it must be to provide sensitive, informed, precise leadership and a commitment in the present, for the City now, and in the future. Since the decisions made in this year about the boulevard tree resource will dictate our inheritance in the Year 2000 and beyond, it is incumbent on those who are elected to public office to plan ahead on behalf of the broader constituency of the Citizens.

Although this report is primarily concerned with the Boulevard Tree Program in Vancouver, this is only one facet of a broader aspect of the qualities of liveability in the City. As already discussed, there is a direct relationship between a high quality city environment, civic pride, and the economic fortunes of the City. This has long been recognized by certain European cities. Aberdeen, Copenhagen, Rotterdam, London, and Paris are examples that enjoy a prosperity linked to their efforts at environmental improvement.

The Vancouver Boulevard Tree Program should be seen in the broader context of the overall Cityscape. The program makes a substantial contribution, but it should not be separated from other programs that embrace similar goals.

It is recommended that consideration be given to a comprehensive plan for City improvement under a single title, for example "Vista Vancouver."

Such a plan would co-ordinate the objectives of the various City departments with a functional responsibility for: environmental health and safety, derelict land, development land, industrial and commercial landscaping, park lands and public areas, heritage buildings, historic areas, beautification projects, street ends and centre boulevards, grassed areas or flower beds on public property, and litter prevention.

Some cities provide tax incentives for the renovation or repainting of older premises and sponsor annual award schemes for private gardens or commercial and industrial landscaping. These schemes directly improve city appearance.

There is, therefore, a great deal that the City could do to foster and advance the investments derived from community and civic pride, while providing unique employment and economic benefits to the City as a whole. It would cost little but leadership and innovative thinking.

The Boulevard Tree Program then, is but one part of a broader package. It could be both the City's major vehicle and contribution to a cityscape that might rival any in North America for setting, architecture, appearance, cleanliness and liveability.

Note: This report attempts only to identify the full spectrum of needs for the boulevard tree program. Neglect, indifference, or fiscal restrictions in the past, mean that some remedies or improvements now will be time-consuming and complex to implement.

To avoid substantial costs in this period of rising expenditures, and to ensure an orderly improvement in management and a progressive upgrading of the boulevard tree resource, it is recommended that a twenty-year plan be adopted jointly by City Council and the Board of Park Commissioners. This plan would implement those recommendations embodied in this report that are deemed appropriate at this time, as well as those acceptable suggestions offered by the Park Board staff, and would set targets for five-year intervals up to and including the Year 2000.

The most important component of the twenty-year plan would be that of the Boulevard Tree Master Plan. It is recommended that this plan be published as a formal report of the Park Board and would provide a hard-copy document embodying the approved Goals, Objectives, Design Criteria and Constraints, Planned Maintenance Program, Resource Inventory, Policy, Powers, Procedural Guidelines, and Standards of Practice for the Boulevard Tree Program up until the turn of the century.

## Conclusions

The timetable given here is intended to be sufficiently flexible as to allow accelerated or delayed implementation of the recommendations depending on the funding and priorities established by City Council, the Board of Park Commissioners, and the staff of the Park Board. Partial implementation of the program recommendations will not severely impact on the overall program in the short term. However, a progression of delays will severely weaken the total strategy and consequently diminish the likelihood of maintaining or improving the present valuable street tree resource.

There may well be differences of opinion concerning the relevance, importance or content of some sections of this report. The information provided here is intended to be competent, informative, structured and practical. The different perspective of various readers may provide additional, alternate, varied or improved insights into the management of the City of Vancouver Boulevard Tree Program. Every opportunity should be given for these ideas to be expressed and, where appropriate, incorporated into the planning and implementation process. It is hoped, however, that this report may provide an overall framework in which to discuss change, and some fundamental building blocks on which to chart the course of the boulevard tree program in the last two decades of this century, in a city where liveability is, and will continue to be, of major concern to citizens.

Crucial to the success of this report is the joint consideration of program direction by City Council and the Board of Park Commissioners, something that has not occurred since 1917. The major recommendations of the report suggest a mechanism for these two elected bodies to provide the momentum and leadership necessary to galvanize and sustain the boulevard tree program through to the 21st century, while exerting political and fiscal management appropriate to the present day.

We cannot turn back the clock, even if we so wished. Vancouver has a substantial existing boulevard tree resource. It is worth perhaps \$50 million and has had some \$5 million to \$6 million invested in it since 1914. Given the benefits derived from our boulevard trees, surely they are worthy of our continuing concern and dedicated husbandry?

The timetable outlined here for the implementation of the twenty-year plan has been reduced to the crux of the recommendations in the report. It is, however, recommended that the final Boulevard Tree Master Plan, while incorporating a similar timetable, would expand on the rationale considered for each topic in the text of the Plan. Early staging for the fiscal year 1980 is given here and it is anticipated that considerable review will take place for each topic before 1985, by which time it is hoped the final Master Plan can be published.

#### 1980

1. City Council formally approve the Park Board as the agency principally responsible for the Boulevard Tree Program.
2. City Council, in conjunction with the Board of Park Commissioners, jointly set a clear and concise goal, and adopt appropriate supporting objectives, for the City of Vancouver Boulevard Tree Program.
3. City Council, with the advice of the Board of Park Commissioners, adopt a new Boulevard Tree Bylaw and an Urban Forestry Bylaw.
4. City Council, with the advice of the Board of Park Commissioners, revise the present Arbor Day Bylaw.
5. The Board of Park Commissioners, with the advice and consent of City Council, adopt a flexible twenty-year plan for the management of the boulevard tree resource.
6. The Board of Park Commissioners adopt and publish a set of public policies for management of the Boulevard Tree Program.
7. City Council, in conjunction with the Board of Park Commissioners, consider the budget requirements to implement the recommendations in this report in sufficient time as to allow preparation of a detailed 1981 budget.

8. Any initial start on implementation of the recommendations in this report, requiring funds during 1980 be accommodated by reallocation of the monies already requested for the current year's appropriation.
9. Approval by the Board of Park Commissioners of the organizational changes and additions recommended for the Forestry and Arboricultural group.
10. The Park Board should advertise for, and appoint, two tree wardens, one Foreman III, a Foreman II Arboriculture, and a Foreman II Forestry.
11. Park Board should advertise for, and appoint, a Foreman I, Small Tree Maintenance and Tree Surgery, a Foreman I, Establishment and Maintenance, and a Foreman I, Pruning and Removal.
12. The Board of Park Commissioners should authorize a study similar to this review of boulevard trees, to examine the urban forestry problems, workload and opportunities associated with other woody vegetation management in the City.
13. Establishment of a community relations program for the Boulevard Tree Program including:
  - adoption of a symbol for the program;
  - improved complaint handling;
  - increased press relations; and
  - an awards scheme and committee.
14. The Board of Park Commissioners should establish a Boulevard Tree Program Committee and determine an appropriate liaison pattern with City Council.
15. Park Board should establish a working committee to develop the Boulevard Tree Master Plan.
16. Park Board staff should establish a working committee to prepare design guidelines.
17. Purchase of an additional water truck.
18. Purchase of appropriate office equipment for the Surrey Nursery.

NOTE: In addition to these recommendations for 1980, City Council, in conjunction with the Board of Park Commissioners, should consider the broader context of vegetation management in the City and the place of that component in a general program of City improvement.

1980 - 1981

1. Community relations program should expand to include:
  - publications and a Program symbol;
  - courses at VanDusen Gardens and through adult education Vancouver School Board;
  - improved complaint handling;
  - awards scheme operating in schools; and
  - an Arbor Day package for schools.
2. Advertise and appoint a City Arborist.
3. Advertise and appoint (in 1981) a Safety and Training Officer.
4. Advertise and appoint the appropriate sub-foreman to support the organizational structure.
5. Complete review of arboricultural tasks and preparation of standards or universal specifications.
6. Purchase of trim lift, work shacks, sprayer, and other support vehicles.
7. Purchase of tree spade in 1980; replacement of the tree stumper (1981).
8. Implementation of a formal staff review and incentives program.
9. Completion of the initial review with the Workers' Compensation Board of basic standards for safe work practices in arboriculture.
10. Implementation of revised records and improved financial information:
  - . unit cost of major tasks (for example, tree pruning)
  - . dollars spent by task
  - . dollars spent by location.
12. Establishment of Priority Maintenance Zones and High Maintenance Zones.

13. Completion of the design constraint guidelines.
14. Designation of a formal training facility.
15. All staff managing or carrying out pest management appropriately certificated under the B. C. Pesticide Act of the Ministry of Environment.
16. Completion of accreditation for all staff trimming or pruning near energized electrical conductors.
17. Completion of a guide for tree protection during construction.
18. Completion of a film on benefits of trees in the City.
19. Completion of a film for youth on causes, prevention, and implications of tree vandalism.
20. Organized circulation of appropriate journals to staff.
21. Completion of detailed filing thesaurus and filing system for arboriculture and forestry.
22. Adoption of a full set of internal working policies.
23. Transfer of Surrey Nursery to Nurseries and Floriculture Group.
24. Full use of appropriate sized trees, stakes and proper tree ties to reduce vandalism and tree damage.

#### 1981 - 1985

1. Completion of a Boulevard Tree Inventory.
2. Completion of a container inventory.
3. Completion of a Boulevard Tree Master Plan.
4. Completion of an internal Policies and Procedure manual.

5. Completion of the system workload analysis.
6. Completion of a complete record system.
7. Completion of the city-wide design guidelines.
8. Operation of an ongoing schools program of education, involvement and publicity.
9. Operation of an ongoing inspection program in all priority maintenance areas and high maintenance areas.
10. Completion of an approved list of consumable products.
11. Completion of an approved list of contractors.
12. Operation of an ongoing program of applied research.
13. Completion of the recommended comprehensive constraints analysis.
14. Completion of training manual.
15. Completion of safety manual.
16. Recognition of Arboriculture as a formal trade.
17. Completion and implementation of a structured pest management program.
18. Substantial reduction in young tree damage and mortality.
19. Substantial reduction in tree vandalism.
20. Full recovery of all costs associated with preventable tree damage.
21. Full changeover from reactive to anticipatory management of the tree resource.



1985 - 1990

1. Replacement of all gerontic trees in the City.
2. Annual inspection of all boulevard trees.
3. Nursery capacity to grow all City trees.
4. A study of decentralization of workload to smaller operating units.
5. Ten-year budget forecast.
6. Ten-year workload projections.
7. Utilization program for all byproducts of the Boulevard Tree Program.
8. Full citizen participation in the planning and operation of the Boulevard Tree Program.
9. Complete re-inventory of the boulevard tree resource.
10. Complete program review and recommendations for the decade 1990 to the Year 2000.

1990 - 1995

1. Full integration of all vegetation management planning in the City.

2000

1. Full attainment of the goals and objectives set in 1979 and 1990.
2. Full species and age class diversity of boulevard trees on City streets.

3. Full stocking on those streets appropriate for planting.
4. Full health and vigour of all individual trees in the boulevard tree resource.
5. Completion of a full program review and Boulevard Tree Master Plan for the Years 2000 to 2050.

## POLICY AND THE CITY BOULEVARD TREE PROGRAM

### Introduction

In order to ensure a clear, orderly and ascertainable guide as to the management and operation of a boulevard tree program, it is essential that appropriate underlying policies be identified, discussed and approved.

There are a number of distinct levels of policy that operate in the City of Vancouver program; there are those policies which provide overall direction for the program by City Council; there are those policies directed toward overall regulation of the program provided by the Board of Park Commissioners and there are those policies that are intended to define the functional implementation of the program, normally originating with senior technical management of the Park Board. In addition to these three levels, policy may also be broken into two broad categories; those policies which are of a public nature, and those policies which are intended only for internal program control.

The process involved in determining policy by an outside analyst may extend from a detailed appraisal of the problem and current situation, a review of goals and objectives, construction of a model, postulation of possible policies and selection of those favored after applying various tests and criteria, to a simple examination of the status quo and recommendations based on experience. This section attempts to fit between these extremes by assessing and documenting policies in force at present, by examining those areas that merit policy guidance, and by providing an overall policy framework for discussion. The step involving major analysis of alternatives has not been undertaken since this report is not a policy document, nor is it prudent to finalize the development of policies for the Boulevard Tree Program until completion of the proposed Master Plan. Rather, questions have been asked concerning the overall opportunities for program direction, while a specific policy framework has been provided for more detailed management of the program over the next few years based, in part, on documentation of existing policies as well as on a series of specific recommendations provided by the consultant for each level of policy need identified in this section.

Discussion

Unlike some other municipalities (see Appendix 15), Vancouver has no public document that outlines the policies governing the Boulevard Tree Program. Similarly, there is no "Policies and Procedures" manual that outlines the internal operating procedures approved for the program. Some policies, either overt or implicit, do obviously exist, but no previous attempt has been made to fully document them, or discuss their validity and use.

Various calls have been made over the years for a formal "Policy" regarding boulevard trees (see section on Historic Highlights). In addition, an Ad hoc Professional Committee, under the chairmanship of then Alderman Cowie, met from October 1975 until mid 1976 with the purpose of suggesting policy directions for the City Boulevard Tree Program.

At the first meeting of the Committee, it was noted that:

1. council on August 12th, 1975, passed a motion stating that in the light of the importance of landscape designs, the City carry out inspection after developments are completed to ensure that the provisions of the approved landscape drawings are complied with;
2. a goals, guidelines, policies, etc. should be outlined in a booklet which would be available to private developers, government agencies and the general public; and
3. that "amenity streets", such as Georgia Street or Burrard Street, should be emphasized with additional trees.

The Committee then discussed an informal diagram outlining possible goals, policies, time frame, guidelines, responsibilities and integration for the then boulevard tree program.

At that meeting it was resolved:

- a) that the Park Board be asked to work with the Planning Department to develop an inventory of existing trees in the downtown area and recommend some conceptive ideas for tree planting, along with a plan that would be outlined in a public information booklet for the public;

- b) that the deadline for publishing this information booklet should be six months from October in time for the 1976 spring planting;
- c) that a report on the inventory of trees in the downtown area be submitted to the next meeting of the Ad hoc Committee; and
- d) that each member of the committee prepare a "contents page" to be used in the information booklet.
- d) that each member of the committee prepare a "contents page" to be used in the information booklet.

At the second meeting of the Committee, on October 30th, 1975, a number of pertinent items were discussed:

- 1. W. Curtis, the City Engineer, was present and advised that a master plan did exist for downtown tree planting, and that approximately 1,200 trees have been planted in the downtown area. Special interest areas had been excluded from this plan, including Chinatown, Gastown and the West End.
- 2. S. Cripps advised that he was in charge of approving tree planting projects but presently had no guidelines to follow:
- 3. R. Gardner suggested that items for discussion should be broken into:
  - a) regulations;
  - b) organization of responsibilities;
  - c) philosophy;
  - d) agreed plan scope;
  - e) choice of species;
  - f) technical problems;
    - . establishment
    - . maintenance; and
  - g) published guide
- 4. W. Curtis reiterated under the discussion of regulations that Council had a policy for tree planting and that it must be decided.
  - a) if each area was going to be handled on an overall basis or as separate character areas with individual designs;
  - b) if trees planted on private property were to be subject to approval by the Director of Planning;
  - c) if trees planted on streets were to be regulated by the Engineering Dept.;

- d) if the Park Board was to continue to do the design work; and
- e) was the present philosophy of saturated planting to continue?

At this meeting it was resolved:

- a) that the Park Board report to the next meeting with future plans for tree planting in the downtown area, regulations relating to street tree planting, and the organizations involved in the process;
- b) that the Park Board, in conjunction with the Planning and Engineering Departments, report back with an inventory of all existing trees in the downtown area; and
- c) that the Clerk be instructed to obtain Council's action of 1971 dealing with the street tree planting plan for submission to the next meeting.

On November 14th, 1975, a small meeting was held at the University of British Columbia to prepare a submission to the Ad hoc Committee as a whole, regarding a philosophy and policies appropriate for a formal Vancouver Boulevard Tree Program. (A copy of the minutes of this meeting are given in Appendix 16)

Prior to the next full meeting of the Ad hoc Professional Committee, the City Clerk circulated information concerning Council's past action on downtown tree planting. The following policy information was extracted from the minutes of various Committees and of City Council during the period 1971-1972.

On September 14th, 1971, Council established two mechanisms for tree planting in the downtown area:

- a) individual property owners or business could arrange for placing of trees in front of their property only; the property owner or business assumes all the capital and maintenance costs.
- b) organizations or agencies can have trees placed on a larger scale by paying only the capital costs, with the City assuming responsibility for maintenance after the trees have been placed.

As a result of this policy, the majority of trees in the downtown area were being placed in planter boxes by the Downtown Businessmen's Association. Relatively few trees had been planted by individual property owners or businesses. The Downtown Businessmen's Association indicated a desire to continue its tree planting program

of planting approximately 1,000 trees on major downtown streets. The City Engineer, in conjunction with the Superintendent of Parks, did not, however, favour planting trees in planter boxes either by the Downtown Businessmen's Association or as a City project. In particular, concerns were raised over the long-term maintenance cost of \$26. per year per tree being assumed by the City, the lower visual impact from smaller trees in tubs, and the pedestrian obstruction caused by them on heavily used sidewalks. In the light of this, the City Engineer recommended that Council's policy on planters in the downtown area, adopted on September 14th, 1971, should be amended (see Appendix 17).

As a result of this submission to City Council by both the City Engineer and the Superintendent of Parks, Council passed a resolution on October 26th 1971, stating:

"That Council adopt in principle the planting of trees on downtown streets rather than in moveable tubs, and that the Board of Administration be instructed to have the City Engineer, with advice from the Park Board, report back on the feasibility of implementing this policy, together with cost estimates based on an annual program."

In March of 1972, a report entitled: "The Feasibility of Planting Trees in the Downtown Area" was duly completed and forwarded to the Board of Administration. This report was in turn referred to the Standing Committee on General Purposes for discussion with the parties involved and for a recommendation to Council.

On July 20th, 1972, The Standing Committee on General Purposes recommended; quote:

1. "That it be recommended to Council that providing the Local Business Association agree the City is willing to start a minimum of one block tree planting program in commercial areas if the merchants in the area apply and agree to pay two-thirds of the original cost and the City pay one-third. The City to take care of the maintenance through the Park Board;
2. That the policy with respect to tree planting now be as follows:
  - a) applicants give full details as to type, size, location, material, along with plans to be submitted for approval by the City Engineer and the Park Board,

- b) a joint report to City Council requesting approval to be submitted by the City Engineer and the Superintendent of Parks and Public Recreation; the report to include capital and maintenance cost estimates, source of funds, current year and continuing, etc.
  - c) applications being for not less than a complete block, one side basis,
  - d) the majority of the abutting owners to be recorded as in favour,
  - e) application shall not be considered for one family, two family or multiple dwelling areas,
  - f) application may be as local improvements under the Local Improvement By-law procedure and the By-law be amended accordingly.
  - g) the City to assume ownership of the trees and planters including the responsibility for maintenance and liability,
  - h) the Superintendent of Parks or the City Engineer to be responsible for any relocation or removal of any tree or planter boxes following installation and acceptance by the City as follows:
    - (i) relocation as a result of transit requirements or requests by abutting owners or tenants - City Engineer
    - (ii) removal as a result of damages - Superintendent of Parks
3. that Council's preference is for a brick base surrounding the trees and the responsibility be left with the City Engineer;
  4. that the Chairman be authorized to appoint a small committee of officials and Members of Council to bring in recommendations relative to a financial formula in accordance with the policy defined; and
  5. that applications from individual property owners or businesses for permission to install trees immediately in front of their premises be referred to the Park Board through the City Engineer."

It was agreed that all tree plantings would be done by the Park Board and that no additional tree planting in containers be allowed except under the direction of the City Engineer. On August 1st 1972, this recommendation of the Standing Committee on General Purposes was submitted to Council and adopted.



On December 5th, 1972, City Council, in full session, considered the submission of an Ad hoc Committee of the Standing Committee on General Purposes, charged with bringing in recommendations relative to a financial formula for downtown tree planting. A brief summary of the report indicated:

"That the general desire of the small committee is that a program be initiated which would approximate that proposed by the Downtown Businessman's Association".

There was general agreement that the program should include installation of filler walks (where they were still required) to be installed and financed under local improvement (initiative) basis and that the tree planting program would be paid for by the City, as the proposed property owner's share of two-thirds of the cost was too small to warrant the delay and detailed work necessary for local improvement and collections procedures. The tree planting cost would, under these circumstances, be provided for in the City's Supplementary Capital Budget in three installments. An examination was made of extending the program further into the West End but it became obvious that adding even the major streets only would double the size of the program. Quote:

"Since the program for downtown involves local improvements, it will be administered by the Engineering Department. Tree planting and maintenance will be carried out by the Park Board."

It was anticipated that 1,200 trees would be planted; in those locations where store canopies prevent large tree planting, or where underground parking garages extend out under the street, provision would be made for existing planters to be moved to these locations. The program, therefore, consists of the following:

- a) planting trees and filling in the tree plots with red brick on the streets included in the program;
- b) installing bricks around the existing tree plots on Georgia Street and Burrard Street;
- c) installing concrete filler walks where required in narrow strips behind the curbs on the streets included in the program;
- d) moving planter boxes replaced by ground planted trees to locations where ground planting is impractical; and
- e) planting 1,200 trees in a three-year program." End of quote.

It was further recommended that \$40,000 for tree planting be made available out of the unallocated funds from the 1972 Supplemental Capital budget.

City Council approved allocation of the funds and adoption of the report and recommendations.

This information on policy prompted a further meeting of Alderman Cowie's Committee in late 1975 quoted in part below.

At the November 20th, 1975 meeting of the Ad Hoc Professional Committee:

1. S. Cripps presented maps outlining a system for street tree planting. The system proposed would use the symbol method for recording existing trees and would be outlined in a sectional map. It was suggested that these maps could be added to it any time, using plastic overlays. It was suggested that a complete inventory for the downtown area would be completed in January 1976. (not done)
2. W. Curtis advised that the City has a mechanized system for recording tree inventory and that the system was extremely effective. (later found to be incorrect)
3. C. Justice suggested that each tree be assessed on a regular basis.
4. The Committee discussed the goals and objectives shown in Appendix 18.
5. It was variously suggested that:
  - a. the VanDusen Botanical Gardens should be responsible for the function of educating the public.
  - b. that a program for tree planting should outline the City's policy.
  - c. that Vancouver is a unique city with regard to many aspects and that other cities tree planting plans could not be used as models.
  - d. that a tree ordinance was required.
6. W. Curtis advised that in the City Charter the Engineering Department is given the overall responsibility for the street tree planting program but is chiefly concerned with safety and economics of tree planting. Once funds have been approved, the Park Board is in charge of planting the trees and doing the design work. However, the Engineering Dept. is concerned about existing underground utilities, leaf cleanup and damage caused by tree roots to City sidewalks and sewers.

Note: The City Engineer is not given the responsibility for any tree program in the City Charter or City Bylaws - see Powers of the City Engineer in the next section.

7. W. Livingstone suggested that if the Park Board was to be given full control over the street tree planting plan, it was best done over a long-term. other City departments, they were in full control of
8. W. Curtis reiterated that once Council had approved funds for street tree planting and once Park Board had discussed their proposed tree planting with design and tree planting.
9. It was recommended that a subcommittee be formed to pursue a heightened awareness of tree planting amongst school children.

At a meeting on February 19th, 1976 the Ad Hoc Committee discussed the items quoted in list below:

1. Continuing work by the Park Board on providing a tree inventory.
2. Reviewed an initial list of suitable street trees (see Appendix 19) provided by the Park Board.
3. Discussed with the Assistant City Engineer, W. Townsend, the incorporation of a Park Board inventory on the Engineering Department computer system.
4. The importance of viewing vegetation in the City in the broader context of urban forestry.
5. The availability of trees for Arbor Day.
6. The establishment of slow ways on some City streets.
7. The need for improved training for those responsible for tree trimming.

It was also resolved at this meeting that the Ad hoc Committee:

"Respectfully recommend to the Standing Committee on Housing and Environment that the Park Board be requested to offer non-academic courses in urban forestry to the general public at VanDusen Gardens."

As far as can be ascertained, no further meetings of this Ad Hoc Committee were held, following the municipal elections in which Alderman Cowie, Chairman of the Ad Hoc Committee, was not re-elected to City Council.

In addition to the policies previously described for the Downtown Tree Planting Program, a number of policies have evolved over the years, often to meet specific concerns or problems. Consequently, there is no overall policy framework, but rather a variety of policies formulated to meet various contingencies as necessity required. In some instances, the source of documents for these policies is difficult to establish. However, the following section reviews the major policy guidelines implemented since 1965.

In November of 1965, W.C. Livingstone (then Assistant Superintendent of the Park Board) writing to Alderman R.A. Williams, made the following points:

1. It was agreed that substantial initiative was required to promote a tree planting program, but that the basic problem centered around funds to implement a comprehensive scheme. "Capital" funds for tree planting at that time relied on the limited annual tree maintenance budget.
2. Early tree planting in the West End had provided home owners with financial incentives. Later, there was extensive plantings by the C.P.R. following clearing of Shaughnessy Heights and the Municipality of Point Grey.
3. During this period, many inappropriate tree species were planted, often too close together. This resulted in mutilation and, in many instances, root removals in an attempt to prevent disruption to City sidewalks, sewers and other services.
4. The City had been attempting to select species with growth habits compatible with limited space available on City streets. Re-planting following removal of undesirable species had been given priority with the limited funds available, followed by areas where boulevard and sidewalk grades had been established.
5. While an overall planting program had been given consideration, the increasing damage to trees on uncurbed streets suggested that tree planting should follow the curb and gutter program, at that time being undertaken by the City.

This is the first documented instance of a recommendation that tree planting should largely follow the curb and gutter program. This recommendation has, in effect, become established Park Board policy in the years since 1965.

As a result of concern regarding damage to trees on the boulevard in the 1400 block Nelson Street, the Park Board, on April 27th, 1970, resolved:

"That prior to removal of trees from City boulevards by developers or individuals, permission should be obtained from the City Engineer in consultation with the Park Board, and if said permission is granted, that compensation should be made to the City for removal and replacement of said trees."

In passing this resolution, it appears that the Park Board was not aware of the powers already existing in Bylaw 940 as amended by 1293 in 1917. (See next Section on Powers)

The Deputy City Engineer reported to the Board of Administration for Council that removal of trees from City streets was prohibited by the Street and Traffic By-law Section 78. It was further noted that there are occasions where a tree has to be removed by a developer in order to gain access to his property. Where such removal is justified, permission is granted by the Engineering Department at the time the access is approved. However, where space is obtained or available on the boulevard, the developer is required to bear the cost of planting a tree of a variety approved by the City Engineer and the Superintendent of Parks to replace the tree to be removed. In a few cases, where the existing pavement work is substandard and a local widening will be of benefit to both the through and local traffic, a widening of the pavement has been approved. This is subject to the developer bearing the cost of removing the existing tree or trees and planting new ones, if boulevard space is available, in addition to the cost of constructing the widened pavement. It was considered that this procedure provided adequate protection against the abuse of boulevard trees by developers of abutting property. It appears that problems still continued and in May 1970, the Streets Engineer indicated that, in future, no Orders were to be given for tree removal without prior inspection by the Streets Engineer and the Park Board, both of whom were to concur in the removal. This would be confirmed by a standard letter to the Park Board and to the developer, who could then remove the tree or trees seven days from date of confirmation that the Board and City Engineer approved the tree removal(s).

It would appear that, despite the good intentions of this policy, problems continued. In October of 1970, a letter outlining this policy and procedure was sent by the City Engineer to eight societies whose members might be responsible for building development in the City of Vancouver. Also in October, an inquiry report was forwarded to City Council by the Board of Administration concerning the matter of jurisdiction insofar as removal of trees on City property was concerned. The City Engineer reported:

"The City's physical plant on the street and lane system is administered and controlled by the City Engineer on behalf of Council, except that the Board of Parks and Public Recreation acts as its agent in the installation and maintenance of the boulevard tree system."

Section 78 of the Traffic and Street By-law Number 2849 (See following section) was described and the basic division of authority between the Park Superintendent and the City Engineer was described as:

"The City Engineer controls the removal of trees which interfere with street improvement work such as pavement and curb construction, sidewalk construction, street lighting projects, sewer and water installations, etc. The superintendent of Parks is responsible for the installation and maintenance of boulevard trees and for the removal of diseased, dying and dead trees."

It was noted that the Superintendent of Parks is also responsible for requests from residents for tree removal. Where trees are causing damage to existing surface works or to sewer and water services, the City Engineer refers the matter to the Superintendent of Parks who investigates and determines the solution. It appears that, as a result of the concerns raised during 1970, it became policy for tree removals to be referred to the Board of Administration, as well as to the City Engineer and the Superintendent of the Park Board.

The problem of uncertainty regarding authority apparently remained until a large tree at 1076 Denman Street was threatened with removal as part of a development permit. The West End Community Centre Association approached then Mayor Art Phillips in an attempt to block removal of this tree. As a result of public concern over the way in which Council and various City departments had dealt with the matter, the following resolution was moved and seconded at the Council meeting of September 25th, 1973:

"That it be the policy of Council that before any trees on public property are removed in the West End area (all streets west of Burrard), such be referred to Council for consideration.

Further, that Council wishes this policy to apply to the large tree affected by Development Permit No. 63072 re 1076 Denman Street."

This resolution was carried and has been in effect since that time.

In addition to the problem of individual building development and sidewalk crossings, opposition to the City Engineering program for street widening in the West End was brought to a head by conflict over the removal and replacement of trees on Harwood Street. It apparently became Park Board policy to:

1. not condone the removal of any healthy trees anywhere in the City;
2. request a tree lawn of sufficient width to allow larger species than the fastigiate Scanlon red maple planted on Harwood Street;
3. advocate a long-range tree replacement program where street widening was necessary, particularly on streets with older decaying trees and on streets at that time devoid of trees;
4. plant trees in the West End with a minimum 3" caliper; and
5. advocate the replacement of City underground services prior to replacement of the trees.

The subject of Park Board policy on tree pruning was also raised during 1973, partly as a result of a number of petitions received by the Park Board from residents in various parts of the City and as a result of a notice of motion recommended by the then Chairman of the Park Board, A. Cowie, suggesting that the estimates for tree pruning should be cut in half until such time as the standards of tree care in the City were improved. The Superintendent and Deputy Superintendent of the Park Board expressed considerable alarm regarding alteration to the pruning estimates. It seems that no formal policy was ever adopted concerning tree pruning.

In 1974, a complaint to Alderman H. Rankin brought up the question of view pruning. Eight residents on South Kootenay requested pruning, or removal and replacement, of the hawthorns and maples planted on the boulevard. It appears that a policy was established that some drop crotch pruning and thinning was permissible. However, it was the policy of the Park Board to do no topping or tree removal in order to enhance the view for some property owners.

During 1975, an incident on St. George Street near 46th Avenue, where two 175 foot maples were removed, brought to the Park Board's attention the need for a clear policy on tree removals. As a result of this unpleasant occurrence, Commissioner Gibson requested, in September, that the staff of the Park Board prepare a report on an appropriate policy for the Board with regard to protection of trees on Park Board property and on street boulevards. Included in the request was a background compilation of policies from comparable cities in the Pacific Northwest. Although some letters were sent out and replies received by the Park Board, there is no evidence that the policy alternatives were submitted to the Board for consideration.

In 1976, few questions of policy arose. At a meeting of March 9th, 1976, City Council approved the recommendations of the City Manager for an appropriation of \$35,895 from the Kitsilano Neighborhood Improvement Program for tree planting in the apartment area. May of that year saw the first questions being raised regarding policy on planting London Plane in the downtown area, particularly around the courthouse building.

In March of 1977, the then Assistant City Engineer, (Departmental Services and Sewers,) K.F. Dobell, initiated a meeting between the City Engineering Department and Park Board to review the development of tree planting and removal policies for the City. Of particular concern were ways of meeting increasing costs, arising from maintenance of engineering facilities, as a result of unsuitable boulevard trees within the City. A variety of steps were considered at the meeting, and it was concluded that a review of present problems should be done on the following basis:

1. the City should use the streets I R system to determine location of problems with streets, curbs, and sidewalks as a result of boulevard trees;



2. the City should investigate their sewer unstop records to determine problem areas for sewers as a result of trees;
3. the Park Board should review their tree trimming activities related to overhead B. C. Hydro and City Electrical Plant (including street lighting);
4. with this information pulled together, Park Board would examine problem areas in the City and identify problem tree species;
5. Park Board staff would consider all options to deal with the problems, i.e. trimming trees, pruning roots, removal of every other tree on a street section, or removal and replacement with suitable trees; and
6. City Engineering, in conjunction with the Park Board staff, would examine possible new chemical treatments for use within sewers to inhibit root growth.

It was agreed then that Park Board staff, after considering the information generated from those steps, would begin to develop policies for:

- a) new tree planting in the City (species, location, numbers);
- b) removal and replacement of existing trees; and
- c) maintenance of existing trees.

In the course of discussion, several problem areas were identified where lack of a comprehensive City tree policy was adversely affecting City operations. The planting of London Plane trees on Hastings Street, the proposed planting of Plane trees around Blocks 51, 61, and 71 in the central business district, and the landscape schemes for False Creek were specifically identified. It was noted that the lack of a policy had precluded removal and replacement of trees where this would be appropriate from both a Parks and Engineering viewpoint. With the possible exception of a trial of chemical treatments to inhibit root growth in sewers, it is apparent that Park Board staff took no further action regarding the six points raised by the Assistant City Engineer.

In May of 1977, City Council received a petition for removal of trees in the 800 block of West 62nd Avenue, because of recurring problems in 1972, 1974 and 1977

with roots blocking sewer connections. The City Manager reported to Council that it was City policy to install root-proof connections, from the sewer to the property line. In this particular case, it appears that root-proof connections were not installed on previous occasions. City Council endorsed the policy of continuing to install root-proof connections where the need arose.

In late 1977, City Planning Department received from the Director of Parks and Recreation of the City of Kamloops a request for an outline of Vancouver's policy and procedures concerning the installation of trees under Development Permit Procedures. The letter was referred to the Assistant City Engineer, Streets, who in turn outlined a detailed policy and procedure for:

- a) the area at the front of the sidewalk, i.e. between the sidewalk and the curb; and
- b) the area at the back of the sidewalk, i.e. between the sidewalk and the property line.

In area a) it was suggested that boulevard trees, which are proposed for the tree lawn between the sidewalk and curb, must meet the City's requirements for City boulevard trees. These requirements were defined as spacing, type and conflict with underground utilities or street furniture. It was noted that the Park Board is consulted as to type and spacing. If the developer agrees to the requirements of the City Engineer and the Park Board, he is then given an estimate of the cost for the Park Board to supply and plant the required number of trees. Upon planting, the trees become the property of the City and are then maintained by the City, the developer having no further responsibility.

In situations where the developer wishes to landscape in the area between the sidewalk and the curb (which is usually discouraged by City Engineering), he must be prepared to enter into an Encroachment Agreement with the City, as stated in the City's Encroachment Bylaw (4243). An agreement is recommended only when the City Engineer is satisfied as to the safety and advisability of any proposed landscaping. The developer then assumes all maintenance and liability which may arise as a result of this landscaping. The developer is also responsible for supplying and planting.

In the area between the sidewalk and the property line b) all tree plantings and landscaping require agreement as stated in the Encroachment By-law. Again the City

Engineer must be satisfied as to the safety and advisability of such a proposal. Park Board does not have a direct input regarding landscaping or trees in this area, but may be consulted as the City Engineer requires. Again, the responsibility for supplying and planting, maintenance and liability arising out of the landscaping of this area becomes the responsibility of the developer or owner. The release of an Encroachment Agreement can only be granted when the landscaping has been removed and the street restored to the satisfaction of the City Engineer.

In order to control developers in this regard, development permit applications are reviewed by the Streets Division of the City Engineering Department when a tree planting or landscaping proposal is shown on the street allowance. A "hold" is placed on the development permit issuance until such time as a detailed plan has been submitted for approval. In the case of Encroachment Agreements, plans must be completed before the "hold" on the issuance of the development permit is cleared. In addition, tree plantings or landscaping proposals on the street, that are not associated with the development permit, are processed in a similar manner.

Considerable correspondence exists in both the Park Board and in the City Engineering Department's central files concerning various Canada Works and Neighborhood Improvement tree planting programs. In some cases, the correspondence indicates that neither policies nor procedures are well defined for these types of project.

In January of 1978, Alderman Harcourt chaired a meeting of a Council Subcommittee on downtown open Space and Tree Planting. In attendance at this subcommittee meeting were three alderman, two commissioners of the Park Board, and senior representatives from City Hall staff and from the Park Board staff, including the Executive Assistant to the City Manager, the City Engineer, the Associate Director for Central Area Planning, the Park Board Superintendent, and the Directors for Planning and Operations. Alderman Harcourt indicated that he had convened this committee to discuss the possible development of an open space and parks policy for the downtown "penninsula". Tree planting programs and procedures were discussed by the City Engineer and by the Superintendent of Parks. It was concluded that an adequate tree replacement program for the West End did not exist and that overall policies concerning downtown tree planting were poorly

focused. It is unfortunate that this sub-committee apparently met on only one occasion and no follow-through resulted. An attempt was made by the Streets Division of the City Engineering Department to activate an interest in preparing a report on the status of tree planting policy in the downtown area, as well as in other parts of the City. It is not clear that any further work was done on this request, first raised in February of 1978.

In June of that year, this consultant was retained by the Park Board to:

1. update and clarify the responsibility and roles of those directly or indirectly concerned with the street tree program;
2. to formalize policy, procedures, and practices; and
3. to prepare an organizational structure for planned maintenance of street trees.

In later correspondence within the City Engineering Department, it was noted that the study embodied in this report was to be conducted during 1978 and possibly 1979, and should incorporate the concerns expressed by the City Engineering Department regarding the large amount of City funds which were being spent for adjustment of sidewalks, collection of leaves, blockages of catch basins and obstructions in sewers due to tree roots. It was believed that the City is spending approximately \$1 million annually in the Engineering Maintenance budget, in addition to funds spent by the Park Board. It was also noted that during the discussion of several projects of a beautification nature, lack of a comprehensive City tree policy was an embarrassment. The lack of appropriate policies also precluded removal and replacement of trees where this would be appropriate for both Parks and Engineering.

No other important memos, correspondence, meeting notes or minutes were found that discussed the matter of recent boulevard tree policy. In effect, the program has grown to substantial proportions relying largely on de facto policy often developed to accommodate individual problems. No thorough review of the underlying premises that govern the program has been undertaken in recent times. The present perceptions as to policy needs have been limited to concerns over operating policy for particular facets of the program. It is assumed that formulating policies for these problem areas will resolve continuing aggravation on these topics. This writer does not feel that

this is necessarily so, since the policy process involves a large number of parties, often with competing goals, poorly understood by each faction. To single out a particular segment, for example tree replacement, without a comprehensive overhaul of the total perspective of boulevard tree management for existing and future sites is to court outright failure, or at least unnecessary disruption of the status quo.

It is apparent that the policy questions that embrace the boulevard tree program can be broken into a number of inter-related strata. As the ultimate authority for the boulevard tree program must rest with City Council who is responsible for approving funds for the program, the first level of policy direction must address the concerns of this elected group. Since the Boulevard Tree Program has largely been under the auspices of the Board of Park Commissioners who, in turn, must provide the philosophical direction for the program in consultation with City Council, this elected group must provide policy guidance for the aims and objectives of the program. In turn, the program itself must be explicitly managed by a policy framework that clarifies the approved modus operandi for the overall program and for individual components. These latter policies must embody the concerns of both levels of elected officials, as well as the mutual desires of various City and Park Board technical staff. Without such support, these policies will be ignored or abused and fall into disuse or disregard. In the light of this, the recommendations provided here are for discussion and are the perceptions of only one analyst as to a suitable policy framework for the City's Boulevard Tree program. It will be up to the various parties involved to delete, add or amend the package as necessary to provide a workable policy set for continuing development of the Boulevard Tree Program until 1990. It is suggested that in that year a major review of all basic premises of the program be undertaken, in order to re-assess the goals, objectives and policies for the following decade.

In order that the many parties and individuals which interact with the Boulevard Tree Program may ascertain the normal operating policies appropriate to it, the writer anticipates (and recommends) that the major program policies will be published in a City or Park Board document. It is not intended that the decisions reached by elected officials concerning the basic structure and financing of the program would necessarily form part of this public document. The normal avenues of public record will provide sufficient information on these deliberations. However, it is anticipated (and recommended) that major changes to policy will be discussed in open forum and will not be taken

in haste. A fundamental reason for this is that, as already discussed, management of trees is a long term enterprise. It is particularly important that major changes in direction do not destroy many years of careful planning and husbandry, without considerable forethought.

The last time that any major statement of policy for the Boulevard Tree Program was compiled appears to have been in the period 1960 to 1964, and is contained in two documents referenced in a Boulevard Tree Planting Report for the District of North Vancouver, dated 1965. Page 10 of that report records a summary of Vancouver policy prepared by W.C. Livingstone (then Supervisor of Parks and Boulevards) in February 1960, and a second compilation of policies of various civic departments and utility companies dated June 1964. Despite the specific references, it has not been possible to locate either documents from the Park Board file, the City Engineering central registry, or from the North Vancouver Municipal central registry. A summary by the North Vancouver report authors, however, suggested that the emphasis, in both documents, "is upon the negative aspect of control, of the problems and the collisions of interest that may occur with boulevard trees, rather than with any Program of tree planting." A full text of the report quotations is contained in Appendix 20. The fact that these policies were prepared at one time is important to an understanding of why the present boulevard tree resource is as it is today. It is therefore hoped that a continuing effort can be made to locate these policies and add them to the historical prospective contained in this report.

In order to prepare a comprehensive set of new, or revised, policy recommendations for the proposed, formal, BOULEVARD TREE PROGRAM for the City, a number of fundamental questions must be examined in light of all available explicit and implicit past policies. Moreover, a number of possible options need to be examined and some assumptions made as to the most likely and advisable policy choices for management of the resource, both internally and externally. The detailed Summary that follows in this section reviews the importance of a Program, suggests the responsibility of elected officials, the standing that might be accorded the Program, general funding, accountability for the Program, provision for a Boulevard Tree Master Plan, adoption of a new Boulevard Tree By-Law and approved of an operating budget for the program commensurate with the goal and objectives given in the Major Recommendations.

## Conclusions

Since the present boulevard tree program has developed from 1914 largely as an adjunct to the responsibilities of the Park Board and has been built up in incremental steps without major incident there does not appear to have been any occasion for the program to become a "political issue." Further, the quality of the City environment is largely a "soft but positive" political concern with a normal involvement of the political level of municipal government being restricted to resolving:

1. external problems of a discreet nature,  
for example, resolving the type of tree to be planted around the courthouse;  
developer removal of trees;  
private complaints; and  
Gypsy Moth spraying concerns.
2. internal problems of a discreet nature,  
e.g. budget review  
resolving interdepartmental responsibilities; and  
personnel appointments.
3. the position to be taken concerning the management of urban green space in the Party Platform at municipal elections,  
e.g. 1978 City Election  
NPA (Non-partisan Association) "Emphasis on maintaining and upgrading the existing Park Board resource";  
TEAM (The Electors Action Committee) "Developing a long range management plan for Stanley Park."  
VIP (Vancouver Independence Association) "A City-wide tree planting program; and  
Orchard parks with fruit and nut trees in various communities".  
COPE (Committee of Progressive Electors) "Increase the per-capita ratio of green space in the East End and improve the maintenance and upkeep of parks and streets"

Given an assessment that the Boulevard Tree Program has not normally been identified as a major election issue and given the present incremental budgeting system and a fairly conscientious arboricultural staff, there is little likelihood of the present Boulevard Tree

program reaching sufficient prominence (as a consequence of normal operation) to stimulate a thorough and fundamental review of policy. In fact, it must be noted (see also preceding paragraphs under Discussion) that it was staff concern (City Manager's Office, City Engineer and staff, and Park Board staff) that prompted an analysis of tree planting policy for City boulevards.

In the situation where a program is perceived by staff to require a policy review but where resolution of many of the concerns raised will require political input, the analyst is faced with a dilemma. To what extent should the underlying program policies be studied, and will the analysis itself constitute an unnecessary intrusion into a basically stable and appropriate function of the City's operations, giving it unwanted park prominence and exposing it to political expediency? This writer has tried to examine this question, and, in answering it, provide a detailed, rather than a superficial, analysis of the subject matter for each of the following sections and their supporting recommendations. An effort has been made to provide workable answers to almost all of the technical questions raised by report participants, both during development of the "concern lists" and as a result of the many interviews conducted with City and Park Board staff. In addition to providing these answers, an attempt has been made to stand back from the scale of individual problems and provide a broad, "politically" acceptable, yet contextual framework for the program, with a realistic and financially viable timetable for implementation.

The present program has had a long history of development without an explicit policy document and has managed to grow to a considerable size without it. It is that very size in terms of annual expenditures, resource value and number of trees that suggests a review of program policies is now necessary. Coupled with the continuing need for fiscal restraint and a change in the patterns of City growth and the retirement of key arboricultural personnel in the Park Board, now would seem an opportune time to assess those basic policies that do, or should, provide the principal direction for the program as well as those policies



that are intended to ensure continuity of day-to-day operations.

There are, therefore, some important and fundamental policy questions which underline the operation of the present program and the application of any solutions to problems arising from present practice. These questions are, in large part, "political" questions. That is, the resolution of them is outside the realm of responsibility for appointed staff and the final decision on any new courses of action, if any are needed, must rest with elected officials. It must be noted, however, that although these questions have been raised, there is no absolute compunction that they must be answered. It is quite possible that, with the exception of a new Boulevard Tree By-Law, the present management infra-structure could be modified to affect improvements without radically changing the present, implicit, fundamental policies that the program has developed around since 1914. It becomes, therefore, a major policy decision whether or not the Boulevard Tree program is of sufficient importance to the City to warrant a full examination of policy questions at this level and whether elected officials and city staff should participate.

1. It is suggested in this report that the present boulevard tree resource makes a very considerable contribution to the appearance, economy and liveability of the City of Vancouver. With proper management, leadership and recognition, it could make a substantially greater contribution without greatly increased funding. Moreover, it seems crucial, over the long-term, that the tree program exist as a consequence of merit and at a level commensurate with the needs and priorities of the City as judged by those elected to manage Vancouver's municipal affairs. It is in this context that the following policy questions are posed.

It can be readily concluded from the preceding Discussion in this section that the paramount policy question must be whether there should be any type of Boulevard tree program in the City? Does the contribution that the program makes, or could make to the City, outweigh the cost and is such a program consistent with other City policies? The boulevard tree program at present costs the City taxpayer almost \$500,000 per year in a City with a budget of \$182,000,000, including a proposed Park Board expenditure of about \$8,500,000.

Thus, the tree program represents 1/17th of the Park Board budget to maintain 140,000 trees worth almost \$50,000,000 in replaceable value, or put another way the program costs about \$1.22 per capita per annum. It can certainly be said that Vancouver would be a different city without any boulevard trees, but without a thorough survey it is difficult to say if citizens feel that the actual or perceived benefits from boulevard trees outweighs their cost of maintenance.

Is the program compatible with other City goals? It certainly appears to be. As the concluding paragraph from the Mayor's 1979 report noted, "We want to maintain Vancouver as the very liveable City that it is and we also want to encourage the improvement and development of our city so that it can fulfill its great potential for the future." Considering these points and the many requests that the Park Board receives for tree planting, there seems little doubt that there is a strong desire on the part of many citizens for some sort of Boulevard Tree program.

The following assume that a Boulevard Tree Program is desirable and bear on the methods that might be adopted to implement that desire. Alternatives range from the present method where the Boulevard Tree Program is only an adjunct of the Park Board responsibilities and must defer to conditions and restraints applied by all other City departments, to a formalized BOULEVARD TREE PROGRAM with a City Arborist, a highly trained and skilled team of arboricultural employees offering a service to all City departments, and a written Master Plan for boulevard development as an integral component in the management of green space throughout the City.

2. The second major question on policy then, concerns the standing that Boulevard Tree Program should be accorded. Should the program be an identifiable discreet entity with a planned mission and mandate, or should it continue in its present relatively low key form albeit with some changes to the methods of management? The question is important, not in the simple difference between a BOULEVARD TREE PROGRAM or a "tree program" but in substantive areas such as the scope of goals and objectives, public identity, public documents, organizational and management plans, funding, and perhaps most importantly in the context

of stature within the City. If it becomes a formal Program (as is recommended in this report), it receives political, public and media recognition, clearly defined targets of operation, and presumably a program status more likely to receive proper funding commitments. In addition a formal program provides a more substantial basis for operation vis-a-vis other City departments, which would be a considerable psychological boost for the arboricultural staff. In return, a formalized BOULEVARD TREE PROGRAM must offer much wider accountability than as a normal function of the Park Board and provide considerably improved standards of care for the boulevard tree resource.

3. The third question is one that is crucial to any decisions affecting change or improvement to the present program. How should the boulevard tree program be funded? Historically, funding has come, in full, from City Council with the exception of neighborhood improvement works and some employment programs where some costs have been shared with the Federal Government.

Experience in other municipalities in Canada is that private tree planting and, for that matter, maintenance, gives widely different results depending on the interest and ability of individual homeowners. This method is now rarely accepted as a city-wide method of supporting a tree program particularly in larger municipalities. Those municipalities which have tried raising funds for tree work by special assessment or local improvement initiative have found that administrative costs outweigh the income from such taxes, and that there is often erratic interest across the spectrum of income or ethnic groups in the City for local beautification even when various subsidies or incentives have been tried.

Since a firm recommendation of this report is for a Boulevard Tree Master Plan to be uniformly administered by the City, and since many citizens in the past have benefited from tree planting provided by the City, it would seem both imprudent and inequitable to suggest that further establishment or replacement funding should come from other than the general tax base. Provision has, however, been made in this report for other levels of government,

companies or citizens to contribute to the City program through the mechanism of a Boulevard Tree Trust Fund. Some suggestions have also been made on providing additional monies to the fund, particularly from visitors, in order to provide additional income for improvement of those high priority areas that are so designated because of tourist use. (Examples are arterial roads, Gastown, Chinatown, and the central business district etc.)

Maintenance has always been an extremely difficult element of boulevard tree operations. Historically it seems to have suffered more than most in being underfunded. In the past, the Park Board budget has included all aspects of tree work as one entity and the difficulty in obtaining separate figures (see also comments under the section on Procedures) has meant that true costs are hard to isolate. Consequently, the Park Board has had great difficulty in making an adequate argument to Council for a properly funded maintenance program.

As with new planting and tree replacement, the same arguments can be made against private maintenance of boulevard trees. The financial burden on individuals for maintenance of large trees would be totally inequitable, while the variable knowledge and skills of the general public would not allow for adequate maintenance for trees in a resource as uneven and large as that in Vancouver. Thus, depending wholly on private maintenance would not seem to be a reasonable alternative. Shared maintenance, that is watering and fertilizing by citizens with pruning and repair done by the City, is tried in some U.S. localities. However, with the large number of young trees in the Vancouver resource and a substantial investment required to plant even a single tree, it seems inappropriate to leave partial, yet crucial, maintenance to the whim of individual property owners.

There remains two further obvious possibilities for raising monies for maintenance. Boulevard tree maintenance could be paid for from a frontage tax levied on each property in the City or, as with planting and replacement, maintenance could be paid out of general revenue. From a historical standpoint, it appears that in the period 1917 to 1920, an agreement was reached between Park Board and City Council for a frontage tax

to be levied for maintenance. However, it seems that that tax was never implemented. The argument has been made again recently that there is reason to consider such a tax, particularly in residential areas where abutting property owners would have a greater incentive to look after their trees and report damage if they saw they were making a financial contribution to maintenance of their own boulevard area. The corollary to this is that individual owners will demand a level of maintenance and service that the Park Board staff could not reasonably hope to meet at least with current staff, equipment and training. This latter argument does not carry great weight when considered in the context of a general move toward improved boulevard maintenance and (as suggested in this report) desire on the part of the Park Board for more public input on the condition of trees. However, the limitations on the use of a frontage tax seem rather more basic. The cost of administration of frontage tax appears to outweigh the income that would be required from each property to pay for the Boulevard Tree Program and, moreover, at a time of financial austerity any new tax particularly on property owners, would not be politically attractive in any way.

Again, it appears that the most favored alternative is to pay for boulevard tree maintenance out of general revenue. This would allow a detailed anticipatory maintenance plan to be prepared and City-wide standards to be applied for all arboricultural work on City trees. Recommendations in this report suggest a move away from the present reactionary maintenance program, more detailed recordkeeping on productivity, costs and needs, as well as work standards, and it would not appear possible to implement these recommendations without a firm funding base. Once the Boulevard Tree Master Plan is prepared and a full workload analysis and detailed maintenance budget for the Boulevard Tree program prepared, it will be possible to advise City Council as to the anticipated costs of maintenance for any given standard of care and to project effected budget requirements for five and ten year time spans for any given rate of resource growth.

4. The fourth important policy question concerns the assignment of responsibilities for the program. The City Engineer has noted (incorrectly) that he is given responsibility for the boulevard tree program in the City Charter and that the Park Board act only as the Engineering Department's agent in carrying out the work. It is quite clear that in 1913 City Council gave the responsibility for the maintenance of boulevards in the City to the Park Board. (See also the Discussions section of this chapter, the present Boulevard Tree Bylaw, and associated appendices)

Presumably the boulevard tree program could be operated in full (as it is in many smaller cities) by the City Engineering Department. However, many of the larger municipalities both in Canada and the United States, though they may have originally given boulevard tree responsibility to the engineering department, have found that even with qualified arboricultural staff such departments inevitably make engineering decisions regarding the tree resource with no effective counterbalance to arbitrate disputes that arise out of questions of engineering necessity versus public desire for tree preservation. In addition, the time-consuming nature of tree work and the specialized knowledge needed to manage a large tree resource is not often to the liking of engineers and, consequently, such a boulevard tree program often has a diminished status compared with engineering priorities. Thus, most larger municipalities have now either an independent city arborist reporting to the city council to oversee the management of the tree resource by the city engineering department or the responsibility for the program has been given to a parks and recreation department with the proviso (as is recommended in this report) that appropriate procedures are established to ensure that engineering requirements are adequately incorporated into tree program decisions.

A third option toward boulevard tree maintenance is for the complete program to be contracted out either as a whole or by individual management sections. If there were sufficient quantity of arboricultural contractors in the City at present with appropriately trained staff, there might be some merit to this approach. However, at present few contractors of sufficient size and expertise exist in the Lower

Mainland and a major contract, such as that for any of the management sections of the City, would probably cause unnecessary disruption to other users and/or unqualified workers would be brought into the system potentially exposing boulevard trees to irreversible and damaging workmanship. Moreover, contract work would still require a sizeable City staff to prepare arboricultural specifications, administer contracts and provide the necessary supervision or inspection of work, thus, jeopardizing any potential savings that might accrue from the use of independent contractors.

5. The fifth question of policy concerns the desirability or otherwise of having a Tree Commission or similar body (normally of a non-political nature) to administer or oversee the City tree program. This approach seems to work well in small American cities, but would demand considerable time from Commissioners for a city the size of Vancouver. It is perhaps doubtful if another administrative body would necessarily yield any management advantages since there are already many groups with functional responsibility for the Boulevard Tree Program or parts of the program already involved (see also Appendix 40). A variation on the Tree Commission theme is to have a Technical Advisory Board but again conflicts of responsibility and time demands often negate their effectiveness. This report recommends that the first crucial area where advice should be solicited is in the design stage and recommendations are made for a design committee made up of Park Board staff, City staff, appropriate professionals (architects, landscape architects, planners, etc.) and local citizens (area planning committee, local businessmen's associations, ratepayers etc.) to prepare appropriate area designs (including documenting existing designs and preparing placement planting designs) for inclusion in the Boulevard Tree Master Plan.
6. The sixth question is one that relates to the last part of the previous question. Should there be a Boulevard Tree Master Plan or should the planting of the City be allowed to develop as the arboricultural staff feels appropriate? At present the program has no defined form, particularly in writing, and consequently there is no overall plan that other City departments, planners, developers, architects, landscape architects, business, industry or the general public can review. Consequently, questions that arise concerning design emphasis, locational emphasis, planting or replacement,

and resource stocking in various neighborhoods can find no coherent answer.

Without major cost or time commitment, it would seem possible to prepare a thorough and ascertainable plan for planting and replacement of boulevard trees in the City, while at the same time providing a clear picture, expenditure and staffing that would be required to implement the Program.

7. The seventh question bearing on policy concerns the most appropriate mechanism to control and regulate the interaction between the general populus and the boulevard tree program. Although public education as to the desirability of boulevard trees and the benefits that they yield is an important component cannot alone provide the degree of protection necessary to ensure that the public resource is safeguarded from the undesirable actions of individual citizens. The most common approach to ensure control of the resource is the adoption of a Boulevard Tree By-Law. Such bylaws may either be restrictive or permissive in nature and provide a broad range of regulation and protection for the resource. Vancouver has had such a Bylaw since 1917 (see the following section) but it has not been used extensively. In fact, in recent years it appears to have been completely dormant. This being the case, it is reasonable to ask whether such a Bylaw is necessary. The present condition of the resource does, in part, attest to the need for and the use of a Boulevard Tree Bylaw in Vancouver. For example, vandalism is high, little protection is offered or required for trees during construction activities and trees are often damaged through carelessness or thoughtlessness. Further, citizens planting inappropriate species on the City boulevards is an increasing problem, the lack of clear public responsibility regarding boulevard maintenance has meant that in some areas of the City tree lawns have become particularly unsightly, and the lack of an adequate procedure to regulate developer planting has been an embarrassment in some recent projects. All of these subjects along with appropriate responsibilities and stipulations for the Boulevard Tree Program would normally be set out in a modern Boulevard Tree Bylaw and therefore relieve both elected officials and City or Park Board staff from any of the pressures arising out of present ad hoc regulation of the resource.



8. The final question of policy concerns the provision of adequate City funds for the Boulevard Tree Program, both in the form of an annual budget and as a commitment over the next few years in order to carry out the major recommendations in this report and ensure that sufficient planning and inventory work is carried out to enable the Park Board to table a complete Boulevard Tree Master Plan by 1985.

Since the budget process to date has been of an incremental nature, no searching review has been made in recent years of the aims and objectives of the City-wide Boulevard Tree Program. This report recommends a more definitive and distinctive role for the Program in coming years. It is no doubt politically possible to endorse such an approach with considerable outward enthusiasm, yet not provide any follow-through in the form of committed funds. There is a duality of responsibilities here - the Park Board must come up with detailed budget needs for the program for City Council to respond to, while City Council must be prepared to assume a commitment toward longer planned goals and, as a matter of policy, provide annual funding commensurate with the approved program. In setting the annual budget, particularly during a period of fiscal constraint, City Council must have a clear understanding of priorities both between and within various programs. In the case of the Boulevard Tree Program, it is recommended that at first, emphasis should be given to improving the condition of the existing resource rather than increasing the overall number of trees in the City and, in addition, that areas of high intensity use should have priority over purely parochial needs until detailed designs are completed.

#### Recommended Policies for Attention By City Council

1. In order to ensure the continuing development of an identifiable, self-contained, well managed and viable boulevard tree resource, it is recommended that City Council continue the present approach on planting and maintaining trees on City boulevards, and endorse formalizing the present activities as the City of Vancouver BOULEVARD TREE PROGRAM. Further, it is recommended that it be City Council policy to adopt clear goals and objectives for the Boulevard tree program in order to provide the leadership, endorsement and basic guidance required for the first five years of the formalized program.

2. In order to ensure continuing and appropriate funding for such a Program, it is recommended that it be City Council policy to:
  - (I) provide all major funding for tree planting, tree maintenance and tree replacement within the street allowance from general revenue. The one exception would be where a proponent is willing to enter into an agreement with the City to pay the full cost of establishing boulevard trees to a standard approved by the City Engineering Department and the Park Board;
  - (II) provide sufficient funds in the 1980 budget to embark on the recommendations embodied in the five year timetable outlined in this report;
  - (III) require by 1983 the submission of a detailed boulevard tree budget linked to workload and the proposed projects to be contained in the Boulevard Tree Master Plan. Also, by 1985 to prepare a full five year budget for proposed expenditures on the boulevard tree program up to and including 1990;
  - (IV) take advantage of any Provincial or Federal funds that are available, appropriate and compatible with the Boulevard Tree Master Plan and the goals and objectives of the boulevard tree program;
  - (V) encourage the Park Board to ensure that, wherever possible, every effort is made to recover external costs imposed on the program and to maximize any financial returns that can accrue from the boulevard tree resource;
  - (VI) endorse the formation of a Boulevard Tree Trust Fund that would allow donations to be made to the City for the continuing improvement of the boulevard tree resource;
  - (VII) at the present time, there are a number of City expenditures external to but occasioned by the boulevard tree program. These costs, such as street light pruning and some sewer

maintenance, are not paid for out of the boulevard tree program budget. Similarly, some funds for tree planting are provided for through monies budgeted by the City Engineer or by the Planning Department. It is recommended that City Council support the consolidation of all establishment, maintenance and replacement costs for the Boulevard Tree Program under one budget submission by the Park Board in time for the 1981 budget review process.

3. It is evident that the major expertise, interest and historical association in planning and development of the existing boulevard tree resource rests with the Park Board. It is quite clear that in early development of the program City Council vested the responsibility for such development in the Park Board. It is therefore recommended that City Council reaffirm that it delegates to the Park Board full responsibility for management of the boulevard tree resource. It is further recommended that, although the Park Board may be the lead agency in this regard, it be clearly City Council's policy that the Park Board must consult with other City departments in the execution of this responsibility and that the delegation of this responsibility is not in conflict with the statutory duties and responsibilities of the City Engineer to ensure the proper and safe overall management of City streets.
4. At present there is very little direct public input into the decision-making process for the Boulevard Tree Program. In the case of Vancouver, with much of the City already planted and many administrative groups already involved, it is not felt that a City Tree Commission is warranted. Instead it is recommended that a design panel, or panels, be established with membership from appropriate City departments, Park Board staff, appropriate professionals and local interest groups, and that these panels be charged with preparing design recommendations for areas yet to be planted on City boulevards, for areas of special importance, and for the systematic replacement of trees in areas where the existing resource is decadent or over mature.

5. In the past, City Council has become directly involved in a number of issues arising from the management of the boulevard tree resource. Since it is recommended in this report that City Council reaffirm its delegation of full responsibility for the program to the Park Board, it is recommended that it be Council policy to deal with such issues only as a last resort and that in general it entrust the Park Board or the Park Board Commissioners to find an appropriate solution to complaints and concerns. However, it is recommended that, if it is clear that no such resolution of a problem can be obtained after a full and thorough effort by the Park Board, then City Council should act as the final arbitrator. In addition, it is recommended that any technical conflicts that arise between City staff and Park Board staff should first be arbitrated by the City Manager but, in the event that questions of policy arise that cannot be resolved, these should be dealt with by liaison committees of the Park Board Commissioners and City Council or, failing resolution at this level, by City Council as a whole.
6. In order to provide a clear and concise plan with an appropriate timetable for the improvement and continuing management of the City's extensive boulevard tree resource, it is recommended that it be City Council policy to support the initiation of those projects required to establish an adequate inventory, workload analysis, work standards and design background for the preparation of a complete Boulevard Tree Master Plan by 1985.
7. Although there is a City bylaw concerning boulevard trees in force at present (Bylaw # 940 including Amending Bylaw #1293), it is recommended that City Council replace this bylaw with an new bylaw containing provisions appropriate to present policy and circumstances. Further, it is recommended that City Council consider amending the existing Tree Destruction Bylaw (#1525 as amended by #3178) to an Urban Tree and Forest Bylaw in order to provide adequate regulation of all trees within the City boundaries. In particular, it is recommended that trees of significant historical, horticultural or visual interest be protected

8. and that a fund be provided for within the By-Law for long term maintenance of such trees, be they on private or public property.

It is recommended that City Council consider the Boulevard Tree Program as only one component in a much broader initiative to improve the visual and environmental quality of the City. In particular, it is recommended that City Council provide municipal leadership by:

- I. emphasizing high quality and standards of design and maintenance on all City property;
- II. identifying and improving appearance of City property that is presently derelict;
- III. actively enforcing the landscape maintenance provision of encroachment agreements;
- IV. encouraging the Engineering Department of the City to work actively with the Park Board to improve the standards of private and City care for tree lawns, triangles, street ends, and mini-parks, etc.;
- V. more strictly enforcing the provisions of the Provincial and Municipal Litter and Health Regulations; and
- VI. through a program of public recognition and awards providing incentives for other levels of government, industrial, commercial and residential landowners to upgrade the appearance and quality of their own property.

The costs associated with such a program would be negligible in comparison with the returns from increased employment, strong economic health of the City, international visitor recognition, and improved Civic Pride. Not only is this recommendation of importance to residents and business, but the benefits which will accrue from tourism, particularly if the major expectations associated with the new multiplex, winter games and transport exposition are realized, will have far-reaching economic stimulus for all sectors of the City.

Coupled with Council's existing interest in architectural excellence and innovative development, plus Vancouver's unique setting, and a creative plan, enthusiasm and responsive leadership for green space development and maintenance, this City has every opportunity to be the leader in North American urban living.

9. It is recommended that City Council should consider a specific mechanism for maintaining an interest in, and liaison with, any developments that arise as a result of the many suggestions contained in this report. In the past a number of temporary and standing committees have had some involvement with various components of the program. To make a specific recommendation in this regard would not be appropriate, however it is strongly recommended that City Council discuss and adopt an appropriate procedure for overseeing, in conjunction with the Park Board, the continuing status and development of the City's Boulevard Tree Program.
10. It is recommended that City Council rescind its present policy of requiring the Park Board to come before Council with all requests for tree removal in the West End. This policy has had a chilling effect on proper tree management in the area and many examples of gerontic, overmature, hazardous, unsightly and in some cases dead trees remain because of this ruling. It is recommended that Council consider the West End and the Downtown Business District as one of the first management areas that should be tackled in the preparation of appropriate designs for Boulevard Tree Master Plan and, in addition, for implementation of the recommendations for workload analysis, tree inventory, limited community involvement with the planning process, improved standards and intensity of maintenance, tree replacement, and tree warden inspection.

#### Recommended Joint Policies Between City Council and the Board of Park Commissioners

1. In accordance with the provisions of the Street and Traffic Bylaw (#2849 and including Amending Bylaw #5122), and the revised Boulevard Tree

Bylaw, it is recommended that it be a clearly stated policy of City Council and the Board of Park Commissioners to allow no planting within any street allowance in the City where that planting is in conflict with approved Boulevard Tree Master Plan designs, street safety requirements, or Park Board maintenance specifications. It is recommended that any such planting that is not a curbside boulevard tree must be the subject of an Encroachment Agreement approved by the City Engineer and the Superintendent of Parks, containing explicit maintenance practices and schedule. Failing to maintain such encroachments should negate the agreement. Further, it is recommended that it be City Council and Board of Park Commissioners policy to allow no private or commercial trimming, pruning, spraying or other maintenance of any type on curbside trees on City property without the expressed agreement of, and a permit from, the City Arborist.

2. Although at present the majority of residents in the City maintain their tree lawn in good condition by mowing the grass and controlling weeds and many take some interest in providing water for boulevard trees, there appears to be no City requirement that this be done. Some properties, particularly those for sale, vacant, or in a general derelict state allow their part of the street to become overgrown, untidy and in some instances unsafe. It is therefore recommended that it be City Council and Board of Park Commissioners policy to require the owners of any parcel of real property to maintain the growing area between the property line and the curb and coinciding with that property line in a neat, weed-free manner. Further, if such maintenance is not undertaken it is recommended that provision be made for City forces or a contractor to carry out the work and for the City to recover the costs of proper maintenance from the property owner. In order to ensure that this policy is properly executed, it is also recommended that the City Engineer and the Superintendent of the Park Board designate staff in their Departments responsible for co-ordination and inspection of such properties in the City and that an appropriate procedure be developed to ensure that this policy is properly implemented.

Recommended Policies for the Board of Park Commissioners

1. As trees grow older, they become structurally weakened. Some species of tree are more prone to decay than others. In addition, poor pruning practice in the past has caused many large trees on boulevards within the City to have internal and/or external cavities. Coupled with these conditions and the death of trees from stress, disease, insects or injury, there are a number of trees on City boulevards that may now constitute a safety hazard. All arboricultural work, particularly that employing aerial work and cutting tools, is both strenuous and potentially hazardous. This is particularly true when work is required in ailing or dead trees.

It is therefore recommended that it be Park Board policy to ensure that safe trees, public safety, and staff safety be paramount considerations in the management of the boulevard tree resource. In order to sustain this policy, it is recommended that all trees in the boulevard tree resource should be inspected and their general condition recorded at least once every three years. Further, it is recommended that any individual tree or species of tree thought to require more frequent inspection, be inspected at least once each year and the results of this inspection recorded and maintained as an ongoing record.

2. A major flaw in the present system of boulevard tree management has been the lack of an adequate overall record system that compiled information on the status of the program in insufficient detail as to allow informed decisions to be made on many aspects of necessary work. Specific recommendations to remedy this situation are contained in the body of the report, however, it is recommended that it be policy of the Board of Park Commissioners to require a full and accurate accounting each year concerning all pertinent aspects of the Boulevard Tree Program, consistent with normal business practice, and that an annual statistical summary be prepared for presentation and review by the Board.
3. Despite the continuing desire by many to expand the boulevard tree resource, including some beautification planting under various procedures, it is



recommended that it be the policy of the Board of Park Commissioners to de-emphasize all new planting after the Chinatown program except that associated with the residential curb and gutter program until such time as there is:

- I. a re-organization of staff responsibility in the Arboricultural Group has been completed;
  - II. adequate trained staff to ensure proper maintenance of young trees;
  - III. at least a first draft of appropriate area design recommendations for priority locations to be included in the Boulevard Tree Master Plan;
  - IV. a substantial improvement in the quality of care for those trees already existing on City streets; and
  - V. adequate supply of appropriate tree species of sufficient size to ensure minimum vandalism and a maximum resource diversity.
4. Even without any new planting, there is a substantial replacement planting requirement for individual trees that are:
- a) missing
  - b) damaged
  - c) mutilated
  - d) causing physical damage to streets or sewers
  - e) diseased
  - f) dead.

It is, therefore, recommended that it be the policy of the Board of Park Commissioners to support individual replacement planting before any attempt is made to effect silvicultural replacement of large blocks of undesirable or overmature trees. It is further recommended that it be the policy of the Board of Park Commissioners to ensure that, wherever possible, larger caliper trees of appropriate species are used in the individual tree replacement program. Once individual tree replacement is largely completed and, in conjunction with the recommendations of the Boulevard Tree Master Plan, it is recommended that it be

policy of the Board of Park Commissioners to initiate a systematic plan for a replacement of full blocks of trees where their age, species, condition or conflict with overall management of the street right-of-way, so requires.

5. In administering the City Boulevard Tree Program, the City and its respective agencies and agents incur specific responsibilities and liabilities. It is recommended that it be the policy of the Board of Park Commissioners to fully inform Park Board employees as to the status of their liability for each particular function and to determine the legal position concerning operations of the Boulevard Tree Program and, if appropriate, to take specific steps to reduce any hazard, risk or liability.
  
6. Significant and costly conflict exists between boulevard trees and aerial services, such as hydro wires, transit wires and, to a lesser extent, telephone and cable television systems. It is strongly recommended that it be the policy of the Board of Park Commissioners for the Board to work actively with these utilities to minimize operating conflicts and, in conjunction with the appropriate staff in the City Engineer's Department, to establish design standards, relocation plans, tree replacement recommendations, and maintenance procedures that will allow these facilities to operate in a manner compatible with the aims and objectives of the Boulevard Tree Program. Some City trees on City boulevards are presently pruned by commercial contractors employed by B. C. Hydro in order to obtain electrical clearance for hydro conductors. The standards, practices and methods of pruning used by a number of these contractors have been extremely poor (although it should be noted that there have been few incentives and little supervision to ensure that proper arboricultural practice was followed). It is therefore recommended that it be the policy of the Board of Park Commissioners for the Board to undertake the bulk of hydro pruning on City trees using Park Board staff and equipment, and, when contractors are to be employed on this work, that they must meet written arboricultural standards prepared by the Board and be vigorously supervised to ensure that City trees are not mutilated.

7. There is a magnificent spectrum of deciduous tree species that will grow in the Pacific Northwest. Many are completely unsuited for use on city boulevards because of undesirable characteristics, ranging from massive size and vigorous rooting habits to production of undesirable fruit and seeds, or because of insect and disease associations. It is recommended elsewhere in this report that proper tree profiles be prepared for all candidate boulevard tree species. It is also recommended in this report that particular species, cultivares or hybrids with known growth habits be tailored to the constraints and uses of each specific street location during the design process for the Boulevard Tree Master Plan. It is therefore strongly recommended that it be the policy of the Board of Park Commissioners to have planted or permit to be planted, only those types of tree that are completely compatible, over an adequate time horizon, with each location chosen for both new planting or replacement planting.
8. The continued planting of new trees, the lack of an overall plan for maintenance and an obvious discrepancy between workload and staff productivity has put considerable stress on maintenance resources. As a result, much of the present maintenance work on boulevard trees has been of a reactionary nature, responding to requests as they accumulated, or to trees in a condition far past the time for normal maintenance. Further, there has been little concerted effort on the part of other City Departments to provide sufficient lead time to the Arboricultural Group regarding tree work necessitated by street operations. It is therefore recommended that it be the policy of the Board of Park Commissioners to have prepared complete anticipatory maintenance plans each year for each district and to ensure that the requirements of all City Departments for known projected work are properly included. It is further recommended that these initial anticipatory maintenance plans be upgraded once the proposed boulevard tree inventory and workload analysis are completed, to become five year projected maintenance plans, incorporating as much information on City development as

possible. These plans could then be updated yearly in conjunction with the completion of each Department's annual budget and the budget approval process to become new five year budget projects.

9. It is clearly the responsibility of the City Engineer and his respective Departments to designate trees that must be removed if they interfere with engineering work, utility work, street safety and street widening. However, in many instances, individual trees or rows of trees can be saved or recycled if appropriate practices are employed or alternative solutions found. This can save the City substantial direct costs and, in some instances, an almost irreplaceable resource. The two crucial elements in ensuring that this is done, wherever possible, are adequate lead time and interdepartmental co-ordination. It is therefore recommended that it be the policy of the Board of Park Commissioners that no trees on City streets be destroyed without the joint and express concurrence of the Superintendent of Parks and the City Engineer, and that, with the exception of emergency situations, any City Department wishing to remove a boulevard tree must contact the City Arborist twenty working days prior to the anticipated start of work and that the trees in question be inspected by the City Arborist, or his designate, and a representative of the Department involved. Where the removal or destruction of a tree or trees is requested by parties other than City Departments, it is suggested that it be the policy of the Board of Park Commissioners to require full compensation for the installed replaceable value of the tree or trees lost and that such monies as are remitted in settlement be added to the Boulevard Tree Trust Fund.
10. The City has a large number of planter boxes of various types, particularly in the downtown area. These planter boxes are not an attractive addition to the City at present. They are, however, set at strategic corners and at some locations where it is not possible to plant boulevard trees. Although they require relatively expensive annual maintenance, they could make a unique visual contribution to the downtown area. It is recommended that it be the

policy of the Board of Park Commissioners to have these planters intensively managed and to have them maintained to a standard that makes them a colorful and pleasing contribution to the City environment.

11. Responsive and responsible communication between the Arboricultural Group and the general public is a basic essential in nurturing the support and aid that the Boulevard Tree Program must have in order to survive politically and operate efficiently. Public support for trees is extensive. At present the rewards from public input and enthusiasm are negated by inefficient, bureaucratic or non-existent communication from the Park Board. The present procedure for recording public calls regarding boulevard trees is for them to be noted in the Sunset Nursery on pink telephone slips. This system comprises the principal method for logging and responding to requests for boulevard tree work or reports on damaged trees. As a consequence no systematic procedure has been developed to catalogue, identify or respond to public inputs. It is therefore recommended that it be the policy of the Board Commissioners to:
  - I. actively solicit help from the general public regarding the condition of trees on City streets;
  - II. ensure that a reply card indicating the status of the concern, complaint or information requested be sent out to each contact. In each case, these reply cards should indicate an approximate date when the Park Board anticipates being able to respond. (This recommendation is made with the proviso that as the workload analysis is completed in each district and anticipatory maintenance plans prepared, individual requests or recommendations for tree work will be logged and incorporated in the appropriate maintenance plans;
  - III. ensure more efficient operation and communication by having each permanent vehicle operated by the arboricultural group fitted with two-way radios allowing the Sunset Nursery to act as a dispatching office for priority work;

12. An even balance must be maintained between political representation, particularly within districts, and the overall benefits of consistency and continuity that flow from explicit policies and procedures. In order to ensure that the policy-making process does not yield to expedient change without serious and thorough thought, it is recommended that the Board of Park Commissioners require a two-third majority of the full Board to change any procedures and policies set down by it or approved for incorporation in the Boulevard Tree Master Plan.

#### Public Policies for the Boulevard Tree Program

1. This report recommends to Vancouver City Council that the Boulevard Tree Program should be seen as only one part of a broader approach toward improvement of the City environment. Similarly, it is recommended to the Park Board that the Boulevard Tree Program should only be one part of a more comprehensive plan for their management of green space in the City. At present, no overall scheme exists to identify, establish, protect, improve, maintain or replace the publicly owned tree resources of the municipality. Consequently, tree removal outdistances tree replacement and few areas are managed to their silvicultural, social or aesthetic optimum.

In the context of this report, it is recommended that it be Park Board public policy to manage all of its tree resources, particularly those in urban forest (as for example Foreshore Park), those that provide screening and wind breaks (for example at Jericho Park), those in complete woodland cover (for example at Stanley Park) and those individual trees in parkland, or on the undeveloped land owned by the City, in a manner consistent with recognized silvicultural practice for sustained resource management in intensively used areas. It is envisaged that eventually each area under the jurisdiction of the Park Board that is in tree cover or has had amenity trees planted would be identified, inventoried and managed under a detailed City of Vancouver Urban Forest Management Plan. The Boulevard Tree Master Plan would then form

one part of this public and documented scheme for tree management in the City.

2. There are a number of special programs for improvement of the City that have been developed by the Planning and Engineering Departments. In addition, there are a number of ongoing programs such as street cleaning and litter collection intended to maintain the general appearance of the City. It is recommended that the Park Board thoroughly examine these external programs and:

- I. determine where related Park Board programs or ongoing work may fit into the broader goals and objectives of the City Council with regard to improved appearance of the City environs;
- II. establish appropriate priorities for all associated Park Board programs that fit into this broader framework; and
- III. determine what new Park Board programs or upgrading of existing programs might be appropriate.

It is recommended that it be Park Board public policy for the Superintendent and his staff to work closely with the City Engineer, the City Planner and the general public to establish and develop a coordinated approach to an improved appearance for the City, with the projected Boulevard Tree Master Plan being one component in this broader contribution of ideas and plans for maintaining and improving the City environment.

3. The historic and visual character of Vancouver is substantial and well known. In order to preserve individual specimens or groups of trees of historic, horticultural or visual importance, either on private or public property, it is recommended that it be the public policy of the Park Board to work with the community under the Heritage Conservation Act or an appropriate By-Law, to identify, protect and maintain such trees as a living resource for the enjoyment of all citizens.

4. A central theme in this report is a need for clear, concise goals and objectives for the Boulevard Tree Program and for a detailed Boulevard Tree Master Plan containing approved designs for specific parts of the City with a timetable for their implementation. It is therefore recommended that it be the public policy of the Park Board to adopt, in conjunction with City Council, explicit goals and objectives for the Boulevard Tree Program and to support the preparation of a City-wide Boulevard Tree Master Plan by 1985.
5. It is suggested in this report that there has been a subtle yet general decline in the quality of the tree resource in the City. It is recommended that it be public Park Board policy to ensure that all trees in the City boulevard tree resource are safe, healthy and properly maintained and that a high standard of arboricultural workmanship provided by Park Board staff.
6. Although it is realized that a few people do not particularly like trees and that some species of tree presently growing on City boulevards are not the most suitable, with time it is expected that most undesirable trees will be systematically replaced. It is therefore recommended that it be Park Board public policy not to remove or heavily prune trees because of individual complaints, unless a particular tree is hazardous or causing structural damage to property or services. However, it is recommended that it be public Park Board policy to minimize the undesirable effects of overhanging branches, shade, leaves, and root growth from boulevard trees, when requested to do so, but within the limitations set by the proposed anticipatory maintenance scheme. It is also recommended that it be public policy of the Park Board to limit arboricultural work on private property, undertaken by Park Board crews, to these specific problems and to authorized pruning or trimming of private trees that have encroached into the boulevard right-of-way affecting either street lights or boulevard trees.
7. The Park Board is the lead agency in the maintenance of all plant material on public property in the City. In assuming this responsibility, the



Board must be prepared to provide sound horticultural and arboricultural practice and high standards of workmanship. It is, therefore, recommended that it be Park Board public policy to employ a professionally qualified City Arborist and a professionally qualified Urban Horticulturist to provide the technical management necessary for its programs. Further, it is recommended that it be Park Board public policy to ensure that every effort is made to employ skilled staff in its field operations and that appropriate ongoing training and safety programs are developed to ensure that the Board maintains safe, healthy trees consistent with the goals and objectives of the Boulevard Tree Program.

8. In order to ensure a quality of workmanship on trees in the City consistent with the advances in arboricultural knowledge and the objectives of the City tree program, it is recommended that it be the public policy of the Board to work toward a provincial licensing and certification scheme for all tree companies and tree workers engaged in tree work. In conjunction with this policy, it is recommended that the Board advocate an appropriate training and accreditations scheme be implemented by the Provincial Department of Labour in order to support the company licensing program and ensure that individual arborists receive a planned program of instruction.
9. Many trees in the City have been badly mutilated by companies purporting to have arboricultural experience but, in fact, demonstrating little or no knowledge of appropriate tree care or pest management. In order to overcome the problem of inappropriate arboricultural work, often with irreversible damage to boulevard trees, it is recommended that it be Park Board public policy to establish an approved list of contractors that can work on City-owned trees. Each contractor wishing to work on City trees would have to have examples of his work inspected and approved by the Director of Operations and the City Arborist before being added to the list. In order to control quality of work, it is recommended that only one warning would be issued if standards of practice were found to be unsatisfactory after which a contractor continuing to damage City trees would be suspended from City work. It is recommended that the Board

of Park Commissioners might hear appeals regarding removal from the approved list, but that a contractor would have to show conclusive proof of competence in order to be reinstated on City work.

10. Tree species for use on boulevards may be separated into two broad categories of conifers or other large evergreen plants and the many deciduous species of tree. Since most conifers and evergreen plants are generally ill-adapted to the stress of curbside street lawns, are a barrier to clear vision particularly at street intersections, and do not provide the open character necessary during winter to allow maximum sunlight to residences, roads and sidewalks, it is recommended that it be the general public policy of the Park Board to limit the use of these species within the street right-of-way to center boulevards or those locations where special and explicit design considerations merit the use of evergreen plants.

A further simple division for the purpose of this report can be made within the class of deciduous trees between abundantly flowering species planted for this characteristic and all other species of deciduous trees suitable for street use. It is recommended that it continue to be public policy of the Park Board to use flowering trees on City streets but to limit their use under the design criteria set for particular areas in the proposed Boulevard Tree Master Plan and to ensure that sound design, horticultural and silvicultural practice is used in their choice, use and maintenance.

11. Although there are professional concerns regarding administrative and design flexibility when a city uses a restrictive list of suitable trees, and there is, as yet, no complete information on the most suitable species for use on streets in Vancouver. It is, nevertheless, recommended that an initial list of approved large, medium and small boulevard trees be published by the Board of Park Commissioners. It is envisaged that this list will be prepared by Park Board staff in conjunction with the City Engineer based on experience to date as a guide for Park Board nursery and planting operations and as a basic document for landscape architects, developers and other such applicants

for Development Permits that embody a requirement for City Engineering approval of planting within the street right-of-way.

As the professional design panel (or panels) examine City boulevards for future planting or replacement recommendations that will be contained in the Boulevard Tree Master Plan, and as documented experience with various species is gathered in the profile form shown in Appendix 38, it is recommended that the initial Approved Tree List be reviewed and updated until 1985 when it is recommended that it be Park Board public policy to limit all boulevard tree planting to tree species given in an Approved Tree List and Profile Source Book.

12. In order to clarify the procedures for Park Board and City contact, approval and establishment of boulevard trees requested by developers through the City Engineer, it is recommended that it be public policy of the Park Board to formalize the accepted procedures with the appropriate City Engineering Departments. Further, it is recommended that the City Engineering Department and the Park Board issue a joint publication on the steps to be taken, the procedure for design approval, and the standards to be met in the installation and maintenance of any landscape features including boulevard trees which will be the subject of a streetside encroachment. In the case of landscaping that will be the subject of an Encroachment Agreement, it is recommended that detailed maintenance procedures, practices and frequency for the specific site as approved by the City Engineer and the Superintendent of Parks also form part of the formal Encroachment Agreement.
13. A continuing and unnecessary expense incurred by the City results from damage caused to City trees during construction, either on City property or on private property. It is strongly recommended that it be Park Board public policy to require proper construction protection for all City trees in, or close to, construction areas. In this context it is recommended that the Park Board develop, in conjunction with the Permits and Licences Department of the City, a procedure for ensuring that City trees in construction zones are identified in the Permits issuance procedure, and that a

substantial Tree Protection Bond be required from the proponent to be returned at the time of final inspection and approval of the site if City trees are found to be undamaged. Further, it is recommended that the Park Board provide the City Inspectorate staff with adequate written standards for tree protection and with training to identify special tree protection needs.

In the case of construction on City property undertaken by contractors, it is recommended that the same procedure be used and where City forces are involved it is recommended that it be Park Board public policy to ensure that the City Arborist recovers all reasonable costs of unnecessary damage from the City Department responsible.

14. In some locations, trees planted on private property overhang the street right-of-way. Although the Street and Traffic Bylaw allows the City Engineer powers to remove or have removed such encroachments, wholesale pruning or removal of such trees may not serve the basic objectives of community enhancement. However, in some instances, large overhanging trees growing on private property interfere with the proper growth and development of boulevard trees. It is therefore recommended that it be Park Board public policy to approach the owners of such trees, both verbally and in writing, to have them appropriately prune these trees or have them pruned by a reputable tree company but, at the discretion of the City Arborist, trees of sufficient merit by reason of shape, size, species or visual contribution to the location may be retained within limits. Any affected boulevard trees would be removed.
15. A continuing and contentious issue that has faced the Arboricultural Group concerns the planting and maintenance of trees on streets with panoramic views particularly to the north, northwest, west and, in some locations, to the southeast. Although in some instances there are reasonable doubts regarding the species and spacing adopted on these streets in the past, and regarding the level of maintenance given to trees with substantial crown growth at present, it is recommended that it be Park Board public policy not to prune or remove

trees to improve the view of individual property owners. However, any property owner or group of property owners who wish particular action to be taken to increase their view or views and who can obtain a 70% approval of the property owners in the block in question can petition the Park Board for appropriate action to be taken to prune, remove, or replace the trees on both sides of the street only in that location.

16. On occasion the Arboricultural Group receives requests from property owners to have trees on public property topped. Although it is recommended that it be Park Board procedure to have all trees on City property that are subject of requests for topping carefully inspected, it is recommended that it be public Park Board policy not to top any trees that are found healthy and wind firm. It is recommended that the methods and results of any such inspection be compiled as a written report and that this report and the decision on the final disposition of the request for topping be forwarded to the party who originated the request.
17. This report suggests that a Boulevard Tree Inventory should be an integral part of the management requirements of the Boulevard Tree Program. This inventory, when complete, will yield a considerable amount of detail concerning the species, location, and disposition of boulevard trees. It is also recommended in the report that the boulevard tree inventory will be fully updated every three years. In order that any system can accommodate the suggested 160,000 trees on City streets, it will have to be computerized and there will be a fairly considerable cost involved in compilation, operation and update. There may well be a considerable demand for this information from planners, developers, other City Departments, school boards and the general public. It is recommended that it be Park Board public policy to provide information on City trees but that there be adequate guidelines on the content or extent of information provided to outside parties and that there be an appropriate charge for all printouts requested.
18. As already noted earlier in these policies, the City of Vancouver has an enviable visual and

historical heritage. An important part of this heritage are the trees on City property including City boulevards. In order to broaden the social and educational advantages of this resource, it is recommended that it be Park Board public policy to prepare appropriate publications, such as a "Pictorial Review of City Trees" and a "Tour of City Trees of Interest", so that citizens and visitors can better appreciate the aesthetic, historical and botanical features of the City. Further, it is recommended that the Park Board take advantage of such media as Channel 10 television, local magazines, and gardening columns in the City newspapers to increase public awareness of the general benefits derived from trees in the City and the specific benefits of boulevard trees.

19. In order that the general public have ready access to the Park Board regarding routine boulevard tree problems, it is recommended that it be the public policy of the Park Board to maintain a boulevard tree contact number in heavy print in the Vancouver Telephone Directory white pages. In addition, it is recommended that there be an emergency 24-hour contact number given as a night time recording. Further, it is recommended that appropriate telephone contact points with the Park Board, the City Arborist, and the arboricultural staff be contained in all suitable Park Board publications.
20. In order that the general public may have access to the senior Park Board staff regarding specialized concerns about the City Boulevard Tree Program, it is recommended that it be the public policy of the Park Board that only complaints or concerns which differ from, or which are not covered by, the general policies for the program, will be heard by the Board of Park Commissioners. In such instances, it is recommended that the Board of Park Commissioners hear personally from aggrieved or concerned citizens but that such hearings will be undertaken with the City Arborist and/or arboricultural field staff in attendance, and that final resolution of problems should be provided in specific and written form.
21. In the course of routine maintenance work on City trees there may be cause to spray, remove or severely prune some species. These valid arboricultural practices may, however, cause citizens some concern

regarding the necessity for such work. Where appropriate, it is recommended that it be the public policy of the Park Board to inform property owners in residential areas that such work is anticipated, to explain the rationale for such work, and to describe the type of work to be undertaken.

22. The operation of a street tree program requires the staff of the Park Board to have constant contact with the citizens of the City. It is recommended that it be the public policy of the Park Board to ensure that those staff associated with the street tree program are courteous, informed, helpful and well presented at all times. It is recommended that it further be the policy of the Board to ensure that staff are adequately trained in order to assist the public in understanding the practices, policies, procedures and principles behind the City Boulevard Tree Program.
23. In order to ensure that the goals, objectives, policies, responsibilities, legal requirements and public obligations inherent in the overall management of the Boulevard Tree Program are readily available to any interested parties in the City, it is recommended that it be public policy of the Board to prepare and have available a booklet outlining all aspects of the City Boulevard Tree Program. In addition, it is recommended that an Annual Report concerning accomplishments, problems, administrative changes, further expectations and other details pertaining to the program be prepared by the arboricultural staff prior to the end of each fiscal year.
24. In order to enhance the public awareness of the importance of boulevard trees in the urban environment and to provide basic information for citizens concerning the establishment, care and repair of amenity trees, it is recommended that it be the policy of the Park Board to sponsor each year a series of tree lectures as a memorial to an outstanding citizen. It is anticipated that these lectures would be provided at a nominal fee and that the VanDusen Garden facilities would provide an ideal venue for these lectures.

25. The observance of Arbor Day, or in some jurisdictions Arbor Week, has provided an ideal vehicle for improving public awareness of the importance of trees in the environment. In order to fully utilize the momentum from national and provincial programs, it is recommended that it be the public policy of the Park Board to actively support a local Arbor Day program, both administratively and financially. In order to partially implement this policy, it is recommended that the Board of Park Commissioners invite the Mayor and City Council to a special tree planting ceremony each year to honor a distinguished citizen or citizens who have given unselfishly in their service to the community. Where appropriate, tree species chosen for these planting ceremonies could fit directly into the proposed testing program for new trees suitable for urban planting and could be appropriately identified with a vandal-proof plaque.
26. As there is considerable merit in encouraging youth to participate in, and contribute to, the objectives of a City Boulevard Tree Program, it is recommended that it be the public policy of the Park Board to encourage observance of Arbor Day in each school. To this end, it is recommended that the Park Board make available appropriate species of tree for class planting and to provide each child or class with an appropriate package of updated information each year regarding the importance of trees in the urban center and the importance of a healthy, clean vigorous urban environment.
27. Vandalism of street trees, particularly young trees, is an ongoing and expensive problem. It is recommended that it be the public policy of the Park Board to press charges against perpetrators of vandalism. Further, it is recommended that it be the policy of the Board to work with the City of Vancouver Police Department, the Prosecutor's Office and the Judiciary to ensure that, wherever possible, enforcement, prosecution, penalties and restitution for street tree vandalism are appropriate to discourage the practice.
28. The frequency of traffic accidents where street trees are damaged is substantial. This imposes an external cost on the Boulevard Tree Program



that is not warranted. In order to minimize the public cost of replacement of such trees damaged or destroyed, it is recommended that it be the public policy of the Park Board to seek full reimbursement for the costs of replacement or repair of trees damaged as a result of traffic accidents.

29. In order to ensure that the Vancouver Boulevard Tree Program operates efficiently and effectively and benefits from the latest innovations in arboriculture, it is recommended that it be the public policy of the Park Board to support a limited program of applied research and development into problems encountered in the management of the resource, into new techniques, tools, equipment and supplies, and into the most appropriate tree species for planting on City streets. It is recommended that such research and development should be undertaken on an ongoing basis with funds specifically identified for the purpose. In this context, it is recommended that it be the Park Board policy to establish an Approved List of Arboricultural Supplies. Each item appearing on this list would have been subject to testing in the applied research and development program with a cost of testing such supplies borne by suppliers, or shared jointly with the Park Board.
30. Many of the research and development needs associated with the City of Vancouver Boulevard Tree Program are also reflected in the similar programs of other Lower Mainland municipalities. It is recommended that it be the public policy of the Board of Park Commissioners to encourage the establishment of co-operative applied research and development in order to equitably share costs and results. In order to initiate such co-operation, it is recommended that it be the policy of the Park Board to advocate the establishment of a Lower Mainland Boulevard Tree Research Committee.
31. Considerable concern has been generated over the most appropriate pesticides to be used in the control of Gypsy Moth found on City trees. Further, there is an obvious concern by the general public about the use of any pesticide on public property in urban areas. It is recommended that it be the public policy of the Park Board to employ those

proven methods of Integrated Pest Management that ensures minimum use of toxic pesticides as long as these methods are consistent with the program objectives of safe, healthy trees. To this end, it is recommended that the Park Board develop appropriate Integrated Pest Management measures to minimize the three major insect pests on boulevard trees in the City, namely aphids, scale and various summer feeding caterpillars. Further, it is recommended that it be Park Board policy to work with Federal and Provincial Ministries of Agriculture to prepare appropriate contingency plans to manage any pests that can be or may become, serious problems to urban trees in Vancouver.

32. In the past, the boulevard tree program has not relied on outside professionals to any extent for advice or input into the development of plans and standards for the boulevard tree program. Consequently, many members of appropriate professional societies are not conversant with, or aware of, the constraints that govern the use of plant material on City boulevards. In the same context, the City has not properly benefited from the creativity and expertise offered by such professional groups as the landscape architects, urban foresters, planners, architects and professional engineers. It is, therefore, recommended that it be the public policy of the Park Board to support liaison with these groups, and with individual members of these professions, in order to increase communication and encourage professional contributions that may maximize the benefits from trees in the City while minimizing the conflicts and costs that accompany their use.
33. Since most municipalities in the Lower Mainland have boulevard tree programs of varying degrees of development, and experience many of the same problems facing Vancouver, it is recommended that it be the public policy of the Park Board to encourage co-operation and interchange amongst the staff of the various departments responsible for municipal tree programs and to work with the G.V.R.D. in providing uniformity of procedures and practices in the employment of arboricultural staff and in the management of amenity trees in the Lower Mainland..

### Operating Program Policies

1. In order to ensure that both the Park Board and program policies are clear, explicit and readily available to staff, it is recommended that all internal operating policies and approved procedures be compiled as a Policies and Procedures Manual. It is further recommended that this manual and any other major concerns arising out of operating experience regarding policies, procedures, practices or safety standards be the subject of an annual review meeting organized by the City Arborist. It is anticipated that these meetings would be attended by senior Park Board staff, the Supervisor of Arboriculture Operations, all arboricultural crew foremen and, where appropriate, members of City Council or the Board of Park Commissioners Liaison Committee for boulevard tree or green space management. It is recommended that the agenda of these meetings would also include invited contributions from City Departments which may be affected or involved in boulevard tree affairs.
2. In the past, the general procedure within the Park Board has been to perceive and manage the boulevard tree resource in large segments. For example there are ten management areas designated in the City by the arboricultural group. Most management decisions within these districts tend to be by City block. As a consequence, single trees are not perceived as individual, unique entities and most maintenance decisions are made on an overall resource basis relying on the field staff to pick appropriate standards of care. Since detailed standards have not existed and both supervision and often staff training, in arboricultural practice minimal, there has been no concerted effort to assess the needs of individual trees. It is therefore recommended that it be program policy to ensure that the boulevard tree resource be managed, wherever possible, with the needs of individual trees and individual locations in mind. It is suggested that the present districting concept of ten management areas continue but that the management systems developed for establishment, maintenance and replacement of trees on boulevards, within each district, reflect the policy of individual tree management.

3. A major constraint in some locations that limits the design opportunities for boulevard tree planting is the marginal tree lawn left after construction of the sidewalk or the relatively narrow width of sidewalk that precludes adequate tree pit location, sufficient pedestrian walking surface or planting without conflict with underground services. It is therefore recommended that it be program policy to work very closely with the City Engineer to ensure that engineering designs are compatible with the aims and objectives of the Boulevard Tree Program and that such designs are appropriately incorporated into the City standards for sidewalk design and placement. Further, it is recommended that such standards should be an early subject for consideration in the preparation of design plans by the proposed design panels working on the draft Boulevard Tree Master Plan.
4. Present designs, particularly those for beautification areas, have included both auxiliary planting at the base of boulevard trees and in some locations such fixtures as metal tree guards, tree grates and feature tree lights. All of these elements require a standard of maintenance considerably more intensive than standard plantings to maintain appearance and ensure the healthy and vigorous growth of boulevard trees. Experience to date is that many trees have been severely damaged by these fixtures and a considerable time is spent replacing base plantings. It is therefore recommended that it be program policy to discourage such designs submitted either by City departments or by developers. Further, it is recommended that a thorough workload analysis be conducted as to the real maintenance costs of such designs and that a separate anticipatory boulevard tree maintenance budget be prepared for maintenance of priority and high maintenance areas as designated in Appendix 60 and Appendix 61.
5. Although this report recommends a short period during which tree planting is restricted to replacing individual trees and planting behind the curb and gutter program, it is anticipated that substantial new planting will follow from the designs and recommendations contained in the draft

and final Boulevard Tree Master Plan and from the silvicultural replanting programs that will replace existing overmature or undesirable trees on City streets. It follows that a considerable stock of suitable species and sizes of tree will be required to accommodate these programs. It is therefore recommended that it be program policy to establish a suitable permanent nursery facility, possibly in conjunction with other municipalities, in order to grow on desired stock in sufficient quantity for City use. Further, it is recommended that the Board fully explore the possibilities of supplementing the existing stock of trees by establishing contract growing agreements with wholesale nurseries in the Lower Mainland, in order to ensure short term supplies of trees in sufficient diversity of species to accommodate the approved new and replacement planting between now and 1985.

6. As noted in this report, a substantial number of City departments in addition to the Park Board are involved in, or interact with, the City Boulevard Tree Program. These interactions have been reviewed in the chapter concerning communications. However, it is recommended that it be program policy to work in conjunction with these departments to delineate the role of each in the administration, management or contact with the City boulevard tree program. Once written agreements have been reached, it is recommended that these be circulated to all City departments so that individual responsibilities are readily ascertainable by all departments.
7. Although the addition of new trees to the City street tree resource can be accomplished fairly readily, it is suggested that the most crucial question concerns the allocation of sufficient funds for ongoing maintenance. It is therefore recommended that it be program policy to carefully assess the additional workload occasioned by all new tree additions and to request sufficient funds based on accurate unit costing to maintain both existing boulevard trees and any new trees at a level of health and appearance consistent with the boulevard tree program objectives.
8. A fairly large number of City trees have now reached the age, size and condition which necessitates

an organized program of removal and replacement. In addition, the strong possibility of Dutch elm disease reaching the City within a very few years now requires the preparation and execution of a planned program for the replacement of elm species. It is therefore recommended that it be program policy to establish priorities for firstly, individual tree replacement and, later, species replacement within the framework of a separate tree replacement budget until such time as the overall block and species replacement workload has been assessed and recommendations prepared for the full draft of the Boulevard Tree Master Plan.

9. In order to ensure that worker safety is given paramount attention in the establishment of procedures and the approval of new equipment, it is recommended that it be program policy to work in conjunction with the Workers' Compensation Board of British Columbia to document all serious arboricultural related industrial accidents in the Province; and, where appropriate, in other jurisdictions, to determine the cause of such accidents and prepare adequate safety procedures to preclude them occurring during arboricultural operations in the City of Vancouver. Further, it is recommended that all safety equipment, such as climbing ropes, insulated tools, and aerial devices, be subjected to approved and scheduled safety testing.

## POWERS AND LEGISLATION

### Introduction

In order to adequately manage a boulevard tree resource, it is necessary to ensure that any actions taken to establish, maintain, alter, or remove trees from the resource base are adequately controlled and that that control flows from clear legal authority which stipulates the conditions and responsibilities that attend such actions.

In the case of British Columbia, there is an explicit process from which the powers that may be used to manage a municipal tree resource are derived. On the one hand, there is statute law and its delegated powers to the municipal level of government, and on the other hand there is a body of common law that affects the disposition of certain circumstances, particularly as they relate to liability and trees. It is not a purpose of this section to discuss the implications of the common law as it may affect the City boulevard tree resource. This is not to suggest that the subject should be ignored, but rather that the emphasis in this section is on powers that the City has or may wish to adopt that would allow appropriate management of trees on City streets, as well as those powers that are vested in other authorities which may, in one form or another, impinge upon the operation of the City of Vancouver Boulevard Tree Program.

Central to this section are the powers delegated to municipal levels of government in British Columbia by the Provincial Legislature. Since such powers have been given to the City of Vancouver in one form (The City of Vancouver Charter) and to other municipalities in another form (The Municipal Act) and that the extent of these powers differs, these differences will be examined and discussed. The powers conferred upon municipalities in British Columbia, including the City of Vancouver, extend well beyond the simple power to regulate by bylaw the trimming and removal of trees. In fact, ample provision is made for bylaws to stipulate the complete management of boulevard trees from planning, financing, establishment and maintenance through to education, publicity, tree conservation, the designation of public and civic responsibilities through to the broader context of urban forestry in the municipal setting.

In addition to specific laws governing the tree resource from a city perspective, there are a number of agencies with powers derived from legislation that directly or indirectly affect the operation of a city boulevard tree program. These agencies have powers that range from

the regulation of pesticide use, through stipulations for safe working conditions, to the Federal powers in the Criminal Code of Canada that allow for prosecutions of theft and vandalism.

Apart from those powers or laws that may directly govern the operation of a city boulevard tree program, there are a number of municipal bylaws or provincial statutes that could or might bear indirectly on the management of trees in the municipality. Zoning regulations, street and traffic bylaws and sign bylaws are examples at the municipal level. Labour and Companies legislation are examples at the provincial level.

The City of Vancouver has had a municipal tree bylaw in force since the late 1800's. The present bylaw, which, although dormant, has never been rescinded, was originally written in 1917. The bylaw has been little used, particularly in the last few years, and the provisions are now somewhat dated. As far as can be determined, no previous attempt has been made either to thoroughly review the use and application of the City's Boulevard Tree Bylaw, nor to examine related or impinging bylaws or provincial legislation that could be applied to enhance the efficient management of the present boulevard tree resource. This section has been prepared in order to provide a brief historical background on the development and extent of existing powers both direct and indirect as they may influence the management of trees in the City of Vancouver, and to provide a basis on which to update and extend those existing powers. This will provide a sound legal basis for effective tree management in the municipality in the next decade, at which time it is proposed that there will be a further review of all of the management strategies outlined in this report.

### Discussion

The municipal powers that are of concern for the management of trees in Vancouver find their original source in the British North America Act passed by the British Parliament and proclaimed on July 1st, 1867. This Act allowed that (in Section 92) the legislature in each Canadian province might exclusively make laws in relation to those matters coming within the classes



of certain enumerated subjects. Included in those classes were:

- At Sub-section 8;Municipal institutions in the Province
- At Sub-section 16;Generally all matters of a merely local or private nature in the province.

Exercising these powers under the provisions of Section 92, the Province of British Columbia has enacted legislation to provide for the establishment of municipal institutions under two separate pieces of legislation; the Municipal Act and The Vancouver Charter. The Municipal Act was first given royal assent in April of 1872 and consisted of five pages. It has been progressively updated since that time and consistently provided powers for a municipality to manage trees within the municipal boundaries. The Vancouver Incorporation Act, which allowed the formal creation of the City of Vancouver, was first enacted in 1886 and, after being substantially revised in 1921, was superceded by the Vancouver Charter in 1953.

The Vancouver Charter contains a number of specific references that are applicable to the management or protection of trees in the municipality and touches on a number of impinging areas where the impact of provisions contained in the Charter may affect the health and survival of City trees.

For the purpose of clarity, two definitions from the interpretation section of the City Charter are given here to assist the reader further.

- Street - "street" includes public road, highway, bridge, viaduct, lane and sidewalk, and any other way normally open to the use of the public, but does not include a private right-of-way on private property.
- Regulating - "regulating" includes authorizing, controlling, limiting, inspecting, restricting, and prohibiting.

For the purpose of this section, the City Charter has been divided into fifteen classes of provision that can affect the management of boulevard trees in the city. These classes are discussed in general order of relevance with direct quotes from the Section and with brief discussion of applicability.

1. Section 488: The Board (Park Board) shall have the custody, care, and management of the public parks in the City, and of such other areas belonging to or held by the City as Council may from time to time determine.

It is clear that adequate provision is provided here for City Council to delegate the responsibility for management of areas of the City as Council may deem appropriate, including:

- i. Street Trees
- ii Center Boulevard Trees
- iii. Trees on the Periphery of Park Land
- iv. Trees within Street Ends & "Triangles"
- v. Tree Lawns and Tree Planting Strips within the Street Right-of-Way

It is clear that City Council has, in the past, expressly transferred the responsibility for management of portions of the City street to the Park Board (see for example Appendices 5, 10 and 12). It is not clear, however, that there has been a concise and consistent transfer of responsibility from City Council to the Board for each and every street presently under the board's jurisdiction, either in a specific sense (street by street) or in a general sense vesting the Park Board with full and complete responsibility for the maintenance of all facets of management for the boulevard tree resource.

2. Section 489: The board (Park Board) shall have the power to provide for at sub-section (p); doing such other things with respect to any of the parks as the Council shall from time to time authorize

and at Section (q); do such other things in furtherance of any of the above powers as shall be deemed expedient.

This section and its 17 sub-sections, although expressly written to encompass designated parks, does in fact include any of the land that City Council may from time to time determine should be the responsibility of the Park Board since Section 488 expressly notes that the term "the parks" includes such designated land. These two sections, therefore, give Council the statutory authority to delegate responsibility of designated lands to the Park Board the custody, care and management of parks and designated lands. They also give the Park Board additional powers as from time to time that Council may authorize and provide a mechanism for implementing these powers.

3. Section 491: In the exercise of any of its powers, the Board (Park Board) may from time to time pass, amend and repeal by-laws (not inconsistent with any by-law passed by the City Council) to be observed in the parks (Writer's note - including any other areas belonging to or held by the City as Council may from time to time determine) or any of them, for the control, regulation, protection and government of the parks and of persons who may be therein including:

at sub-section (c) the regulation of advertising or signs of any kind in any of the parks

at sub-section (d) prohibiting persons from damaging trees, shrubs, flowers, or other growing things, or fences or other property, in the parks; ....

It is apparent from this section and the accompanying sub-sections that the Park Board would have the power to pass a by-law for the protection of plant material within a street right-of-way if those streets had been expressly transferred to the custody, care and management of the Board, since those streets would constitute "parks" as defined in Section 488.

4. Section 289: Unless otherwise expressly provided, the real property comprised in every street, park, or public square in the City shall be absolutely vested in fee simple in the City subject only to section 291A (writer's note - which allows for establishing new streets) and to any right therein which the person who laid out or dedicated such street may have expressly reserved; provided that section 5 of the Highway Act shall not apply to any street, park or public square aforesaid; provided further, however, that it shall be lawful for the City to acquire from any person rights or easements for street, park, or public square purposes less than the fee simple, whether on, above or below the surface of any real property owned by such person.

This section allows for streets and parks to be vested in the City except where streets have been established or approved over private property and are subject of an easement agreement.

5. Section 290: No person shall excavate in, cause a nuisance upon, incumber, obstruct, injure, foul, or otherwise damage a street, except under such terms and conditions as may be imposed by City Council.

This provision allows Council to regulate all activities within the street right-of-way.

6. Section 291: The Council may provide:
  - at sub-section (a); for establishing, laying out, opening, maintaining and improving streets, and for determining the width and boundaries of streets.
  - at sub-section (k); for regulating the planting and care of shade or ornamental trees on a street, and for prohibiting the injury or destruction of such trees.
  - at sub-section (l); for causing any tree upon a street to be trimmed or moved when deemed necessary in the public interest.

This section and sub-sections provide Council with clear and explicit powers to manage and maintain trees on streets in the City.

7. Section 496: Every warden, lifeguard, patrolman, or watchman employed in the parks by the Board (Park Board) shall, while in the performance of his duty within the parks, be ex-officio possessed of all the powers of authority of a police constable.

This provision would allow for the designation of street tree wardens and for them to assume custodial responsibility for City trees.

8. Section 500: When, in the exercise of any of its powers of affecting and carrying out any works, improvements, services, the Council deems that any such works, improvements, or services will specially benefit real property in a limited and determinable area, the Council may from time to time, subject to the provisions of this Park, undertake and carry out such works, improvements, or services (in this Park referred to as "projects") and pass by-laws (herein referred to as "local improvement by-laws") for borrowing on the general credit of the City such sums as may be necessary to defray the cost of any such project and for levying and

collecting taxes based on special assessments imposed, save as hereinafter provided, upon the real property so deemed to be specially benefited, for payment of all or any part of such cost.

Although not presently used for this purpose, the local improvement by-law section could be used to raise funds for boulevard tree planting. However, it is past practice and policy that boulevard tree planting for all City areas be paid out of general revenue.

9. Section 506: The Council may, in this discretion, undertake and carry out a project in any of the following cases;
  - i. By petition...
  - ii. On the initiative of Council (with provision for objections)
  - iii. On special grounds.

Although street tree planting could result from either of the first two methods of local improvement procedures, it is unlikely that boulevard tree planting could be included in the section on special grounds. In this section the powers of the Council are limited and expressly outlined in three parts for street improvement and include only the provision of paving and repaving, ornamental lighting, and the provision of sidewalks. Presumably, it would be possible to object that expenditures for the provision of boulevard trees is not covered by this sub-section.

10. Section 506B: Where a project undertaken by Council as a local improvement has been completed, then the council may by by-law provide that an annual cost of any or all of the following services:
  - (a) Cleaning, maintaining or repairing the project shall be specially assessed upon the real property benefited by the project and specially assessed for all or any of the cost thereof.

As with the previous section, this section does not presently apply since boulevard tree planting has not be considered appropriate for local improvement procedures. However, it can be seen from this section that provision can be made for maintenance of boulevard trees as a special assessment on those properties adjacent to the street where planting was undertaken.

11. Section 191 (in the context of encroachments)  
The Council may provide:

at sub-section (d) for the prohibition and removal of any unauthorized encroachment or obstruction under, upon or over a street or any part thereof,

at sub-section [g, (ii)] for regulating encroachments for a stipulated length of time upon, under or over a street, upon such terms...

These two sub-sections provide Council the power to regulate or prohibit obstructions on any street. This would include the power to regulate or prohibit any private tree planting on City streets. The operational responsibility for ensuring adequate regulation of street right-of-ways has been given to the City Engineer whose staff, in turn, inspect and approve all types of temporary or permanent encroachment on City streets. Temporary encroachments are subject to a permit system while permanent encroachment, including landscaping or special tree planting by private developers, would be the subject of a binding Encroachment Agreement.

12. Section 210: The Council may make by-laws:

for regulating signs and for defining same, provide for the fixing and collecting of a charge for signs projecting into or being in a street;

Commercial signage extending from buildings abutting the street right-of-way can and do conflict with street trees, particularly when they are planted in narrow sidewalks. This section allows Council to prepare a Sign By-Law in order to regulate sign encroachments into the street right-of-way.

13. Section 186: Where it is satisfied that any proposed Dominion or Provincial legislation effecting the City should be watched, promoted or opposed the Council may provide for such watching, promotion or opposition and may defray the expenses occurred relation thereto.

This section provides Council with a mechanism for involvement in the legislative process of higher level of Government. This section would allow, City Council and the Park Board, for example, to advocate and promote the concept of a Provincial Licensing scheme for tree companies and arborist journeymen.

14. Section 192: The Council shall have power to make the City:

(a) a party to any agreement to which under the terms of any act of the Dominion or the Province it is contemplated that Municipalities may be parties in which the Council deems will be for the benefit of the City;

(b) to any agreement with Her Majesty in Right of Canada or the Province or any of her duly authorized regions with respect to the construction, improvement and maintenance of any private roads or ways, sewer, water mains, poles, wires, pipes, conduits, other utilities, installations, or equipment at anytime situate on, over or under the surface of any real property in the City in which her Majesty aforesaid has any interest and for contributing in whole or in part toward the cost thereof;...

These two sections provide council with appropriate mechanism for improving the appearance of the street right-of-way as would be the case with, for example, a joint enterprise with B. C. Hydro to remove overhead wires in a program partially sponsored under the Powerline Beautification Fund Act.

15. Section 203: Where and to the extent that the Council is authorized to regulate, license of tax persons carrying on a business, trade, profession or other occupation it shall have power to:

(a) divide and subdivide such businesses, trades professions, or other occupations into as many groups of classes as it sees fit, having regard to the number of persons therein...

(b) differentiate and discriminate between groups or classes both as to the amount of any license, fee or tax to be paid and the terms and conditions under which any group or class may or may not carry on the business, trade, profession, or other occupation:

(c) define any business, trade, profession or other occupation

(d) define any business, trade, profession or other occupation

This section provides the city Council with powers to regulate businesses. This would include private tree companies within the Municipal boundaries.

16. Section 204: Council may provide for the expenditure of money for:

(a) the reception, entertainment, or other suitable recognition of guests or persons of important whom the Council deems worthy thereof;

(b) the celebration of any anniversary or other partriotic event deemed by the Council to be desirable;

(f) paying rewards offered by the Council to any person who furnishes information resulting in the conviction of any person guilty of any offence against any Statute of Canada or the Province or any by-law of the City;

These provisions in section 204 provide City Council with the opportunity to recognize any citizens who have made outstanding civic contributions by honouring them at Arbor Day, for recognizing Arbor Day, and for providing rewards to those citizens reporting tree vandilism.

17. Section 152: The City may receive and accept any real or personal property devised or bequeathed to it or given by transfer or grant, subject to the trusts, if any, upon which the same is devised, bequeathed, or given.

This section would allow the City to receive gifts for the proposed Boulevard Tree Trust Funds from citizens who willed assets for that purpose.

18. Section 179: The Council may acquire for the City such real property within or without the city as it thinks necessary for parks, playgrounds, pleasuregrounds, or recreational areas, and the Board of Parks and Public Recreation may from time to time make recommendations with respect thereto. So much of the real property so acquired as the Council from time to time so designates shall be public parks.

This section allows the City Council to acquire land and the Park Board to make recommendations concerning its use. Presumably this would include the purchase of additional land within or adjacent to road rights-of-way for the purpose of tree planting. It may also allow the City to purchase land outside the City boundary for support of city park or street tree development, as would be the case with any permanent nursery area some distance from the city.



19. Section 206: In this section Council may, by resolution passed by not less than two thirds of its members, provide for the making of money grants to (at sub-section J) any organization deemed by Council to be contributing to the culture, beautification, of welfare of the city.

This section and sub-section would allow the city to financially support any private group or groups that might be interested in, or be encouraged to undertake improvement of, the appearance, public understanding, identity, layout or management of the city's tree resource.

20. Section 292 (1): For the purpose of regulating the subdivision of land, the Council may make by-laws (sub-section f) requiring that all power-lines, telephone-lines, or any other wires or cables shall be installed underground. The by-law may provide that the Council shall have power to waive this requirement where the applicant for the subdivision would be put to an unreasonable expense.

This sub-section clearly allows Council to require undergrounding to utility wires in new subdivision. Although the city is now largely developed, this sub-section has allowed servicing to be prescribed in some areas and for street trees to be planted free of overhead constraints. Some limitations may, however, be required on placement and size of trees in order to protect underground services if these cannot be removed from the tree planting area.

21. Section 314 (1): The Council may, subject to the Electrical Energy Inspection Act provide (at sub-section f) for regulating the placing or maintenance in any street of any electrical works, including the poles or other means of support thereof; however at part 3 it is stipulated that the power conferred on Council by clause (f) shall not be used (a) to require any of the said companies to remove any presently existing electrical works or any renewal thereof, or to move the same to any new location, except upon condition that the city shall pay reasonable compensation to such company for the expense and loss of and from such removal or moving, the amount thereof to be such as the city and such company may agree upon or, in the event of failure to agree, as may be settled by

arbitration pursuant to the Arbitration Act; or  
 (b) with respect to underground duct banks or vaults of any of the said companies, except as to the position and overall size thereof.

This section would appear to provide Council with some control over the placement and maintenance of electrical services which could have a profound effect in determining the standards of tree trimming acceptable in the city. Existing legislation governing B. C. Hydro may, however, have precedence since the Vancouver Charter is not mentioned as binding B. C. Hydro. It would seem possible that, if no reasonable accommodation can be reached with B. C. Hydro regarding tree trimming, Council could limit any contractors working on Hydro tree maintenance.

22. Section 317: In this section Council may make by-laws (sub-section [f]) for classifying streets and parts thereof and differentiating between classes of them in the exercise of any of the powers of the Council with respect to the use of streets.

This section will allow for the maintenance standards on the tree lawns and on street trees to be tied to specific designations of street importance. It would also allow priorities to be established based on desired level of maintenance for specific locations.

23. Section 323: The Council may make by-laws for (at sub-section [a]) preventing, abating, and prohibiting nuisances; and (at sub-section [r]) for requiring the owner or occupier of any parcel to clear the same of brush, trees, noxious weeds, or other growths, and (at sub-section [u]) for requiring the owners or occupants of real property to maintain the said property in a neat and tidy condition and in keeping with a reasonable standard of maintenance prevailing in the neighbourhood.

These provisions give Council the power to provide specific by-laws for nuisance abatement including such by-laws as may be required for vegetation removal or maintenance (but not retention) on private property.

24. Section 324A (1): The Council may, by resolution or by by-law, declare any building, structure, tree, or erection of any kind whatsoever, or any drain, ditch, watercourse, pond, surface water, or any other matter or thing in or upon any private or public lands, street or road, or in or about any building or structure, a nuisance or dangerous to the public safety or health, and may, by such by-law or resolution, as may be directed therein, order that the same shall be removed, pulled down, filled up, or otherwise dealt with...

This section allows Council to regulate hazardous or potentially hazardous trees on private property.

It can be seen from the foregoing the City of Vancouver is fairly well provided for in the context of enabling powers that might be used to manage and enhance the tree resource in the city. An important key to successful management, however, is the assurance that those by-laws which are passed are comprehensive and up-to-date. Unfortunately, it appears this is not the case for those by-laws which are presently in force for Vancouver. The powers now available to the City for tree management flow from by-laws which were essentially developed at the turn of the century. There have been many changes in the city since that time and although many of the basic concepts are still relevant, it would seem that more complete and current set of by-laws should be prepared and adopted.

In order to provide some perspective, on the development of existing by-laws and to provide some foundation for the recommendations given in this part of the report, the more important tree by-laws presently in force in Vancouver are briefly outlined in the following few pages.

## By-Law 246 :

NOTE: Since this by-law and its subsequent amendments bear directly on the regulation of boulevards and street trees in the City of Vancouver, original and subsequent wording may be used in its entirety from the version of the by-law under study. However, in the interest of brevity some words and phrases that do not affect the general meaning of individual sections has been removed. Consequently, in most cases sub-sections of the by-law are not presented as direct quotes in quotation marks.

In the first section of By-Law 246, which was passed on March 30 in 1896, the owner or occupier of any lot abutting onto any public street had to receive permission from the Board of Works or the City Engineer to enclose the street opposite his lot. A 2'6" railing could be put out 18' where the road allowance was 66' and 24' where the road allowance was 99', except where sidewalks had already been constructed. The space so enclosed was to be called the boulevard. Such enclosures were not permitted on Westminster Avenue, on Granville Street, North False Creek or where the Board or City Engineer felt it disadvantageous.

The second provision of the by-law required that boulevards were to be made to conform to street grade, to be sodded or seeded with grass and closer and to be kept in good order, free of weeds.

The third provision of the by-law required that no person should pile, place or keep lumber or building material or any other thing on the street boulevard except an approved fence, railing, shade trees or grass.

The next provision of the by-law required that no boulevard should be used for pasturing any horse, cow or any other animal and restricted any animal from being allowed on the street boulevard.

The fifth provision of the by-law provided that shade trees could be placed or planted at a distance not less than 2 feet from the edge of the sidewalk. The sidewalk was to be judged as nearly as practicable, in the centre of the boulevard. Silver Poplar, Balm of Gilead, Cottonwood trees and Willow were prohibited from being planted.

In order to encourage boulevard tree planting the next provision of the by-law provided for a premium of 50 cents to be paid out of municipal funds for each and every Ash, Basswood, Beach, Birch, Cedar, Chestnut, Oak, Walnut, Butternut, Elm, Hickory, Maple, and Whitewood planted on the boulevard. In addition, all other shade trees approved by Council which had been planted and kept in good order for the space of 2 years from the passing of the by-law could be paid the 50 cent premium after inspection and certification from the City Engineer.

The seventh provision of the By-Law required that trees planted on the streets could not be placed closer than 20 feet apart, or where directed by the City Engineer acting under the instruction of the Board of Works.

The eight provision of the by-law provided protection for trees and property. It noted that no person should break, injure, dig up or destroy any tree lawfully planted or damage any sod or grass, railing or any box, stake or guard which was placed around any tree, except by permission in writing from the Board of Works.

The ninth provision of the by-law required that no person could fasten any horse or any animal to any tree or box around any tree or near enough to injure any tree in the boulevard.

The tenth provision of the by-law required the owner or occupier of property opposite where a tree had been planted to keep that tree trimmed at all times so that projecting limbs and boughs should not be less than ten feet above the sidewalk.

In the eleventh provision of the by-law the duty of the City Engineer "for the time being" was to see that the provisions of the by-law relating the shade trees and boulevards were carried out.

The final provision of the by-law provided that any person convicted of an offence under the by-law could be subject to a penalty not exceeding \$50.00 for each offence and costs to be recovered by distress sale and/or 20 days in jail, with or without hard labour.

On the 9th October 1899 an amendment to By-Law 246 (By-Law 343) was passed in order to repeal section 6 in which the 50 cent premium had been paid for tree planting. No new provision was made for reimbursing citizens for private tree establishment on the city boulevards.

On May 21, in October of 1912 the original Boulevard By-Law (By-Law 246) was replaced by By-Law 940, which was indicated as a by-law "relating to boulevards and shade trees". This by-law is shown in full along with its subsequent amendments in Appendix 22. By-Law 940 was not in any way a new by-law but rather an adaptation of the original. Minor improvements included the requirement for the boulevards to be seeded with lawn grass rather than rough grass and clover, for the specific planting distances between trees to be replaced by distances at the discretion of the Committee of Works, for tree protection to be referred to as box or guards rather than cases or boxes, and for the wording in the old Section 10 (now a new Section 8) wherein the responsibility of landowners originally designated as opposite street trees, was broadened to apply to those adjoining the boulevard to now be responsible for tree trimming. Two other significant changes in the new By-Law 940 were that the original reference to the duties of the City Engineer were dropped and the penalty for each offence against the by-law increased to \$100.00

#### Amendment 1293:

On the 21st May, 1917, at a time when there seemed to be considerable interest in improving the standard of boulevard maintenance, By-Law 940 was substantially improved by Amendment 1293. The original Sections 5, concerning the placement of shade trees, 6 concerning injury to shade trees, 7 precluding the tethering of animals on the boulevard, 8 requiring private tree care and trimming and the section concerning penalties were all repealed and replaced with new sections. In addition 7 new provisions were added to the by-law.

The new provision 5 required that all trees planted in any boulevard in the city were to be deemed the property of the city and the control of such plants were declared to be under the care and control of the Board of Park Commissioners.

The revised provision 6 precluded the public from planting private trees on the boulevard without first obtaining a written permit from the Board of Park commissioners. This permit lapsed after 30 days.

The seventh provision of the revised by-law required that anybody applying to the Board of Park Commissioners for a tree planting permit had to specify the location, variety, grade, methods of planting, supply of soil and type of stake proposed. No charge was made for those permits that were issued.

The eight provision of the new by-law required that no person was to plant any tree unless the conditions of the permit that they had received were complied with and that the work was done to satisfaction of the Parks Board Superintendent. Trees were to meet minimum standards. They were to be no greater than 6" in diameter, 4" above the ground, nor to be less than 1 1/2" in diameter, measured at the same place. No tree was to be less than 8' tall and all species were to be approved by the Board of Park Commissioners.

Finally, the revised provision nine required that trees were to be planted at a minimum of 30 foot spacing. Shrubs could be planted between the trees at intervals of 10'. No planting was to take place where the space between the curb and the sidewalk or the property line and the sidewalk was less than 3'.

The seven provisions introduced into the by-law had obviously been given careful thought and, when combined with the other sub-sections of the by-law, provided the city with a detailed instrument with which to regulate any tree planting on city streets. These section are as follows:

The new section 10 noted that no person was to remove, destroy, cut, deface, trim or inure or interfere with any boulevard planting except by express authority of the Board of Park Commissioners. This provision however did not extend to staff employees by the Board. Provision was made for persons desiring to prune or trim trees to mak an application to the Superintendent of the Park Board with the proviso that an undertaking was to be given that any tree work would be done by a competent person under the supervision of the Park Board Superintendent.

The new provision 11 contained the revised by-law requiring that no building material was to be placed up against any tree unless that tree was properly protected by a guard to prevent possible injury. In the case where building material was temporarily placed on the boulevard any and all instructions issued by the Park Superintendent were to be property complied with by the order.

In the twelfth provision of the new by-law protection was afforded to trees by precluding the hitching or fastening of animals in the boulevard in such a way that they could stand near or bite, rub, injure or deface any tree or other plant material.

In similar context provision 13 provided that no person should remove any building along any street in such a way as to interfere with boulevard trees without a permit from the Board of Park Commissioners. And in the following section 14 any moving of trees to allow for building relocation was to be done expressly by the staff of the Parks Board under the supervision of the Parks Superintendent and at the expense of the applicant. If moving and replanting caused the death of any plant material this was to be replaced at the building owner's expense. A deposit was required of \$10.00 per tree plus as much more as the Board of Park Commissioners required to cover the cost of moving and replanting trees. This bond could be retained for a period up to 3 months in order to ensure that the trees were properly established.

Full power was given to the Board to destroy, remove, transplant or otherwise dispose of trees on city boulevards if they were found to be:

- (i) infected by diseases or insects,
- (ii) planted too close together,
- (iii) any other reasons as the Board deemed proper.

Finally the by-law provided the Board of Park Commissioners with the power to remove any wires, conduit or other "thing" that burnt, cut or chafed any part of any tree whether the trunk, root or branches, if the owner of the infringing wires failed to remove them after 3 days from receipt of written notice from the city.

By-Law 940 and its amendment 1293 has remained unchanged since 1917. It seems, however, that the by-law has largely fallen into disuse since no copies were found at the Park Board offices and general knowledge of the existence of the by-law was not apparent. The various copies discovered by this author were first obtained in the City Archives. Later the Law Department provided an up-to-date copy, however some dubiety was expressed as to whether the by-law had in fact been superseded. No evidence in this regard has been found and it must be assumed that the by-law is in fact still in force. Although the by-law is now sadly out of date, in the main it contains the essence required for comprehensive management of plant material in street right-of-ways. It does require review in order to ensure that all present day problems are adequately addressed (see also the "model by-laws in this section)



### Arbor Day By-Law

In concert with the boulevard street by-law passed by City Council in 1917, a further by-law, number 1290 was passed in order to recognize the importance of tree planting in the city. This by-law, the Arbor Day By-Law - a by-law to proclaim a civic Arbor Day is shown in Appendix 23.

The by-law has not been repealed and contains 4 provisions. The first requires ("shall be the duty of") the Mayor to proclaim a Civic Arbourn Day between February 1 and April 30 each year. Within that period:

- (i) Trees and shrubs may be planted on city boulevards by private citizens and;
- (ii) tree planting ceremonies may be held on the specific date proclaimed as Arbor Day by schools or other organizations.

The second section requires that trees and shrubs for Arbor Day planting

"Shall be provided by the Park Board provided suitable trees are in stock. Trees may also be provided by any person provided that the trees and shrubs are approved by the Park Board." The third section of the Arbor Day By-Law requires that all trees must meet the provisions of By-Law 940 and its amendments, while the fourth and final section of the by-law provided for it to come into force on March 12, 1917.

Although a separate Arbor Day By-Law may have some merits it would seem more appropriate to incorporate the intent of this by-law in the proposed revised Boulevard and Street Tree By-Law.

### By-Law 2849

A very important by-law passed and revised on a fairly consistent basis by the city is that of the Street and Traffic By-Law, number 2849, which was last consolidated in November 1977. This by-law contains a number of provisions which effect or impinge upon the planting and maintenance of trees on city streets. Moreover, in the interpretation section of this by-law there is the following definition for a "Boulevard" which has been adopted and used throughout this report.

"Boulevard on a street with curbs, means that portion of the street lying between a curb and the adjoining property line, and on a street without curbs, means that portion of the street lying between a ditch line and the adjoining property line; and on a street designed for segregation of traffic travelling in opposite directions by leaving a central portion thereof in an undeveloped state or improved by paving or by the planting of grass and shrubs, and that portion of the street so left shall be included in the term boulevard". (See also By-Laws 3241, 3861 and 4022, November 22/62)

The definition of a street is also contained in this bylaw and is given as:

"Street includes public road, highway, bridge, viaduct, lane and sidewalk and any other way normally open to the use of the public but does not include a private right-of-way on private property."

(By-Law 3773, June 9, 1959)

The by-law contains a number of important provisions that relate to the health and care of boulevard trees. The most important is a direct reference at Section 78, where injury to trees and flowers is prohibited.

"No person other than a duly authorized officer or employee of the City or Parks Board acting in pursuance of his duties, shall dig up or in any other manner injure or destroy any tree, flower, foliage, flowering plant, or shrubbery in any street".

Any person who commits an offence against this section is liable to a fine and penalty not exceeding \$250.00 plus costs, or in default of payment, or as an alternative, to imprisonment for a period not exceeding 2 months.

The second area of direct protection afforded to trees in this by-law is given at section 75 where the by-law specifies:

No person shall tie or fasten any horse or other animal to any tree, traffic sign or lamp standard."

The third general area of importance in protecting the boulevard tree resource are 3 sections that prohibit vehicular traffic from boulevards. These are Sections 1 (a), 79, and Section 80.

In the short term three permit systems govern activities within the street right-of-way and may adversely effect the health and vigour of boulevard trees. The first and most significant permit is the Street Area Permit issued by the City Engineer governing such activities as excavation within the street right-of-way. This permit normally carries with it a significant deposit requirement which may be forfeited for clean-up and repair costs if restoration of an area after construction is not undertaken and approved to a standard set by City inspectors.

The second permit in the short term case is issued by the Permits and Licensing Department for a nominal fee governing Street Occupancy. This permit may dictate specific hoarding requirements necessary to provide pedestrian safety and protection during construction activities. The manner of construction used in erecting such hoardings may significantly effect the condition of boulevard trees.

The third permit governs temporary sidewalks and boulevard crossings with the permit (Temporary Crossing Permit) issued by the City Engineer and again requiring a fairly substantial deposit.

The system presently used to permit and regulate all permanent encroachments is discussed more fully in the section on communications and liaison, however, it should be noted here that in the case of all encroachments such as landscape into the street right-of-way, where the City does not assume responsibility after establishment, the proponent must enter into a legal contract with the city that becomes an encumbrance on the title for the property concerned and is registered in the Land Registry Office as such.

In the second sub-section of section 71 of the Street and Traffic By-Law the City Engineer is given the power to control any encroachment onto the street right-of-way including (by specific designation) any trees. The wording in this section does not appear to cover trees growing on private property and overhanging the street, however, (as is the case in the previous sub-section) but rather tree (or any) debris dumped upon or allowed to remain upon any street.

In sub-section 4 of section 71 of the Street and Traffic By-Law the City Engineer is given the power to remove any offending intrusion into the street right-of-way and for the city to recover the costs of such removal from the order.

The second important reference in the Street and Traffic By-Law with implications for the management of boulevard trees is contained in section 30 and governs activities that might effect the health and condition of boulevard trees.

"Any person designing to have parking privileges temporarily suspended in order to facilitate a special operation, or desiring to reserve for temporary occupation any street or portion thereof....shall make application for such occupancy to the City Engineer....such person shall in each application agree to idemnify and save harmless the City....no person shall occupy a specific location on any street or portion thereof for any purposes....without a permit first having obtained from the City Engineer.

Such permits may be issued as follows:

- (i) for the occupancy of a specific location from time to time for short periods as may be stated on the permit, to be known as 'Special Zone Permit';
- (ii) for the occupancy of a specific location not exceeding one city block in length, for a period necessary to complete a particular project but not exceeding two weeks duration, to be known as a 'temporary special zone permit';
- (iii) for the occupancy of a portion of a specific street or streets for the time necessary to carry out an activity on a street, or to complete a particular project where the duration is more than two weeks, or to the extent of the zone or location is more than one city block in length, to be known as 'open clearance permit'."

Although these provisions cannot themselves provide protection for trees, it is possible that issuance of a Parking Clearance Permit for example, could be actively tied to an information system that allows the Arborcultural Group a warning of construction activities that might effect boulevard trees. Issuance of such permits might also have (in addition to a requirement for reimbursement to the City for lost revenues from parking metres, a provision for deposit or bonding for tree protection.

The third related section in the Street and Traffic By-Law that may influence execution of tree work during day to day operations (particularly those involving major tasks such as tree removal, large tree pruning, and insect control is section 86 that allows the City Engineer to close a street or portions of streets for maintenance work.

"when owing to work of construction, repair, or maintenance, or owing to damage by accidents or storm or other emergency, any street, or any portion thereof, is unsafe or unsuitable for traffic, or it is necessary that traffic should be restricted thereon or diverted therefrom, the City Engineer or the Chief Constable, or any person duly authorized by either of them, may close such street, or portion thereof, or restrict or divert the traffic thereon or therefrom, and for that purpose may erect or place lamps, barriers, signboard, notices, or other warnings upon such street, or portion thereof; and no person shall enter upon, or travel upon such street, or portion thereof, so closed as aforesaid, or enter upon or travel thereon contrary to the restrictions placed upon the traffic thereon as aforesaid, or remove, damage, alter or destroy, or attempt to remove, damage, alter or destroy any lamp, barrier, signboard, notice, or warning so placed as aforesaid.

Finally, in places where full closure is not necessary but where temporary no parking signs are to be erected to allow tree work, this provision is governed by section 22, part (d) of By-Law 2849.

Most of the by-laws desired in this section provide some indication of the delegation to and responsibility of city staff. Nevertheless, there seems to have been some dubiety as to the principal roles of the City Engineer and the Superintendent of Parks for the management of trees in the street right-of-way. Considering the clear concerns, responsibilities, duties and provisions contained in the three main city by-laws either directly or indirectly concerned with tree management, it is surprising to find the Legal Department of the City being asked in late 1970 for a legal opinion concerning the question of jurisdiction in the control of boulevard trees. This was requested by Mr. Townsend in the City Engineer's Department and Mr. Ellis of the Legal Department rendered an opinion based on the City Charter (sections 291, 151 and 488 were quoted. The opinion given was that although section 488 gave the Park Board care and custody and management of the public parks in the city, the boulevards were not included.

Presumably Mr. Ellis was not aware that boulevards had in fact been transferred to the Park Board (see section 5, By-Law 940 as amended by By-Law 93 discussed above and given in Appendix 22 and 23). A fuller text of Mr. Ellis' letter is contained in appendix 26.

For those wishing to compare the provisions of the City of Vancouver charter with the Municipal Act reference should be made to section 514 (1) a, b, d, e, section 711 (1) b, and section 868 f of that act. In Addition, reference should be made to sections 514 (3) and section 870. The detailed provisions of these sections are contained in Appendix 27 of this report.

This situation clearly demonstrates that the confusion that has surrounded the control of our trees in the City and the need for re-examination of the present By-Laws. Perhaps it also shows the need for more assertive management on the part of the Park Board and a clear mechanism for publication of the policies, responsibilities and By-Laws governing boulevard trees in the City.

For a specific example of a By-Law to regulate or prohibit the cutting of trees from municipal lands, as provided for in sub-Section (f) of Section 868 of the Municipal Act, readers are referred to Appendix 28 of this report. It should be noted that although the By-Law provides adequate provision or permits to be obtained prior to tree cutting, there are no provisions in this particular By-Law to preclude issuance of permits on any grounds thus effectively negating any intent to top tree cutting in the municipality.

#### New Jersey Example

Some jurisdictions have had a consistent, active and well developed approach to street and shade tree management for some considerable time. An example is that of New Jersey, (see Laws of New Jersey relating to Shade Trees, 1933, Appendix 29). In these laws, developed at the state level, provision has been made for municipal Shade Tree Commissions (1915), County Shade Tree Commissioners (since 1924), regulation of Trees on State Highway, authority for the state highway department to plant trees on highway lands, the control of road signs and advertising, declaration of Arbor Day, and penalties for tree injury and destruction. The powers given the Shade Tree Commissioners are considerable.

"To exercise full sole and exclusive control over the regulation planting and maintenance of shade and ornamental trees and shrubbery, or which may hereafter be planted in any public highway, park or highway, except county parks or parkways, of the municipality for which it is created, including the planting, trimming, spraying, care and protection of the same for the public good; to regulate and control the use of the ground surrounding the same, so far as may be necessary for their proper growth, care and protection; to move, or require the removal of any tree, or part thereof, dangerous to public safety, at the expense of the owner of such trees; ...to encourage arboriculture; to make, alter, amend and repeal, in the manner prescribed for the passage, any ordinances necessary to carry out the provision of this act."

State laws, such as that noted above, provide strong direction for tree management amongst urban municipalities in the United States. The appointment of Shade Tree Commissioners in most municipalities where commissions have been established is normally at the direction of the mayor and/or council and normally consist of 3 to 5 members. The city Park Director (or the City Arborist where one may have been appointed), is normally confirmed as an ex-officio member. Community residents with an appropriate landscape, nursery, horticulture, forestry and/or business background are often favoured for at least part of commission membership. These commissions have, for the most part, worked successfully and provided many municipalities with an enviable tree resource.

#### International Society of Arboriculture Model By-Law

Another example of a model by-law has been prepared for those interested in public arboriculture. Here the International Society of Arboriculture has prepared a booklet outlining a model shade tree ordinance principally for use in the United States. The most recently published edition is 1972 (and contained in detail in Appendix 30) provides an introduction laying out general principals, a specific model by-law, a list of suggested arboricultural specifications and a model permit system.

In the introduction to the booklet, the Society strongly suggests that:

"Municipalities should assume complete control over all public tree planting, maintenance, and removal. These functions should be performed with municipal crews and personnel, or by contract with qualified, licensed and insured private tree companies. Sufficient monies for these services should be provided from general municipal funds or by municipal-wide assessments."

The model municipal ordinance contains the following preamble:

"An ordinance regulating the planting, maintenance and removal of trees in the public streets, parkways and other municipally owned property: establishing the Shade Tree commission and establishing the office of a Municipal Arborist as the agency prescribing regulations relating to the planting, maintenance, and removal of trees in public places: providing for the issuing of permits for the planting, maintenance and removal of trees in public places: providing for the pruning and removal of trees on private property which endangers public safety: and prescribing penalties for violation of its provision."

The ordinance actually contains the following sections:

- (i) Preamble
- (ii) Definitions
- (iii) Establishment of a Shade Tree Commission
- (iv) Appointment of a qualified Municipal Arborist
- (v) Salary
- (vi) Duties
- (vii) Authority of the Municipal Arborist
- (viii) Permit procedures for planting, maintenance, removal, replanting and replacement.
- (ix) Pruning orders for obstructing trees
- (x) Injury or mutilation of public trees
- (xi) Interference with the Municipal Arborist



- (xii) Protection of trees
- (xiii) Placing materials on public property
- (xiv) Violation of penalty
- (xv) Legality of the ordinance and parts thereof
- (xvi) Emergency

Although this by-law has been written for situations in the United States, it provides an ideal outline of most of the provisions required for a comprehensive Boulevard Tree By-Law.

#### Ontario Model By-Laws

As part of a project in Ontario a publication entitled Urban Tree Forest Legislation (in Ontario) has been published for Canadian conditions. (see Appendix 31 for excerpts). Three model tree by-laws have been developed for different sized municipalities. One by-law is for towns with a population between 5,000 and 25,000, one for populations from 25,000 to 100,000, and the third model for towns with populations in excess of 100,000. This latter model bylaw would appear to have applicability for Vancouver and is reviewed briefly here.

The by-law opens with a preamble, title and interpretation sections and then goes on to contain sections for:

- (i) Establishment of a Department of Parks, an office of the Municipal Arborist and Tree Committee
- (ii) A definition of powers and duties of the Municipal Arborist
- (iii) Duties of the Department
- (iv) Duties of the Tree Committee
- (v) Authority and duties of City Council
- (vi) Arbor Day
- (vii) Prohibited activity
- (viii) Protection of trees during construction work
- (ix) A permit system

- (x) Duties of private landowners or occupiers
- (xi) Public nuisance from trees on private land
- (xii) Pruning and maintenance
- (viii) Removal, and replacement of public trees
- (xiv) Public participation
- (xv) Exemptions
- (xvi) Enforcement
- (xvii) Penalty
- (xviii) Incorporation of a master street plan and specifications
- (xix) Validity of the by-law
- (xx) Limitation

In the section on the appointment of a Municipal Arborist suggested expertise, education and experience are noted. A college degree in an appropriate field is given as a minimum requirement.

In the model the powers suggested for a Municipal Arborist are extensive and include:

- (i) Supervision and enforcement of the by-law
- (ii) Safety and Retention of trees
- (iii) Implementation of a tree program master plan and arboricultural specifications
- (iv) Issuance of permits
- (v) Inspection of work, departmental, commercial and private
- (vi) Designation of historic trees and tree values
- (vii) Tree planting
- (viii) Co-operation with other municipal departments
- (ix) Entry onto private property and sampling

In the section covering prohibited activities, specific provision is made for a permitting system that requires all parties, with the exception of Park Board staff, to obtain a permit prior to any work that may affect boulevard trees, with the exception of emergency circumstances.

This model by-law is a very complete attempt at regulating the management of tree resources of the urban environment in the Canadian context and demonstrates that such a by-law can be developed if the interest, need, and elective representatives support can be found.

#### Portland Example

On the west coast of the United States less emphasis has been paid to the formal appointment of Shade Tree Commissioners although some municipalities do have advisory committees, either drawn from city departments with a direct interest in city tree management, from a mix of such staff and local residents, or from a purely lay group intended to be geographically representative of the municipality.

Such is the case in Portland for example, where an eight member Advisory Board of civic-minded citizens with an interest in the appearance of Portland have been appointed by the mayor. The board assists the city arborist in planning new plantings and acts as a buffer between the general public and city government when controversial work such as tree replacement and insect management have been required. In 1972 Portland passed a revised street ordinance and regulations (contained in full in Appendix 32). This modern American by-law contains sections for:

- i) Definitions
- ii) Development of a comprehensive plan for planting, maintenance and replacement of trees in or along city streets. A survey of trees must be taken, an approved list of trees that can be planted has been developed and any person engaged in tree work must obtain a license.
- iii) Jurisdiction over street trees is given to the Superintendent of Parks with the proviso that he may call the City Engineer and the Board of Nuisance Abatement for enforcement.
- iv) The Superintendent can arrange for the planting of trees and may administer the permit system for private planting.

- v) Responsibility for maintenance is given to the Superintendent of Parks who may also require private trees encroaching on the street to be pruned. On public trees, tree trimming for utility is controlled by permit procedure. Permits are issued by the Superintendent of Parks.
- vi) Tree removals and injury to trees are prohibited without consent of the Park Superintendent. Permits are required for tree removals and may be conditional or on replacement with another tree at a suitable location.
- vii) Procedure for permit approvals, exceptions, and appeals against non-issuance of a permit are laid out.
- vii) Cutting, trimming and pruning specifications are established.
- ix) New subdivision tree planting requirements are established.
- x) New streets and street widening programs by the City Engineer must be prepared prior to construction and the City Engineer is required to co-ordinate the engineering designs with the Park Superintendent.
- xi) The measures required to protect trees during construction are set out.
- xii) The procedure for receiving and dispensing gifts and funds from local residents or businesses are laid out. There is also a part in this section that outlines city and private landowner/tree owner liabilities.
- xiii) The city Parks Superintendent is required to prepare a list of historic trees to be so designated by City Council. A procedure is laid out to provide 30 days notice prior to the proposed removal of any designated historic tree or trees.
- xii) The procedures for receiving and dispensing gifts and funds from local residents or businesses are laid out. There is also a part in this section that outlines city and private landowner/tree owner liabilities.

- xiii) The city Parks Superintendent is required to prepare a list of historic trees to be so designated by City Council. A procedure is laid out to provide 30 days notice prior to the proposed removal of any designated historic tree or trees.
- xiv) Penalty and nuisance abatement procedures and specifications complete by the by-law. This by-law has much to commend it and could well serve as a useful model for the proposed updating of the City of Vancouver Boulevard and Street Tree By-law.

#### Regulations of Tree Work:

The standard of tree work in Canada, and on the Pacific Coast in particular, differs widely both between and within commercial tree companies and parks departments. The principal reason for this situation can be ascribed to the lack of adequate training facilities, courses and work standards from either recognized colleges or major employers.

Further, there seems to be strong evidence that the general public require to be protected from the unscrupulous or untrained staff of some tree companies who will mutilate or destroy trees, undercut those who undertake sound but more costly arboricultural work and also practise without adequate liability insurance coverage. Since many municipalities are required to take the lowest bid for tree work without considerable justification, unreliable tree companies are employed, often without intensive supervision, causing trees to be irreparably damaged.

In order to overcome this grave situation, Ontario has proposed that there should be a Provincial Statute and/or qualified licensing of Arborists in that province. (see also Appendix 33) in a proposed draft of legislation to accomplish this provision is made for licensing arborists and arborist companies, examinations, establishment of an Examining Board, a hearing procedure, enforcement, and appropriate penalties.

It would appear that this approach has some considerable merit, however, the concept must hinge on provision of an accreditation and comprehensive training scheme in arboriculture. Such a scheme is advocated for the Province of British Columbia in this report. A logical development from the institution of such an apprenticeship training program would, of course, be the eventual regulation of all arborists and tree companies in the province.

## Historic Tree Preservation

In order to complete this section there are a number of miscellaneous areas where legislation or power for tree management requires comment. One such area is the preservation of historic trees in the city. Vancouver has a rich history of people and events. Many are associated with, or are commemorated by trees. A prominent example is a record of tree planting contained in The Royal Record (an extract is contained in Appendix 72).

Many jurisdictions have felt that it is desirable to not only have a "Roll of Honour" for historic trees but also to make specific provision to ensure that they are not mutilated or wantonly destroyed without clear procedures to review the necessity for destruction. An example of such legislation is that used in the United Kingdom entitled "Tree Preservation Orders".

It is not proposed here that specific by-law be adopted in Vancouver for historic tree protection. However, it is recommended that trees of importance on both private and public property have adequate legal protection from unwarranted damage. Three possibilities appear to be viable in this regard. The first possibility pertains to the protection of trees on private property. Here, the specific by-law regulating trees on private property would have to include a section dealing with historic trees in the city. As already noted the city would probably require an amendment to the City Charter to provide similar wording to that in the Municipal Act, Section 868.

If some provision could be made for the municipality to assume the maintenance for trees designated as historic trees by reason of their historic, horticultural or landscape values, this would substantially remove a major problem of inequity which attends tree preserving statutes in other jurisdictions. Often the onus for tree maintenance rests with the private property owner who cannot remove the specimens yet is required to bear the cost of maintenance for a tree or trees retained for community benefit.

The second option is for the incorporation of a specific section in the Boulevard Tree By-Law to ensure that historic trees were afforded some protection. However, it would seem that this mechanism would be limited to trees within the street right-of-way or on city property unless there is a change to the City Charter it does not appear that the city has the enabling power to

The third mechanism for protecting trees of historical importance or civic merit would seem to be through use of the Heritage Conservation Act (1977), although this legislation is intended primarily for the protection of structures and artifacts. A number of the Acts definitions are included below for interest.

"The purpose of this Act is to encourage and facilitate the protection and conservation of heritage property in the province".

Heritage object is ascribed as:

"Personal property of heritage significance, whether designated or not".

Heritage means:

"Historic, architectural, archaeological, palaeontological, or scenic significance to the province or a municipality, as the case may be".

Heritage site means:

"Land, including land covered by water, of heritage significance whether designated or not".

As the Act stands at the moment it would seem that it probably would allow City Council to "designate" particular trees and provide for their preservation, both physically and arboriculturally since, in the past, land has been taken to include trees on land.

#### Impinging Legislation

To finally conclude this section it is worth examining some legislation from each level of government that impinges upon the operations of a boulevard and tree program. In the case of Vancouver, two further by-laws are worthy of note. The first with implications for tree management within the street right-of-way is the local Sign By-Law.

This By-law is intended to regulate the size, shape, location, projection, method of attachment and type of signs, other than approved traffic signs, in, on or near to city streets. In conjunction with the building regulations and the Street By-Law, the Sign By-Law also provides effective control of canopies that can, or do, project or overhang into the street right-of-way. Regulation of signs and canopies is an important component in the overall regulation of street furniture, as well as the protection, location and maintenance of street trees. Although the general powers for sign regulations in this context are available, there is little evidence that the Sign By-Law has been used in order to ensure the location and health of street trees.

The second by-law of interest is that pertaining to the management of parks. Consistent with the provisions of the City of Vancouver Charter, the Board of Parks and Recreation has prepared and passed a Parks By-Law. This by-law was last amended in June 1978 and contains a number of provisions relevant to the management of boulevard trees although it is not specifically used for this purpose.

In the interpretation section, part c, boulevards are defined as:

"any portion of any street or highway under its jurisdiction which has been sodded, seeded or otherwise improved and maintained by the Board."

In the interpretation section, part 1, of the Parks By-Law, sub-section e provides a definition of parks.

"Parks means and includes public parks, playgrounds, driveways, roadway, paths, trails, fire trails, boulevards, beaches, bathing beaches, swimming pools, community recreation centres, golf courses, playing fields, building and other public places under the custody, care, management and jurisdiction of the Board."

In general, regulations set out in section 2 of the by-law prohibitions are listed in order to protect all fixtures in parks including trees.

Section 14 (a) provides the Board and its employees full freedom to carry out their designated responsibilities.

Section 24 of the Parks By-Law provides the superintendent with powers to post areas within all parks and recreational facilities for the purpose of prohibiting, restricting or regulating any activity in those areas.

Although no specific provision are made for the management of boulevard trees in the city within the wording of the by-law it is obvious that the Board and its superintendent have been given substantial powers for the regulation of parks. If it is remembered that the definition of parks in the City of Vancouver charter also include those other areas designated parks as defined by City Council and that City Councils in the past have so designated many streets and boulevards in the city, it becomes apparent that the Park Board does have some jurisdiction over trees on streets and boulevards in the city, even without the provisions contained in By-Law 940.



At the provincial level an example of important legislation is the Worker's Compensation Act of B. C. This legislative instrument, which creates a Worker's Compensation Board charged with inspecting places of employment and issuing orders or directives specifying the means for the prevention of injuries, is an example of an external control which may limit arboricultural methods.

Pursuant to the Act, industrial health and safety regulations have been passed and from the basis on which safety programs can be developed, although the Board specifically notes in the regulations that they should not be viewed as an end in themselves. This is evident from the present promulgated regulations in British Columbia which (unlike other jurisdictions, eg., the United States and Ontario) do not contain any specific detailed regulations for arboricultural operations despite the hazardous nature of many tree maintenance tasks.

A number of sections of the regulations are, however, of direct importance in addition to the accident reporting and other administrative requirements of the Act. Section 8 outlines general requirements for places of employment, section 14 describes personal protection equipment, section 16 includes specific references to chippers and chain saws, section 22 includes live line tree trimming tools, section 44 contains specific requirements for tree trimming around energized conductors while section 26 covers aerial devices and section 52 traffic control on streets. It is understood that more detailed regulations concerning all arboricultural operations are, or may be, in the process of development by the Board.

To conclude this discussion section on power and Legislation, it is worthwhile to touch on a legislative area under the jurisdiction of the federal government. The Criminal Code of Canada and the Juvenile Delinquents Act provide legislative tools to curb vandalism. In the case of the Criminal Code, Part X, section 387 and 388, contain remedies for public mischief. Vandalism is addressed in section 22 of the Juvenile Delinquents Act and restitution in Sections 653 and 655.

The writer does not foresee that legal constraints or penalties are likely to substantially curtail adult or adolescent vandalism on trees. However, it seems worthwhile exploring more extensively the remedies that can be obtained through fines and restitution for offenders that are convicted. This avenue is, of course, dependent on the co-operation of the police and judiciary in recognizing tree vandalism as an important cost to society.

## Conclusions

Trees on city streets at present are subject to a considerable amount of thoughtless or deliberate abuse. Although the present Boulevard Tree By-Law has not been used lately, this is symptomatic of the present style of tree management rather than an indication that such powers are not required. In order to implement the broad change of perception implicit in this report it is essential that the by-law be updated.

Similarly, inadequate protection is presently afforded trees on public lands in the city and to those trees of significant public value on private lands. The present Tree Destruction By-Law is now redundant. However, it could, and should, be rejuvenated to cover a broader scope urban forest activities and protection.

A number of city by-laws impinge upon or are useful in providing added protection to city trees. The Park Board has not made full use of the provisions in these by-laws, although it must be recognized that they have not been normally written with tree protection in mind. Some minor updating and redefinition would make these by-laws useful supplements to a proposed new Boulevard and Street Tree By-Law.

Some legislation at the Provincial and Federal levels of Government have direct implications for the management of trees in the urban setting. More attention should be paid to the provisions in these laws both as they may limit present activities or as they may assist in providing the legal background for a more complete approach to management of trees in the City of Vancouver.

## Specific Recommendations

1. It is recommended that a revised and renamed Boulevard and Street Tree By-Law be prepared by the staff of the Park Board in conjunction with the city Legal Department and with participation from all appropriate city departments. The draft by-law should be vetted by the Board of Park Commissioners and submitted to City Council for consideration and adoption.

It is recommended that the present Arbor Day By-Law be repealed. It is further recommended that the new Boulevard and Street Tree By-Law should address the following topics:

(i)	Short Title
(ii)	Definitions
(iii)	Appointment of a City Arborist
(iv)	Duties of City Arborist
(v)	Authority of City Arborist
(vi)	Appointment of Street Tree Design Panels
(vii)	Duties of Street Tree Design Panels
(viii)	Reimbursement of Design Panel Member
(ix)	Appointment of Tree Wardens
(x)	Duties of Tree Wardens
(xi)	Prohibited Activities
(xii)	Protection of Trees During Construction
(xiii)	Protection of Historic Trees
(xiv)	Moving Large Objects on City Streets
(xv)	Protection and Maintenance of Tree Lawns
(xvi)	Infestations of Insects or Disease
(xvii)	Permit Requirements & Conditions
(xviii)	Permit Fees
(xix)	Registration of Arborist Companies
(xx)	Exemptions
(xxi)	Appeals
(xxii)	Establishment of a Boulevard Trust Fund
(xxiii)	Appointment of Trust Fund Trustees
(xxiv)	Establishment of Arbor Day
(xxv)	Establishment of an Approved Tree List
(xxvi)	Establishment of a Boulevard Tree Master Plan
(xxvii)	Emergency conditions
(xxviii)	Enforcement of the By-Law
(xxix)	Penalties for controvention of the By- Law

2. It is recommended that the present Tree Destruction By-Law be replaced with a new Urban Tree and Forest By-Law to be prepared by the staff of the Park Board in conjunction with the City Legal Department. The draft by-law should be vetted by the Board of Park Commissioners and submitted to Council for consideration and adoption.

It is suggested that the new by-law should address the following topics:

- (i) Short Title
- (ii) Definitions
- (iii) Duties of City Arborist
- (iv) Authority of City Arborist
- (v) Prohibited and Regulated Activities
  - (a) Encroachment
  - (b) Fires
  - (c) Dumping
  - (d) Camping
  - (e) Horses
  - (f) Trail Bikes
  - (g) Tree Cutting
  - (h) Tree Damage
  - (i) Removal of Windfall
  - (j) Disturbance of Wildlife
  - (k) Disposal of tree debris
- (vi) Regulation of Private Trees
- (vii) Regulation of Park Trees
- (viii) Regulation of the Urban Forest
- (ix) Historic Trees
- (x) Agreements with private landowners
- (xi) Infestations of Insects and Disease
- (xii) Establishment of an Urban Tree and Forest Master Plan
- (xiii) Emergency Conditions
- (xiv) Enforcement of the By-Law
- (xv) Penalties for controvention of the By-Law

3. In order to impliment the intent of the previous recommendation for an Urban Tree and Forest By-Law that provides the option of regulating trees on private property, it is recommended that City Council make application to the Government of British Columbia for an amendment to the City Charter similar to that already provided for in section 868 of the Municipal Act.
4. It is recommended that the present Park Board By-Law be amended to reflect the suggested Park Board role in full management of the Boulevard Tree Program and Urban Forest Resource.
5. It is recommended that a new subsection to Section 71 of Part 2 of the Street and Traffic By-Law (2849) be drawn up by the City Engineer's Department in conjunction with the Park Board in order to define the engineering and traffic safety role of the City Engineer. A procedure, that ensures that all boulevard tree projects affecting engineering or traffic safety, are referred to the City Engineer, should be evolved.

6. It is recommended that the revised Boulevard Tree By-Law incorporate specific reference to tree vandalism and providing appropriate police power, penalties, and restitution procedures to discourage this careless or anti-social practice.
7. It is recommended that the City petition the appropriate Ministries of the Provincial Government for Provincial legislation to regulate the qualification and licensing of arborists in British Columbia. It is further recommended that such legislation should be linked to a Trades Training and Accreditation scheme for practising arborists and arboricultural companies.
8. It is recommended that the City document and take particular note of, and comply with, any Federal or Provincial legislation that may affect the operation of the Boulevard Tree Program. Examples of such legislation at the Federal level are the provisions of the Plant Quarantine Act (as with concerns for Dutch Elm disease, Gypsy Moth control, etc.) and at the Provincial level, the Pesticides Act and the revised Worker's Compensation Board regulations.
9. It is recommended that a specific subsection be added to the existing City Sign By-Law (4810) outlining interference with boulevard trees, responsibility of the Park Board, restrictions governing sign placement, and appropriate clearances for signs and canopies. In addition, it is recommended that the required stipulations for this subsection also be incorporated in the proposed new Boulevard Tree By-Law.
10. It is recommended that the Development Permit procedures and Encroachment Agreement requirements concerning procedures, approvals, liabilities, costs, and maintenance of boulevard trees desired by developers (in the sidewalk or between the sidewalk and the curb, or between the sidewalk and the property line) continue to be executed and approved by the City and City Engineer. However, it is recommended that a Park Board consultative role be specifically delineated and that transfer of developer trees to the Boulevard Tree Inventory be by formal memorandum.

## ORGANIZATION AND RESPONSIBILITIES

### Introduction

The purpose of this section is to provide a complete outline of the organizational relationships and responsibilities existing within, or impinging upon, the street tree program. Without such an outline it is not possible to provide a coherent framework for planning, administering or executing the City Boulevard Tree Program, nor to assess the adequacy of existing resources to meet the program goal and objectives set out at the beginning of this report.

This section has been broken down into four distinct categories; division of responsibilities, relationship with other City Departments; relationships with other agencies; and arboricultural group organization. A community relations aspect of the Boulevard Tree Program has been treated as a separate topic in this report.

Division of responsibilities is an important consideration for it can reflect adversely on aspects of communication, trust, staff morale, efficiency, program performance and budget requirements. It embraces all those who have a direct interaction with the Boulevard Tree Program.

The organization and staffing of the Arboricultural Group has an obvious correlation with standards of operation and maintenance, ability to meet performance and workload targets, perceptions or expectations for the program, public, political, departmental and as already noted staff morale.

The relationship with other City departments, which interact with the Boulevard Tree Program, is coloured both by the foregoing and by the responsiveness of the boulevard tree program staff to meet those needs generated by the day-to-day activities of all other City jurisdictions. Where conflicts occur, respect for the program is diminished; and where accommodation is made, the objectives of the program are strengthened. Much the same is true of relationships with other agencies not directly connected with the City, but which contribute to, or are affected by, operations of the Boulevard Tree Program.

The staff of the Park Board responsible for the Boulevard Tree Program interact with a substantial number of City departments during day-to-day operations. Field staff have generally had the bulk of the responsibility for this interaction and there is some evidence that management level employees of the Park Board have been reluctant to engage in a dialogue on organizational, policy, or planning matters with their opposite members in City Hall. To the extent that this has happened, it has handicapped the program and resulted in unclear procedures and responsibilities.

In order to attempt to fully identify the various groups that are affected by the present Boulevard Tree Program, a simple communications net was prepared by the participants in the workshop that determined the major areas of concern. This net is shown in listed form in Appendix 36. The nature and importance of the various levels of communication with each entity listed was not determined. Where appropriate, direct interviews with each group were undertaken, while consultation with the remainder was by telephone. The list is not exhaustive and no doubt some agencies, particularly outside the realm of Municipal Government, remain to be identified. Within the City Hall structure, the Budgets and Research Divisions of the Finance Department, and the Classification Section of Personnel Services Department were not contacted, though this will be necessary once the report recommendations are accepted. In addition, field interviews with foremen in City departments outside the Park Board were not conducted at this time, as it was felt that the report recommendations should be discussed and reviewed at the management level with appropriate changes to responsibilities and organization in the Park Board implemented before drawing attention to changes in operating procedure. However, the success with which some recommendations can be implemented, particularly those requiring voluntary communication in the area of procedures and practices, is wholly contingent on full cooperation from many City departments at the technical level.

Discussion - Division of Responsibilities, City Engineering

By far the most important contact in the operation of the Boulevard Tree Program is the City Engineer's Department. The City Engineer has full responsibility for control of all street/boulevard rights-of-way in the City (see also section on Powers) and consequently, responsibility for approving or disapproving of any additions to the streetscape, including boulevard trees. Principal functional

responsibility is vested in the Streets Division, with Sewers, Projects, Water and Sanitation, Electrical, and Traffic divisions all concerned from their own prospective.

The Engineering Department duties and authorities regarding streets are contained in Section C: Streets Development and Maintenance of the City of Vancouver Administration Manual. These evolved from the delegation of responsibility for Bylaws 2849, 4702, 3334, and 3506 through Council and the City Manager to the City Engineer. This responsibility includes general care and custody of, and jurisdiction over, the City streets, including areas leased for street purposes, and for all of the City's street works and improvements. The City Engineer is also empowered to act on behalf of the City in all matters regarding street maintenance, trolley and street lighting poles in joint use with B. C. Hydro, and to work with the Department of Highways, University Endowment Lands and surrounding municipalities regarding routine joint concerns.

In particular reference to the management of street trees, the City Engineer may prescribe the alignment of new street trees or require that their installation be deferred because of other planned work, or may remove street trees where necessary to carry out authorized work, including that associated with utilities, encroachments, and crossings. In addition, the City Engineer may require the trimming or removal of street trees which interfere with street lighting, which obstruct pedestrians, vehicles, or the view of traffic signals or signs, and may authorize the removal of roots which obstruct or endanger sewers. In practice, the City Engineer and his supporting divisions have maintained good liaison with the Park Board and in most cases necessary tree work has been referred to the Arboricultural Group by work order or similar procedure. Insofar as this situation prevails at present, it seems that major conflict does not normally arise. Moreover, there is no doubt that the provisions set forth for the City Engineer to safeguard the public and maintain acceptable engineering standards where these interface with the establishment, maintenance or removal of street trees, are necessary. Further, it would seem incumbent on the City Engineer and his staff to rigidly stipulate basic standards for the Boulevard Tree Program, something that has not occurred to date.



A number of specific divisions within the City Engineering Department have detailed concerns about the Boulevard Tree Program. In general, the introduction of trees into the street right-of-way complicates each division's responsibilities, and adds an additional burden onto their operating procedures and costs. It is, therefore, a responsibility of the Park Board, as custodian of the boulevard trees of the City, to see that every effort is made to accommodate and mitigate the intrusion of trees in the right-of-way without sacrificing the philosophical, social and economic benefits derived from them. Good design, appropriate choice of species, effective communication, prompt, complete and efficient management, coupled with clear policy and work practices, are obvious examples of measures that can enhance interaction with other departments.

The divisions within Engineering that have operating interests in boulevard trees were contacted, and a brief review of their concerns follows.

Projects Division looks to the Park Board to provide detailed, professional advice on choice of species, particularly when developers or their architects have a specific plant in mind. The lack of adequate written guidance from the Park Board on approved species and sizes of stock is seen as an operating handicap. Where work is carried out by the Park Board in conjunction with the Projects Division, there has been inadequate documentation and lack of accurate costing for both trees and planting. The unavailability of adequate maintenance standards from the Park Board complicates project control. Some confusion exists regarding scheduling of Park Board operations, particularly when planting can, or will, be undertaken. The present encroachment agreement process could be much improved if the Park Board participated with detailed recommendations. (Encroachment Agreements are dealt with in greater detail in the section on Powers) As in many other situations, it appears that Park Board communication is handicapped by lack of hardcopy on operating procedures, and severe time constraints on personnel responsible for program planning.

Department Services and Sewers Division provided information on budgets, operations research and sewers problems. The present de-emphasis on funding neighborhood

improvement programs by the Federal Government will mean that projects that relied heavily on these procedures for tree planting may not continue. Local improvement procedures that have provided funds for curb and gutter programs have not been extended to include tree planting, which is normally paid for by the City out of capital funds appropriated for the Park Board. An equity problem arises if this procedure is used for tree planting, since much of the City has already had trees provided out of general tax revenue. Moreover, it is extremely difficult to plan a cohesive tree planting program with the administrative burden often disproportionate to the financial returns. The present City Five Year Plan has no provision for beautification funds similar to the one-third City, two-thirds property owner, cost-sharing program previously enforced. There will be a continuation of the curb and gutter program, but the responsibility for providing funds for trees will apparently still rest with the Park Board. Previous programs in the downtown, with merchant participation, have been allowed to lapse; with no monies specifically earmarked, maintenance has also declined.

Operations Research Division have, in the past, had some interest and responsibility for data collection and coding of street tree information, although no concerted effort has ever been authorized. Familiarity with the existing street inventory system would allow this group an advantage if a full boulevard tree inventory program was to be written and tested. Such a program would be in addition to present responsibilities, and would require approval and, probably additional funding. It seems that this division has the appropriate expertise and enthusiasm if the administrative machinery can be set in motion for an initial study of computer software requirements.

The Sewers Division requires almost \$150,000 per year for sewer unstops caused by tree roots, and this sum grows by about six percent per annum. In addition, a further \$150,000 is spent out of capital funds for installation of root-proof pipe, while it is estimated a further \$50,000 is spent by homeowners to repair sewer pipe damaged by tree roots. This problem is primarily one restricted to the sanitary and storm sewers constructed of vitrified clay with mortar joints, and in sizes below 12". The problem is slowly being overcome with the use of root-proof sewer pipe, but some areas have had a number of recurring problems. No system presently identifies species or location particularly

prone to problems, and as far as can be determined, few trees are specifically removed to rectify root or sewer conflicts. It is strongly recommended in the 1979 Municipal Services Report (Page 87, No. 10) that this situation should not be allowed to continue.

In the Electrical Divisions, the Street Lighting and Utilities Control Engineer has a general concern for the security of all utilities, both below and above grade. Maps, at one inch equals forty feet, exist for all utility services in the Downtown and West End; while maps of one inch to one-hundred feet cover the rest of the City. Below-grade utilities include: secondary sewers at five feet; main sewers at seven to nine feet; water at three to four feet; gas mains at two and a half to three and a half feet; gas service; telephone; electricity; steam heat; street light; fire alarm and traffic signal services all around 18" below grade. Other miscellaneous utilities include: cable television, often in the same ductwork as telephones; G.V.R.D. Sewer and Water; oil tank feeders; and irrigation systems. All below-grade utilities are of concern when mechanized tree planting or moving is contemplated, although the combination of field maps and pipe locaters can normally certify an area as safe for digging. Electricity and telephone are normally separated and protected by ductwork, while most street light feeders at 244 or 480 volts are not "live" during the day. All gas pipe easements are ascertainable from the Gas Division of B. C. Hydro, and it is required by law that accurate checks are made for this utility. No serious accidents, with tree planting or removal affecting underground services, are on record.

The laying of new underground services where boulevard trees already exist is of concern, and adequate arboricultural standards for protection do not presently exist. It is suggested that field inspectors who review work proposed or done by contractors should receive some basic training in arboriculture. A hold-back for damage to City property, including street trees, is suggested as desirable but difficult to implement and assess, since tree root damage or overall decline may not become visible until a growing season after the contractor leaves the site. Adequate review of proposed underground utility installations by the Park Board is not part of current procedures.

Above-ground services include telephone, cablevision, C.N. and C.P. wire services, trolley wires and B. C. Hydro lines. Maps or records exist for all of these services. It is estimated that there are 300 miles of City streets with joint-use pole lines, although it is not clear if this figure includes joint-use poles or telephone and hydro separately. As far as can be determined, protection standards exist only for electrical utilities. Although, in some cases, such as Water Street, undergrounding has been undertaken with funds from the Provincial Power and Telephone Beautification Fund Act, no concerted effort related to the Boulevard Tree Program is in effect for residential undergrounding or for backlaning. This procedure was advocated in the Municipal Services Report. (See Recommendation #9, page 106 of that report). A more detailed discussion on interaction with B. C. Hydro is covered in the next section of this chapter.

At present, there are funds provided to the Park Board for tree trimming and pruning around street lighting fixtures. The current account is slightly over \$14,000 per annum. A list is provided by the Street Lights Foreman, and the tree work is carried out by the arboricultural and forestry group. No special standards account for different light fixture spacings, overhang design, street widths, types of luminaire, for specific tree species or for different types of street. An Illuminating Engineering Society standard does exist for tree trimming but has not been formally adopted in Vancouver. In addition to normal street lights, ornamental lighting, tree lights and Christmas tree lights may be located in or very close to some trees. Problems presently exist with the use of these lights in some locations. An example is the high intensity feature lights located in many of the beech trees on Granville Mall where heat from the lamps has caused large patches of bark dieback and the plastic clips holding the light cable conduit is starting to bite into the stem of some trees.

In the Streets Division, with responsibility for 194 miles of major road, 687 miles of local roads, and almost a thousand miles of sidewalk, concern centres around safety, construction and design considerations. This includes street widening, paving, curb and gutter programs, tree species and their potential to damage sidewalks, curbs and road surfacing, tree braces, grates and guards, general engineering and public safety, street crossings and lanes maintenance. As already

discussed, detail design profiles for various trees would allow appropriate engineering appraisal and approval of specific species. Such profiles have not been prepared by the Park Board. An example of the topics contained in a detailed tree profile are shown in Appendix 38. In beautification areas, tree grates and guards are presently serviced by the Engineering Streets Division as are tree braces in all sidewalk cutouts, except in some locations subject to an encroachment agreement or where base plantings have been used.

Street crossings have to contend with trees already in place and in the way of proposed crossings. Park Board and Council have not been sufficiently flexible in allowing removal of trees for crossings. Where trees are to be removed, Park Board has not had a program of saving small trees by digging and removing (no tree spade). No standards exist for clearances from crossings for trees of different caliper or age class.

For the past 12 years there has been a special emphasis on providing curbs, gutters and properly paved residential streets. This program requires the abutting property owners to pay for the curb and gutter, while the City has borne the cost of the asphalt surface, preparing the boulevards and installing trees. The tree installation and subsequent maintenance is budgeted for by the Park Board. The policy to plant fairly quickly following the curb and gutter program has severely taxed the Arboricultural Group's capabilities, as staff and equipment have not kept pace with the requirements for small tree maintenance. It is presently estimated that the curb and gutter program will not be completed until the year 2000; 280 miles remain to be completed at approximately 14 miles per year.

Sidewalk location is a prime factor in determining the amount of tree lawn left for planting. In many places, there is inadequate space for even fastigate trees. As new sidewalks are installed, or old sidewalks replaced, there is an ideal opportunity for additional space to be incorporated in the street design.

At present, 391 miles of lane are maintained by the Streets Operations Branch. Maintenance includes tree trimming and pruning, and in some cases, removal. Hydro tree pruning also takes place in those lanes where

portions of the overhead Hydro system have been located. No conflict appears to exist between the responsibilities of the arboricultural and forestry group and the lane responsibilities of the Streets Operation Branch.

Up until very recently, the architectural treatment of City streets, commonly called "amenity streets" in beautification areas, has been carried as a joint effort by the Streets Division and Special Projects Division. These projects have included streetside plantings, trees in sidewalk cutouts, and plantings at the base of trees. Although capital monies were at one time available for this work, no provision was made for the very high plant and labour costs which attend the maintenance of these installations. Moreover, these projects overtaxed the Park Board ability to supply a diversified resource of appropriate tree species at time of construction. This will result in ongoing problems of high intensity maintenance for tree trimming, tree removal, possibly insect and disease control, and certainly treatment of tree pit plantings and ground cover.

Notwithstanding these reservations, it was concluded in the Report on Municipal Services to City Council in 1977 that: (The City) "continue and expand the program of tree planting to enhance the street landscape" (Recommendation #12 page 52). It is assumed that the costs and programs necessary for long term maintenance were also implicit in the recommendation.

In the Traffic Division, concern is expressed that street safety and accessibility might be compromised by tree growth. Facilities include traffic control signals, "stop", "yield" and "crossing signs", parking and other curb side limitations, and general information signs, including street names. Present pruning practice for mandatory traffic signs is to obtain two years' clearance, while no maintenance standard probably exists for other facilities. Similarly, no standard has been prepared to outline basic planting practice in the vicinity of existing street signs.

The Traffic Division also has a responsibility for centre boulevards, many of which have substantial plantings which must be checked to ensure that bollard lighting, street signage and signals are not obscured by excessive tree growth, or damaged by plant roots.

Water and Sanitation Division are charged with the protection of water systems from tree planting or subsequent growth and the collection of leaves and other tree debris primarily in the Fall. In general, the water system is not substantially effected by trees either below grade or at the numerous service and inspection boxes. No standards for planting constraints around the water system or protection of trees during water pipe repair or installation, presently exist.

Leaf pickup is a costly problem though limited to two months in the Fall or after gale-force winds. Some large leaf species can easily plug storm drains and cause localized flooding. No trees have been specifically removed to alleviate this problem, nor is there any program of installing side mouth street drains. Cost of leaf pickup in 1977 was slightly more than \$110,000. No program presently exists to compost leaves and recycle them as a commercial enterprise through a contractual agreement with large users. This has been tried but stiff competition from Lower Mainland peat producers has precluded success. Leaves are presently dumped and stored for the Park Board on location, or at Kerr Street dump for use at the Vandusen Gardens, and at Camosun for the University Endowment Lands. Leaf pickup in areas of heavy parking and large trees with big leaves, such as the residential area south of City Hall, is extremely difficult due to continuous car parking on both sides of many streets. In addition, some species, for example, catalpa, are a specific problem, since their leaf-drop period is considerably later than most other species, requiring costly individual attention. It is known that some leaves are more difficult to pick up than others, but at present this problem is not well documented.

#### Other City Departments:

Apart from the City Engineering Department, a number of other City departments interact with the street tree program. These include Properties Division of the Finance Department, the Fire Department, the Health Department, the Department of Permits and Licences, the City Planning Department and, in a few circumstances, the City Clerk's Office.

The City Clerk's Office maintains records of Council meetings and any questions raised concerning trees. This information can be obtained by referring to the Minutes Index. Details from 1973 onwards are given in Appendix 39 of this report.

The Properties Division does not have a substantial interaction with the Boulevard Tree Program except where trees on publicly-owned property interfere with the growth of boulevard trees, or where the Arboricultural and Forestry group is asked to contain, maintain or remove hazardous trees from City property. Some derelict land at street ends held by the Properties Division has had boulevard trees planted at one time or another. However, no organized maintenance is evident in most locations. Properties have suggested that there should be an articulated policy regarding the maintenance and use of trees on School Board property.

The Fire Department does not have the major concern with regard to street trees that it once had, when trailer men were required for long apparatus. The new Firebird equipment can lay into trees without substantial damage, if the need arises. In other cases, street trees may be sacrificed if the problem of access requires such drastic measures. Fireplugs require at least a minimum clearance from street trees to allow access with a swing spanner. No specific rule presently applies for planting beside fire plugs.

The City Health Department has some limited interaction with the existing Boulevard Tree Program. Concern has been expressed regarding the removal of trees with potentially poisonous parts, (for example, laburnum) planting of species that cause allergenic reactions, (for example, plane and poplar) and the use of pesticides for insect or disease management. These concerns have not been formalized as standards for prohibited species or spray procedures, practices or materials.

The Department of Permits and Licences controls both building permits and street permits for hoardings. In general, building permits that will affect existing street trees or will require specific agreement of the City for new plantings are referred to the Park Board for review. It is not clear that this procedure is



followed on a systematic basis. Permits for street hoardings are normally issued after field inspections and, in some cases, contact is made with the Arboricultural Group. However, no proper procedures exist to remove trees, nor to provide adequate protection for those left in place during construction.

It would appear that inspection by the Arboricultural staff, or by Building and Street Inspectors with Arboricultural training, would allow the Park Board to recover costs of damaged boulevard trees from the hold-backs presently levied against developers and their contractors.

The City Planning Department has had considerable involvement in the tree program, primarily in beautification areas. A reticence on the part of the Park Board to provide detailed information suitable for planning decisions is perceived by some planning staff. This, in turn, has meant that friction has developed between the personnel in both groups. Some concerns have been raised by planning staff, particularly regarding policy decisions on design; for example, big trees versus flowering trees, choice of species for theme areas, tree use in historic areas, and the possibility of large tree moving for specimen planting at important intersections. As noted in communication with other groups, lack of accurate documentation for establishment, maintenance and similar topics has fueled the difficulty, as Park Board has not had method and costing information to provide. Frustration has increased because consultation approaches have apparently been rebuffed rather than cultivated. The downturn in funding will reduce the direct communication with Planning; however, preparation of the City-wide Master Tree Plan will benefit from contributions by this Department.

No specific contact was made with the Vancouver Library, the Centennial Museum, or staff involved with presentations at the Pacific National Exhibition. Each of these facilities could provide innovative community-related projects or displays, emphasizing the importance of boulevard trees to the community.

The Police Department has been directly involved with programs to reduce vandalism through the Community Relations Officer, although there has been no special emphasis on tree problems. Citizen concern regarding

vandalism has been brought to the attention of police on many occasions but, at present, there is no concerted effort to prosecute perpetrators. Further discussion regarding vandalism can be found in the section on Procedures and Practices.

#### Groups other than City Departments.

Interaction with groups outside City Hall has been broken into 11 categories (see also Appendix 40) including; other municipalities, the industrial/commercial sector, professional groups, the utilities, the general public both organized and unorganized, the Provincial and Federal level of government, the news media, academia, and other miscellaneous groups.

For a more detailed discussion on relations with the general public and the news media, see the section on Community Relations. It would seem that insufficient attention has been paid to local ratepayers' groups, most of whom support the Boulevard Tree Program and appreciate individual attention and input to the planning process.

Relations with other municipalities are minimal at present, with little specific interaction concerning respective boulevard tree programs and the relative effectiveness of different approaches. Burnaby has initiated a substantial planting program based on a detailed report submitted to Council in 1975 following a questionnaire sent to all Lower Mainland municipalities. A staff professional has now been employed to specifically oversee implementation of the program.

Surrey has only the barest minimum of staff and presently no maintenance program, hard copy program controls or bylaw. Vandalism is an ongoing problem. Developers contribute \$50.00 for trees for projects, and this is to be raised to \$150,000.

New Westminster has relied on the local improvement procedure to plant trees and has appropriate forms to encourage tree planting and handouts for homeowner participation in maintenance. Work on tree planting is undertaken as a joint effort between Parks and Recreation, City Planning, and a citizen planning committee. Emphasis is on flowering trees and adequate aftercare. Four to five boulevards are being planted each year. It is a policy to withhold planting where

people have expressed a wish not to have trees. There is no street tree bylaw.

Richmond has relied heavily on neighborhood improvement and contract planting. Many centre boulevards have been planted, particularly with conifer specimens. A street tree planting plan was prepared in the past by Justice and Webb. The onus for planting in new residential areas rests with the developer, and forms part of the development approval.

Delta has recently appointed a new Parks & Recreation Manager, who may upgrade that municipalities' approach to boulevard trees. At present private planting is allowed on boulevards. West Vancouver has an organized tree maintenance and removal program. The principal concerns are view pruning and Hydro pruning.

The District of North Vancouver prepared an extensive report on boulevard tree planting in 1969. A fully organized program has not evolved.

There would appear to be a number of opportunities for co-operative exchange of information and resources. Examples include data on the suitability of tree species, comparison of standards, equipment pooling, young tree nursery ventures, certification of tree companies, approved lists of materials, and boulevard tree management seminars. Joint funding of applied research may also be a viable possibility, yielding substantial benefits on a cost-sharing basis.

Although the City of Vancouver has previously worked with the Businessmen's Association to install planters and ornamental plantings, there is no direct liaison with this group and the Park Board staff. The resources and enthusiasm of such Associations therefore has not been adequately tapped and past projects have been allowed to decline through mutual neglect. In the industrial/commercial sector, the City has not taken an aggressive stance on certifying tree companies; and consequently, a number of "undesirable" firms and practices exist, according to the Provincial Ministry of Consumer and Corporate Affairs. Liaison with the nursery trades industry has not been expanded into a productive dialogue on growing suitable tree species for boulevard planting, contract growing, digging and transportation mortality or similar topics. The Nursery Trades Association is an active group, and would welcome improved interaction with the City.

The main professional group concerned with the Boulevard Tree Program appears to be the B. C. Society of Landscape Architects, which maintains an Urban Design Committee. This committee has, on occasion, provided consultation services directly to the City Engineer. Contact with this Committee of the Society has not been established on an ongoing basis, and both the Society and individual members do not appear to have a particularly high opinion of present boulevard tree operations (for example, see Appendix 41). The expertise and interest of this group of professionals could be harnessed in the design element of the Boulevard Tree Master Plan, and in providing professional advice to architects and developers, based on the design criteria established by the City.

Relationships with telephone and electrical utilities appears to be good at the working level, but does not appear to extend to the management level responsible for the Boulevard Tree Program. Pruning of boulevard trees by companies engaged by B. C. Hydro remains a contentious issue. The quality of work has been extremely poor in some instances. In addition, some pruning carried out by the City crews, on behalf of B. C. Hydro, has also been sub-standard. The total amount spent by B. C. Hydro over the years, for pruning by City forces, is given in Table 3. No program presently exists to remove incompatible species from below Hydro conductors, nor to encourage backlaning in areas where tree problems predominate. B. C. Hydro has expressed willingness to participate in both programs, if an organized approach is developed. Where tree trimming or pruning must still be carried out in boulevard or park trees in the City, it would seem that City forces can be adequately equipped and trained to handle all such work irrespective of line voltage. This would ensure that the City maintains complete control over the quality of work on City trees, while B. C. Hydro would benefit from a degree of accountable and cost effective protection that it does not presently obtain from partial contracting to commercial tree companies.

Transit concerns include tree clearance for Hydro buses, especially on new routes, and protection of overhead trolley wires. These problems do not appear to present undue conflict at present. However, the extensive planting of tall growing species in new beautification

areas, often below trolley system feeders, is likely to become a major source of irritation and ongoing maintenance in the next ten years. This problem could have been avoided at the design stage, but will now require some difficult decisions on appropriate practice in the future, if these trees are not to become severely mutilated to ensure continuity of trolley service.

B. C. Tel has, in the past, provided a substantial contribution (see Table 4) to the Park Board for boulevard tree trimming. These funds have diminished in recent years as open telephone lines have been replaced with cable, both above and below ground. Technological advances in the field of fibre optics will probably see the disappearance of much telephone equipment from above-grade locations in built-up areas.

Contact with the Provincial Government has not been a part of boulevard tree operations except in dealings with the Workers' Compensation Board (see also the section on Training), the Forest Service for supply of seedlings, and the Pesticides Branch of the Ministry of Environment for certificating pesticide applicators. No approach has been made to Municipal Affairs for logistical or financial support for City beautification.

Contact with the Federal Government has been fairly minimal, despite the Federal responsibility for plant quarantine (see also the section on Procedure and Practices), pesticide registration, and forest research. In the past, various manpower programs have been sponsored by the Dept. of Manpower & Immigration and temporary staff have been recruited for planting and maintenance. De-emphasis and reorganization of these programs will probably reduce their attractiveness and workability in the future.

Contact with Faculty at Simon Fraser (Pest Management, Urban Geography) and at the University of British Columbia (Urban Horticulture, Forestry, Planning, etc.) has not been encouraged, and these resources have largely remained untapped as potential allies and problem-solving entities. Small scale funding of graduate student projects can often provide a wealth of useable information on special problems, while faculty can often be interested in special consulting assignments. Liaison with the community colleges,

particularly B.C.I.T., has not been encouraged or developed; consequently, the expertise of the practical schools has not been incorporated in the Boulevard Tree Program. In particular, full utilization has not been made of the facilities available for trades training. (see also the section on Training, with regard to certification of an Arborist Trade)

### Conclusions

A great deal remains to be done in the important area of communication and interaction with departments and agencies outside the Park Board. The capitalized boulevard tree program could be substantially strengthened by improving relations with other City departments, and by being more responsive to their operating goals, objectives and constraints. In particular, a more flexible attitude appears to be needed in removal and replacement of some species. In addition, the role of the Arboricultural Group in providing professional advice to other City departments has not been developed. This has resulted in diminished responsibility for the Park Board, some conflicts of purpose, and an increasing and unnecessary dependence by other City departments on outside consultants. They are often not familiar with internal and municipal constraints, nor provide the consistency of advice necessary to develop an overall integrated approach to woody plant management in the City.

Relations with outside agencies have been sufficient and in some cases rewarding, but the City has not taken a leadership role in developing or cultivating useful contacts. Many untapped opportunities exist for beneficial interchange of ideas and contributions for solving specific problems, often common to a number of municipalities. A better understanding of the regulatory process within Provincial and Federal Government agencies is possible and necessary in order to take advantage of their facilities and expertise. Many levels of research, education and training exist within the schools, colleges and two universities in the Lower Mainland. Sufficient contact has not been established with these resources and there remains many opportunities for improvement to the Boulevard Tree Program through improved interaction.

## Discussion

### Arboricultural Organization and Responsibilities

The boulevard tree resource will have undoubtedly surpassed 200,000 trees by the year 2000. Currently staff (see Table 9) cannot keep abreast of the present workload particularly that relating to large tree maintenance. Moreover, trained staff are extremely difficult to find and, without a recognized arboricultural trade, difficult to retain.

Although management of the resource can be broken down into large blocks of discreet tasks such as program management, establishment and initial maintenance, small tree maintenance, tree surgery and pruning or removals, no concomitant organizational structure has been developed. Consequently some work such as tree surgery is not done at all and other tasks such as large tree pruning are left for some years past the appropriate time for treatment. This situation can, of course, be attributed to a number of factors other than organizational constraints alone. Principal amongst these are lack of a workload analysis that would establish man hours per year in each task area (and thus crew numbers), and insufficient work programming.

In the context of general identity it would seem that the arboricultural group are not seen as a specific group and are confused, at least in the public mind, with the present forestry group. The two groups, though working somewhat independently, do undertake similar work and could be combined under one group title.

At present there is no qualified professional to act in an advisory role to either of the above functions. Although a City Arborist position was established at one time, this post lapsed when the first appointee resigned. It would appear that upcoming retirements in the current organization coupled with increasing time demands on existing staff and a resource size and complexity requiring sophisticated technical expertise that the Board should strongly consider re-establishing the post of City Arborist. Since much of the work would be of a consultative nature, it is anticipated that the position might be more appropriately a staff position and not a line position. In this latter context the existing Arboricultural Supervisor has carried much of the burden for direct supervision without sufficient time being available for work or program planning.

In addition to difficulty in undertaking a planned program of establishment and maintenance the board's staff have had to rely heavily on private citizens to alert the arboricultural group to tree problems on City streets. No direct policing or inspecting capability has been developed largely as a result of staffing limitations. Many other jurisdictions have found it appropriate to appoint individuals specifically identified as tree warden. This course of action would seem appropriate for Vancouver given the number and geographical extent of the tree resource.

At present, the arboricultural group is responsible for administering the Surrey Nursery. Although the appropriateness and necessity for the City to maintain its own street tree nursery may be open to question (and is suggested as a separate study depending on tree supply needs and private nursery tree costs and availability) it is probably a more appropriate phase to couple with other nursery functions of the Board if it is going to be retained.

Responsibility for existing boulevard tree work has rested with the Board for many years. However, other City Departments, most notably Engineering, have played a varying role in deciding on new tree planting programs depending on location and financing. This dual responsibility has not been entirely satisfactory and has caused some organizational and policy conflicts in the past. It is quite clear the City Engineer must retain statutory responsibility for all street encroachments but it would be most appropriate that the Engineer's role in engineering and traffic safety be clearly stated while the full responsibility for the Boulevard Tree Program be vested in the Park Board.

Elsewhere in this report a major recommendation is made concerning the preparation of a Boulevard Tree Master Plan for the City. It will take a number of years to prepare this plan and a great deal of preparatory work will be required. Since leadership for this will be required for sometime at a senior level and since the Board would be both initiator and lead agency in the development of such a plan, it would seem appropriate that the Director of Operations of the Board should chair any group charged with developing a Plan. In addition to, but congruent with, the development of the Master Plan it is suggested there be a Design Guidelines Manual for streetscape improvement. The development of both these guidelines and any site specific conceptual designs would require a committee.



It is envisaged that the prepared City Arborist will have been approved and appointed by the board in the period 1980-81 which would allow for the appointee to assume responsibility for the preparation of the Design Guidelines and for the Design Committee. The full duties of the City Arborist should be set out and approved prior to finalization of the job description and adjustment of the job.

At this time there is little written policy (see also the section on this topic and the section on Community Relations) consequently, there have been numerous interpretations of policy by many members of staff. Much of this policy has been adopted to meet specific circumstances. A more standardized approach coupled with written policy would provide the public and developer a clear understanding of what specific policies are and exactly who is in a position to comment on or interpret them.

### Conclusions

it is clear that the magnitude of the Boulevard Tree Program as it now exists is substantially more complex and extensive than current organizational and staffing can accommodate staffing analysis will require a detailed workload analysis in order to accurately determine proper staff needs. However, the current condition of trees on many streets is a clear indication that frequency of maintenance is insufficient and that although inefficient work programming is partly responsible, the main reason relates primarily to too few staff for such a large tree resource.

Since the program has grown to a size where a full complement of arboricultural tasks are performed or should be performed on a regular basis, there is no doubt that the organization of the arboricultural group should reflect this complexity and extent. This question of organization also extends to the management of the program which clearly requires both explicit leadership and technically sound supervision.

In order to ensure that the overall program is well structured and focused, the Board should be given full and complete responsibility for the program while both the Board and City Council should more effectively recognize the role and responsibilities of the City Engineer for street and traffic safety as these concerns may be effected by trees on City streets.

Specific Recommendations - Communication and Liaison

1. It is recommended that the City Engineer instruct appropriate divisions in the Engineering Department to prepare a draft of minimum "engineering" design requirements for boulevard tree use in Vancouver. These requirements would substantially assist the work of the Boulevard Tree Design Committee, and the eventual preparation of the Boulevard Tree Master Plan.
2. It is recommended that monies required for, or related to, the operation of the Boulevard Tree Program, with the exception of leaf pickup by the Water Sanitation Department, should be budgeted for by the Park Board. In particular, this would include monies presently budgeted for Street Lighting to carry out tree pruning, and by Sewers for unstops but not for sewer replacement. Capital projects by other City Departments should also be budgeted for by the Park Board after full consultation with the departments concerned. A more complete discussion of funding is found in the section on Procedures and Practices.
3. Operations Research has an interest in, and expertise for, consultation on the proposed boulevard tree inventory. Although it may not be possible to use this group for the development of the final software, it is recommended that the Park Board participate in a joint review of needs appropriate to the boulevard tree inventory and benefit from suggestions made by the Operations Research Unit. It is further recommended that the Park Board explore the possibility of using Operations Research as the lead agency in developing the computer program and field data collection system, if Operations Research are able to undertake the project.
4. The cost associated with sewer unstops is certainly substantial, yet no concerted effort has evolved that would substantially reduce the problem. It is recommended that the Arboricultural Group work with

the Sewers Group to identify and reduce the incidents of recurring sewer problems. If necessary, the Park Board should be prepared to include tree removal in critical locations if other strategies have not been successful.

5. Improved use of the present mapping and record system for utilities location would allow the Arboricultural Group an opportunity to tailor choice of species to a particular site based on present information and predictions of future utility requirements. It is recommended that the Arboricultural Group consider a more detailed level of communication with the Utilities Engineer and that emphasis be placed on written requests for site specific assistance on the actual or probable location of utilities that may affect, or be affected by, boulevard tree planting and maintenance.
6. The present unwritten procedures for operation of the Boulevard Tree Program have not assisted in the development of good managerial communication between the Park Board and City Hall, although day-to-day operations normally function smoothly because of good field relations between the Arboricultural Group and operations personnel in City departments. It is recommended that there be a concerted effort to include City departments in the pre-planning process and actual development of the Boulevard Tree Master Plan, as well as improving overall liaison, particularly as to improve function of the responsibilities assigned to the proposed position of City Arborist.
7. Leaf pickup incurs an ongoing cost that cannot be avoided, but can be simplified by adopting a number of approaches. In particular, it is recommended that areas where the problem of street sweeping is most difficult (because of parking density and tree species) that alternate side parking be instituted on appropriate streets, at least during September, October and November. In addition, it is recommended that a brief study be done to identify those species of tree whose leaves are particularly troublesome for clogging storm drains, tracking into buildings, staining sidewalks, proving difficult to pick up, or which have similar undesirable characteristics.

8. It is recommended that every effort be made to identify and accommodate the concerns raised by the City Medical Officer concerning poisonous and allergenic tree species. Further, it is recommended that the Arboricultural Group and the City Arborist maintain close communication with the City Environmental Health Officer concerning pesticide use for disease or insect control on City-owned trees.
9. It is recommended that the proposed tree wardens work closely with the Department of Permits and Licenses to prepare a procedure whereby there is both tree inspection and later damage assessment of City trees likely to be affected by construction. Further, that the Park Board received adequate recompense where trees are damaged or must be removed as a result of such construction work.
10. Liaison with City Planning could be substantially improved and the expertise of this department should be incorporated in the preparation of the Boulevard Tree Master Plan. In addition, it is recommended that the local planning officers be encouraged to develop a rapport with the proposed City Arborist, and that the Supervisor of Arboriculture and Forestry Operations, in order to better identify local area concerns and expectations.
11. The incidents of vandalism in all Park Board property is substantial and rising. In the case of boulevard trees, public concern has been demonstrated in many cases, and the police advised of tree breakage. The pressure of other police work and poor response from the judiciary has apparently relegated this type of crime to a very low-level priority. It is recommended that the Arboricultural Group develop greater communication with local area Team Police Units. It is further recommended that the general public be encouraged to report incidents of vandalism, that emphasis be placed on prosecution and punishment (including restitution proceedings) and that the Police Department be encouraged to incorporate an anti-vandalism theme relating to trees in their school presentations.

12. It is recommended that the City of Vancouver, as the largest municipality in the Lower Mainland with the most extensive boulevard tree program, encourage interaction with, and between, other municipalities concerning problems common to all. In particular, it is recommended that, once the initial work has been accomplished toward implementing the major recommendations of this report, the Park Board staff organize a first meeting of those responsible for tree programs in the Lower Mainland, in order to share experiences and identify areas of mutual concern and co-operation.
  
13. It is recommended that a brief survey of the worst areas for electrical distribution interference with the appearance and normal maintenance of boulevard trees be carried out. Once this has been accomplished, it is recommended that the Park Board, assisted by City Council, approach B. C. Hydro management with a proposal for:
  - I. a study of undergrounding for those locations where severe street tree/electrical conductor conflicts occur, particularly in areas of high density use, high amenity or historic value, or of high landscape/streetscape potential;
  - II. a program of backlaning, where this possible, in locations where tree/conductor conflict are substantial, but where undergrounding of the distribution system is not warranted;
  - III. a co-operative program of tree removal and replacement where lines cannot be undergrounded or removed but where present trees are costly to maintain or have been severely mutilated through past pruning practice; and
  - IV. a study of those areas that should not have boulevard trees because of long term system conflicts or for electrical security considerations, and a study of those areas presently (without trees because of potential conflicts with existing conductors or apparatus) that could be planted if the lines were relocated.

14. It is recommended that the Park Board initiate a brief study to identify the location of existing or likely tree conflicts with present transit routes. Further, it is recommended that B. C. Hydro transit be approached to see if any of the problems can be mutually resolved now or before they become costly maintenance problems. In areas where trees are badly mutilated or will require severe pruning in the future, tree removal and replacement with compatible species should be considered.
15. The section on Training discusses interaction with the Workers' Compensation Board. As noted there, it is recommended that the Park Board and the Compensation Board work toward an acceptable set of safe work practices for arboricultural operations. It has also been recommended in that section on Training that approaches should be made to the Apprenticeship Board of the Department of Labour for certification of an Arborist Trade.
16. It is recommended in the chapter on Training that Park Board staff, including those managing and supervising the application of pesticides, must be certificated under the Provincial Pesticides Act. In order to provide the prerequisite training for certification, and to provide additional aid in determining the suitability of various pesticides for tree maintenance, it is recommended that the Arboricultural Group have direct contact with the Pesticides Branch of the Provincial Department of Environment.
17. A number of Provincial agencies, including the Forest Service, Municipal Affairs, Tourism, Consumer and Corporate Affairs, may have services or funds that could be tapped by the Park Board in order to enhance the Boulevard Tree Program. It is recommended that the proposed City Arborist review Provincial agencies and develop those contacts that would benefit the Board in this regard.
18. The Federal Government operates many schemes for funding special projects and programs in municipalities. In addition, continued unemployment has placed emphasis on providing jobs. The Board has availed itself of these schemes in the past.

An attempt to reduce Federal spending and the changes in programs occasioned by this and the possibility of a general election in 1980 will probably alter the emphasis on this type of Federal support available. It is recommended that specific attention be paid to all new Federal schemes that may allow external support for the City's Boulevard Tree Program, and that every effort be made to keep abreast of these opportunities.

19. The Federal Departments responsible for Health, Agriculture, and Forestry all influence, or could influence, the Boulevard Tree Program. In particular, registration of pesticides, plant quarantine, and urban tree research are undertaken by these agencies respectively. It is recommended that improved liaison with these Departments (as represented in Vancouver) should be a function of the proposed City Arborist position. Further, it is recommended that the Park Board approach the Department of Agriculture for a seat on the West Coast Plant Protection Advisory Council in order to represent their concerns for urban vegetation. Of particular importance at present are concerns for winter moth, gypsy moth, and Dutch elm disease, all of which could have devastating implications for the City street tree resource.
20. Contact with all levels of academia has been a low priority in the past, and has often been instigated by other City departments rather than the Park Board. This situation should be rectified, and it is recommended that the Arboricultural Group review the major functional problems inherent in the operation of the Boulevard Tree Program. Simple examples might be: surface root control, sewer root control, tree utilization after removal, integrated pest management for aphids, bird control, tree support systems, and appropriate ground cover for tree pits. These problems can be identified as discreet entities that are unresolved but that cost the Board maintenance funds on an ongoing basis. It is recommended that applied research proposals be solicited for those problems identified as high priority and small contracts be let to appropriate researchers.

21. Trained craftsmen with expertise in detailed tree care are not generally available in Western Canada. In fact, no course specializing in Arboriculture is available in the Pacific Northwest, although a number of schools in the East offer courses ranging from a degree in Arboriculture to trades training up to journeyman level. It is recommended that the Park Board approach local technical colleges with a view to formalizing appropriate tree care courses tailored to the needs of both the City of Vancouver and other municipalities.



Specific Recommendations - Arboricultural Group Organization

1. A number of organizational changes and a small number of staff additions should be seriously considered in order to adequately manage the boulevard tree resource, which will exceed 200,000 trees by 1990.

In particular, the re-establishment of the City Arborist function, with a job description appropriate to a professionally-qualified position, is considered imperative to supplement existing field staff. It is envisaged that duties would be of an advisory and long-term planning nature, and that the expertise would be utilized by the boulevard tree program, forestry, and horticultural maintenance, as well as other Park Board and City departments.

Professional qualifications and expertise in urban forestry, forest entomology and pathology, civic arboriculture or horticulture and related fields are considered appropriate backgrounds. It is foreseen that the City Arborist would report to the Manager of Grounds Construction and Maintenance or the Director of Operations and Maintenance.

2. It is recommended that there be an initial appointment of two full-time tree wardens/tree inspectors. The principal duties of these positions would include collection of inventory data during the summer season, including the supervision of students in this activity, intensive boulevard tree, beautification area, mini park and planter inspection. These duties would be particularly important in the areas designated as "high maintenance" areas or "priority maintenance" areas.

In addition, it is seen that these positions would assist in the change from reactive to planned maintenance, improving community relations particularly in schools where Arbor Day programs and general tree courses may help to reduce vandalism, and in handling of the complaints. Further, it is envisaged that their field knowledge from surveys would substantially assist in preparing the Boulevard Tree Master Plan, implementing design guidelines, elements of the twenty-year plan, and preparing short and long-term budgets.

It is anticipated that the tree wardens would report either to the City Arborist or to the Supervisor of Arboriculture.

3. No radical changes are proposed for the existing arboricultural section of the Grounds, Construction and Maintenance Group. A number of staff additions and some reorganization is suggested to manage the more diversified and considerably larger workload occasioned by rapid increases in the street tree resource. It is also recommended that the group title be changed to Forestry and Arboriculture to reflect the broader status of the group and to emphasize the forestry section functions as an integral part of the overall management of woody vegetation within the City boundaries.
4. The organization of the re-named Forestry and Arboriculture Group, which would continue to operate from the Sunset Nursery, would, as now, be functionally responsible to the Manager, Grounds Construction and Maintenance.
5. It is recommended that the present Supervisor position should be retained and the job responsibilities in the area of program planning strengthened. Provision is already made for this in the existing job description, which is well written but does not reflect the present emphasis which is largely crew supervision and response to public complaints.
6. In order to free the Forestry and Arboriculture Supervisor for planning, consultation and management functions, it is recommended that a position of Foreman III be established with full direct supervisory responsibility for the Forestry and Arboricultural crews and crew tasks.
7. It is recommended that, in order to service the Forestry and Arboricultural function, there should be a secretary/filing clerk shared between the positions of Foreman III and Group Supervisor.
8. Reporting to the Foreman III, it is recommended that there be a Foreman II-Arboriculture and a Foreman II-Forestry.
9. Reporting to the Foreman II - Arboriculture, it is recommended that there be a Foreman I - Small Tree Maintenance and Tree Surgery, a Foreman I - Establishment and Maintenance, and a Foreman I - Pruning and Removal.

10. Under the jurisdiction of the Foreman Small Tree Maintenance and Tree Surgery, it is envisaged that the tasks of watering, fertilizing, guying and minor corrective pruning would be vested in one sub-foreman, the responsibility for pest management and stress control on all sizes of tree would be the responsibility of a second sub-foreman, while tree surgery and repair on all sizes of tree would be the responsibility of a third sub-foreman. Finally, there would be a fourth sub-foreman responsible for high-intensity maintenance areas such as mini parks, and all beautification projects.
11. Under the foreman responsible for Establishment and Replacement, it is recommended that there be a sub-foreman for central boulevard maintenance, a sub-foreman for replacement planting, and a sub-foreman for new planting. During the periods when planting is not possible, these latter two crews would be responsible for complaint response, tree inspection, root pruning, planting site preparation, watering, grass cutting or would be on loan to other crews.
12. Under the responsibility of the foreman for Pruning and Replacement, it is recommended that there be a sub-foreman for general and safety pruning, a sub-foreman for utility pruning, and a sub-foreman for tree removal and site preparation.
13. It is recommended that the responsibility for the Surrey Boulevard Tree Nursery be transferred to the Nurseries and Floriculture Group and operate on a self-sustaining contract basis to the Forestry and Arboricultural Group. The scope and size of nursery facilities for both the arboriculture section and the forestry section should be given close scrutiny and a composite nursery requirement determined as noted elsewhere in this report.
14. This study has restricted itself to the concerns of the Boulevard Tree Program; however, it is apparent that a study of the duties and workload accorded the Forestry Section is necessary especially with the increasing interest in productive or self-supporting urban forestry. It would seem propitious to more fully examine the forestry function and establish an appropriate structure of foremen and sub-foremen in this section following the system proposed here for the Boulevard Tree Program.

15. Although somewhat beyond the scope of this report, it is suggested that some thought be given to the existing senior management level of organization and reporting. In particular, the recent retiral of the Manager, Grounds Construction and Maintenance, may provide an opportunity to divide this function into two separate and distinct entities, with the appointment of a City Arborist for Forestry & Arboriculture and a City Horticulturist for Grounds Management.

Specific Recommendations - Responsibilities

1. It is recommended that full and complete administrative authority for the Boulevard Tree Program be vested in the Park Board, with the exception of those factors which affect engineering and traffic safety within the boulevard right-of-way.
2. It is recommended that the City Engineer retain the right of veto on any and all Boulevard Tree Program plans which would affect engineering or traffic safety and that such veto must be communicated to the Park Board in writing, setting out the reasons for such action. Where any substantial conflict occurs, it is suggested that resolution must be arbitrated by City Council.
3. It is recommended that a Boulevard Tree Master Plan work group should be established by the Park Board and chaired by the Director of Maintenance Operations. Membership should be drawn from the City Engineer's office, streets, utilities, crossings, sewers, projects, and lighting within the Engineering Department, training and safety from Personnel Services, ( if a separate Training and Safety officer is not appointed for the Boulevard Tree Program,) a member from Area Planning and a member from the Development Permit Group within the City Planning Department, and a general member from the Dept. of Permits and Licenses. It is suggested that members from other departments be seated as the need arises. An initial responsibility of this work group would be to advise the Park Board, from each appropriate perspective, on the preparation of appropriate components for the Master Plan.
4. Within the boulevard right-of-way, the responsibilities of the Park Board and the Forestry and Arboricultural group in particular, should include both the boulevard tree and its immediate planting area. In the case of trees in planting pits, this would include the management of tree guards, tree grates, and pit covering or plantings. Although the Streets Department has responsibility for this function at present, it would appear that there are sound organizational and arboricultural reasons for transferring this work.

5. A boulevard tree Design Committee should be established to work in conjunction with the Master Plan Committee. This committee would be chaired by the City Arborist and would solicit representation from appropriate divisions within the Engineering Department, the City Planning Department and from appropriate members of the design community in landscape architecture, architecture and urban horticulture.

This committee would be charged with establishing

- 1) a clear set of design standards for the City of Vancouver tree program based on the constraints identified in this study,
- 2) a set of design principles for trees on boulevards in each sector of the City,
- 3) specific design plans for individual segments, locations or streets in the City that should be specifically identified in the Master Plan.

Where necessary, it is intended that this committee may act as a design panel should the City choose to solicit designs from consultants or when developers make application for development permits.

6. The responsibility for giving formal advice to the public regarding procedures, interpretation of policy, decisions regarding written complaints and similar contentious issues should rest only with the following appointed Park Board staff:

- 1) The Director of Operations and Maintenance
- 2) The City Arborist
- 3) The Manager of Grounds Construction and Maintenance
- 4) The Supervisor of Arboriculture.

It is recommended that the responsibility for giving formal decisions to the general public or City Departments regarding procedures, interpretations of policy, or questions arising from the Boulevard Tree bylaw should rest with the Board of Park Commissioners. It is recommended that formal decisions or changes concerning the Boulevard Tree Program would require the normal majority for approval.

7. It is recommended that the responsibilities of the reactivated position of City Arborist should include:
  - 1) professional advice to all City Departments concerning arboricultural and forestry practice;
  - 2) chairmanship of the Design Guidelines Committee;
  - 3) co-ordination with other agencies (e.g. Universities, Agriculture Canada, the Provincial Ministries of Agriculture and Forestry, other municipalities, and utilities;
  - 4) resource inventory;
  - 5) program workload analysis;
  - 6) master plan development in conjunction with the Manager of Grounds Construction and Maintenance;
  - 7) inspection and condemnation of hazardous trees;
  - 8) preparation of work standards in conjunction with the Manager of Grounds Construction and Maintenance or the Supervisor of Arboriculture; and
  - 9) applied research.
8. It is recommended that all containers on City property that have trees in them should be considered part of the arboricultural group's responsibility. Those containers with only shrubs, perennials or annuals should be the responsibility of the horticultural maintenance group. It is recommended that the suggested container computer inventory and maintenance schedule indicate the responsibility for each facility (see Recommendations F.4)
9. It is recommended that those trees which have been planted at street ends, park margins, municipal boundaries, center boulevards, mini-parks, beautification areas and similar locations should be the full responsibility of the arboricultural group. Trees on park land and derelict land should be the full responsibility of the forestry section in the Forestry and Arboricultural group.
10. The Board of Park Commissioners should establish a three person sub-committee specifically as a liaison and interest group to deal with the development and operation of the prepared formal Boulevard Tree Program.

## CONSTRAINTS

### Introduction

When this section was first conceived, it was anticipated that the scope of the section would include all constraints that act upon the boulevard tree program. It was envisaged that this would include those major factors that influence the structure, organization, execution, rate of progress, quality, standards, design and present status of the program. As the report developed, however, it became clear that other sections overlapped the intent of this section, and that the factors were many-fold, often inter-related and in a constant state of flux. Moreover, they would be influenced and altered by both the collection of data for this report, and any implementation of recommendations arising from the study.

The eventual content of this section was, as a result of the writer's concern about the usefulness of a broader analysis, restricted to outlining the physical constraints that might be applied to the program in the form of design guidelines fundamental to the safe and efficient operation of a street for its fundamental purpose of expediting the movement of people and commodities.

### Discussion

The individual uses of the boulevard right-of-way are many. Not only the average citizen moving by foot or by vehicle from place to place, but a multitude of users claim a portion of the space below, upon or above the corridor for pipes, wires, signs, access, energy and similar purposes. Most uses take precedent over the allocation of space for boulevard trees. These trees are perhaps something of an afterthought rather than an integral part of the streetscape design - an attempt to mitigate the visual incubus within the typical urban street.

Given that the planting of trees on City boulevards is a tertiary function vis-a-vis major activities and uses of the street, how best can trees be established when accommodating the needs of principal users? If each need can be quantified and documented, is it then possible to prescribe the limitations that



must bind the establishment or maintenance of trees in each circumstance or set of circumstances? By grouping similar constraints together, it is possible to establish a pattern of standards that might serve as design or maintenance guidelines for the tree program.

### Conclusions

The simple listing of categories that should exert a constraining influence on the establishment or maintenance of trees on any boulevard belies the difficulty in accomplishing a compatibility between all the conflicting demands for space in the street. Moreover, the paramount concerns of engineering, pedestrian and traffic safety provide severe limitations. Accordingly, the process of determining exact parameters for each need must be a process undertaken and adjudicated directly by the actors involved. This section is intended to provide a primer on the likely topics and concerns that warrant consideration. It is suggested that the categories of importance include; public transportation, private transportation, commercial transportation, general traffic information, public safety, utilities above grade, utilities below grade, water supply systems, gas supply systems, streets general, streets industrial, streets commercial, main arterial roads, view locations and other locations. A brief attempt to provide such information is given in Appendix 42. However, this list is very far from exhaustive and even the more extensive listing developed for this report and given in Appendix 43 is likely to be incomplete.

### Specific Recommendations

1. It is recommended that, as a prelude to preparation of the Design Guidelines suggested in the section on Procedures, a comprehensive set of design constraints be adopted in order to regulate the establishment of trees on City streets.
2. In order that these constraints are acceptable to all City departments and the Utility Companies, it is recommended that the City Engineering Dept. and the Park Board staff meet to prepare a draft set of standards that will be circulated for comment prior to final adoption.
3. It is recommended that these standards outline specific establishment or maintenance restrictions or requirements in the following categories:

- public transportation
- private transportation
- commercial transportation
- general traffic information
- public safety
- utilities above grade
- utilities below grade
- water supply systems
- gas supply systems
- streets general
- streets commercial
- streets industrial
- streets residential
- main arterials
- view locations
- other locations.

4. It is recommended that a full analysis of program constraints be undertaken as a separate study by the Park Board to identify major factors that influence the structure, organization, execution, rate of progress, and quality of the boulevard tree program. Although this study has identified political, administrative, organizational, physical and biological concerns, it is difficult in this overall report to assess the root causes of all constraints or their implications for program success without a more intimate knowledge of the day-to-day operations of the program. Further, there should be an ongoing forward planning process in the light of changing circumstances. Such a study would best be initiated after the recommendations of this report have been considered.

## INVENTORY

### Introduction

Effective management of urban trees requires an inventory of the resource that is sophisticated enough to provide information essential to develop program scheduling and management planning, yet simple enough to be readily understood by staff, while at the same time being cost effective.

The system adopted must be sufficiently refined to provide information on individual trees, yet comprehensive enough to encompass a large geographical area requiring an extensive data base. Output options must satisfy the needs of the arboricultural group at both management and operating levels, and provide information in a flexible and accurate form. Data collection and processing costs should not exceed ten to fifteen cents per tree for the initial survey.

In order to satisfy the criteria suggested here, those systems that operate manually, or that rely on random sample surveys, are precluded. Given the resource base and geographical size of Vancouver where there are 880 miles of streets, and an estimated 150,000 trees, the only realistic data-handling system requires the use of a computer and a tailored data collection system. If sufficient forethought is given to long-term system requirements, there should be only one investment needed to develop the software program required to operate the system. Ongoing data processing time should not be a substantial charge, particularly when viewed in the light of efficiencies that will result from having accurate field information, as well as being able to store, retrieve, update and manipulate individual tree records rapidly and simply.

### Discussion

Despite repeated calls for an inventory, and assurances that such an inventory had in fact been completed (see Appendix 44), no complete inventory of the trees on all City streets has ever been undertaken. Attempts that have been made, have been completely inadequate, and few records even remain (see Appendix 45).

The arboricultural group has kept a partial list of trees planted since 1963 by management unit, date, block planted, variety and number established. Species is often recorded by common name, which diminishes the value of this basic record. No update exists of the information concerning survivability, maintenance requirements or costs.

The City Engineering Department carried out an analysis of tree locations in the West End in 1970 as a precursor to implementation of recommendations in the Rawn Report concerning trunk sewer requirements. This report recorded side of street, street name, block by intersecting streets, clear widths between trees, distance of face of trees to front/walk, distance of P.L. to front/walk, and some quoted remarks. To what extent the information was used in planning the sewer locations or construction is unknown. The information, which is of an engineering nature and of no arboricultural use, has not been reviewed or updated since 1970.

Comprehensive tree inventories are normally compiled in a municipality to provide a systematic method for collecting, storing, retrieving, and updating field information on the condition of the boulevard trees. Some examples of work by other municipalities are included in Appendix 46. Street (boulevard) tree inventories may be of a number of types and be expected to fulfill a number of different purposes. Types of inventory may be simply divided into two main categories - those that rely on a sampling procedure from randomized sites within homogeneous areas of the City; and those that provide a complete tree-by-tree data collection system. Within each system there are varying degrees of data collection, accuracy and completeness, depending on technique adopted. A "car window" survey, for example, might apply either to a complete or sampling survey but would provide less accurate information than a tree and site measurement system.

Two factors that constrain or influence the operation of either category of sampling are: time (and hence cost) versus accuracy and comprehensiveness; and quantity of data collected versus sophistication of the data handling system. Both factors are, in turn, affected by the overall size of the boulevard tree program in terms of geographic extent and probable number of trees. If only eight records are made of each tree in a city of just 12,000 trees, then it

is conceivable that a manual system can handle the 96,000 entries if they are not updated or manipulated too often. Even so, there are distinct limitations to the amount of information that can be extracted from such a manual system, particularly when considered in the light of the myriad cross-comparisons that might be desired. In the City of Vancouver, with an estimated 125,000 trees requiring a complete inventory management system, collecting data on perhaps a hundred topics in the first instance, the resulting 12.5 million records can only be handled by modern computerized methods.

Since the Vancouver tree system embraces a very wide variety of streets, locations within the street, zoning, and physical constraints, and a spectrum of tree species, age classes, and conditions that are presently unknown, the required homogeneity required for a statistically valid sampling procedures does not exist. It will, therefore, be necessary to undertake a complete inventory of the City, street-by-street and tree-by-tree, in order to prepare accurate base-line inventory for future management decisions. Obviously it is not possible to accomplish a detailed City-wide survey in a short period of time. It is anticipated that six years will be required if the work is undertaken by two competent tree wardens on streets presently planted. It is possible that these tree wardens could supervise summer student teams to assist in the base-line studies, especially in residential areas. To make such a proposition efficient, considerable pre-inventory work will be necessary to establish the logistics and data collection system appropriate to an intensified inventory. In addition to the system software required for the computing program, and provision for data handling, there will be an additional requirement for a structured inventory manual to assist in the training of student teams. It is unlikely that this could be accomplished before the 1981 spring and summer seasons.

It is assumed that all new planting would be the subject of automatic inventory at the time of establishment, and that ongoing maintenance information would be incorporated into the inventory update process from weekly worksheets. At the present time, sufficiently detailed field records that would allow data to be incorporated into the inventory system do not exist.

There are a number of individual and discreet reasons for undertaking an inventory. However, these reasons, when combined together, constitute a comprehensive information management system for the resource. In order to answer political, public, legal and management questions regarding boulevard trees, and to demonstrate competent, equitable and effective use of the public funds assigned to the boulevard tree program, management must be able to respond to a broad cross-section of searching questions regarding the placement, condition, worth, expected workload and critical problems associated with individual trees.

Some examples of common questions that might be posed are:

1. How many trees do we have?
2. What is the current value of the boulevard tree resource?
3. What is the composition of the tree resource and what is the density and distribution by various age classes?
4. What maintenance tasks are needed in what locations?
5. Where are those trees that are excessively vigorous and are costly to maintain because of sewer damage, sidewalk damage, interference with lighting, or short cycle pruning?
6. What species are particularly suited to boulevard planting when assessed in terms of size, condition and vigour?
7. What proportion of the resource will require replacement and where are these trees located?
8. What is the present stocking in the City and how many empty tree planting locations exist?
9. In the context of legal proceedings, what inspections have been carried out on particular trees, and have any complaints been received prior to particular litigation?
10. Where are major insect or disease problems likely to occur, and what might be the anticipated workload associated with control?
11. How many man hours are required for annual operations at optimum maintenance, at medium maintenance, and at crisis-only maintenance levels?
12. When incorporated with workload analysis and costing information from the Financial Information System, how much is spent per task, per species, per location and what productivity can be expected from crews engaged in specific operations?

These questions are given only to provide an indication of the type of information that an inventory should be able to respond to. It is essential information for planned management in establishment, maintenance and replacement phases of a competent boulevard tree program. None of these questions can be accurately answered at present about the Vancouver boulevard tree resource.

A more detailed review of the expected information requirements for a Vancouver system are given in Appendix 47, and are based on a survey that would collect tree data in six categories; Tree Condition, Small Tree Maintenance Requirements, General Tree Maintenance Requirements plus Site Base Data as shown in the abbreviated form in Appendix 48 (see also Appendix 46). It is anticipated that Tree Base Data and Site Base Data would be available prior to field data collection. Suitable tree identification codes are given in Appendix 49.

The most complex problem in street tree inventories is that of locating an individual tree and providing an accurate identity system compatible with record and retrieval systems used by other city departments. Numeric and alpha-numeric systems using postal addresses, sequential numbering, street or block names, numbers or intersects, and similar systems have been used by other municipalities. In Vancouver, a matrix system is used for the roads inventory. The accuracy of this system allows enough control to identify individual properties or about 20' street sections. It is unlikely that this system would allow sufficiently precise identification of individual tree sites.

The metrification policy of the Federal Government has spurred many municipalities to re-appraise their present manual mapping systems. The City of Vancouver is no exception and has prepared a study (Vancouver Mapping Study, 1978) in which a computerized mapping system is recommended. Comparison with other municipalities showed that Vancouver is at least two years behind most other Canadian cities. A common scale of metric map adopted by these other municipalities has been determined as 1: 1,000, with the majority opting for Universal Transverse Mercator co-ordinates to be included for accurate locating. The City of Vancouver mapping report also advocates adoption of the UTM,

which would, in turn, allow the Park Board to adopt a system for identifying its own facilities and operations, including boulevard trees. With a set of large scale ortho-corrected (to overcome prospective distortion) aerial photographs with the UTM co-ordinates inscribed on the picture, it will be possible to provide accurate location of individual trees using a six digit code. Further, it will be possible to integrate this system at little expense with the overall City mapping system and have some boulevard tree information reproduced on computer graphics as mapped information, suitable for day-to-day work scheduling. Tree planting was specifically mentioned in the 1978 mapping report (Page 81, Appendix E1) with potential applications. In time, more sophisticated mapping will allow long range planning; three dimensional graphics (currently available, see Appendix 50) would allow streetscape designs to be modelled and tested on the computer prior to implementation.

The presentation of information processed from raw field data is an important consideration. Criteria noted in the introduction to this section suggested that information must be presented in a form that is suitable to the intended end use, and must be readily understood by the user. It is envisaged that information would be outputted in one (or more) of five formats:

1. two-way contingency tables - for example, street designation by pruning requirements or species by height
2. Histograms - for example, tree height and total number of trees.
3. Descriptive measures - for example, statistical analysis.
4. By strata - area species, individual tree location and vandalism management unit species, individual tree location and plugged sewers.

System flexibility is an absolute prerequisite for a viable tree inventory. In particular, the ability to



extend the system to provide comprehensive management information and control beyond the normal operating philosophy common to most existing municipal computer tree inventories is considered essential. It will require some time to develop the Vancouver system beyond the day-by-day stage, but the broad scope of eventual expectations should be included in the decision making horizon for the initial scheme. Included in the planning considerations should be the use of the system for;

1. workload analysis and forecasting;
2. predicting short term capital and maintenance funding requirements;
3. long range budgeting;
4. work scheduling;
5. problem species or location identification;
6. tree performance assessment;
7. public relations information; and
8. assessment of work performance compared to annual targets.

## Conclusions

Without a full inventory of trees on the City boulevards, there can be no effective management of the resource, nor a reasonable assessment of the monies required for operation. A comprehensive survey of the species, location, condition, maintenance and establishment needs, and priorities requiring attention for the complete resource is a fundamental requirement. Vancouver lags some considerable way behind other major North American municipalities in not having at least some record system.

A computerized tree inventory system only provides data. Effective use of the data is the key to budget maximization. Savings in annual operating costs alone may offset the initial cost of the inventory and ongoing computer processing expenditures. Certainly it will allow a more effective targeting of existing funds, reduce the dependency on a reactive management system, and identify the most pressing problems on a City-wide basis.

In addition to accurate operations, workload and financial forecasting, it should be possible to implement a work record system that provides constant update of information in response to ongoing establishment and maintenance activities.

Without an initial start now to collect basic data on the boulevard tree resource, there is little possibility of ensuring that the Program, which will spend almost one-half million dollars a year by 1980, is providing an appropriate return for the substantial monies invested.

## Specific Recommendations

1. The City should give high priority to computerized inventory of all trees on City streets and boulevards. This inventory should be implemented in stages using the existing management units as discrete segments. An order of importance should be established for completing the full survey. It is suggested that the initial unit be number 1 (see map) and that the study progress numerically.
2. In order to ensure continuity and consistency in collection of the data, it is recommended that two tree wardens be appointed (see recommendations in

Organization and Responsibilities) and that they be given adequate training in the codes, procedures, and criteria necessary for accurate data collection.

3. Seasonal factors can greatly influence the accuracy and comprehensiveness of any data collection on deciduous vegetation. It is therefore recommended that inventory surveys only be undertaken between, and including, the months of May through September.
4. A balance must be struck between the quantity of data collected in an inventory and the cost related to man hours and data processing time. However, since the City has no data base at all at present, it is recommended that the first inventory collect both locational and arboricultural data. If, and when, future updates are required the second and successive cycles can be accomplished very rapidly since the quantity of information collected diminishes substantially. Experience has shown in other municipalities that a re-inventory is often required after five years, and then again after ten years.
5. The more comprehensive the ongoing update process, as work is carried out on the resource, the longer revision cycles can be maintained. It is recommended therefore, that additions and deletions from the tree resource and changes in growing conditions occasioned by street works should be recorded on a consistent basis in order to modify and update inventory information.
6. A common failure of many computerized systems is their inability to adequately accommodate user needs. In particular, complexity of data coding, difficulty in understanding printouts, inaccessibility of needed information and poor turnover time from data processing facilities are recurring faults. It is recommended that every effort should be made to ensure that adequate input is obtained from management and field staff to ensure that the system finally adopted is flexible and responsive to operating needs.
7. There is some doubt that the existing City computer services can provide any additional service and that the added burden of planning, compiling and executing a new program is beyond their present organizational, staff, and equipment capabilities. It is, therefore,

recommended that the actual computer program be a joint effort between the Engineering Operations Research Group (to ensure compatibility with existing and future engineering computer information systems) and an outside computer consultant. Further, it is recommended that the Park Board consider purchase of computer time on a private time-sharing system or invest in its own micro-computer facility. This facility could handle many other routine Park Board data processing requirements. (Data handling, processing and records for all Park Board operations not presently computerized may warrant a separate analysis and report)

8. An important consideration during system design should be to accommodate the decentralized nature of Park Board operations. In this context, it is recommended that the Park Board head office and the Sunset Nursery have online access to inventory information. Consequently, it is recommended that a remote terminal be situated at both locations, allowing ready input, output and update of information. With time it may be deemed desirable to add a terminal at the Surrey Nursery in order to allow nursery operations and inventory to be quickly processed, or to provide vehicle-mounted terminals for supervisory personnel.
9. It is recommended that consideration be given to computerizing the management of all planters under the jurisdiction of the Arboricultural Group. Since many planters are in a poor or marginal condition at present, this would allow a more accurate and intensive level of maintenance to be performed on these additions to the visual streetscape.

## COMMUNITY RELATIONS

### Introduction

Community relations must play a fundamental role in a boulevard tree program. Without an informed public it is difficult to obtain support for a complete program; without a public understanding of management methods, it is difficult to provide other than crisis management or to incorporate public concerns in workload schedules.

With an integrated approach to promoting public awareness, it is possible to obtain, for relatively little investment, a substantial improvement in public understanding, support and direct involvement. In residential areas, this should encourage early feedback on the system generally, and on individual problem areas specifically. In commercial and industrial areas, it should also allow for merchant or company awareness of their responsibilities and promotion opportunities through financial assistance for the Boulevard Tree Program.

### Discussion

The Vancouver Boulevard Tree Program has not been organized in a formal sense and has become a routine responsibility of the Park Board. Consequently, a particular "Program" as such does not have any public recognition or identity, and the various operations of the Arboricultural Group are not viewed as being a cohesive part of a planned scheme.

At the present time, the main contact with the general public is through complaints phoned to the boulevard tree number at the Sunset Nursery. Every attempt is made to investigate complaints, but no formal mechanism exists for reporting to individual property owners as to the findings of any particular inspection. Work may or may not be carried out then or later, but in many cases the concern raised does not warrant a specific trip of a work crew. There is presently a backlog of unattended complaints from 1973. For those members of the public who are concerned and phone back, they cannot be assured of any course of action as the pink telephone slip system of recording complaints does not allow quick retrieval. The Park Board files

contain a substantial number of letters, some referred to the Mayor, some to Council members, some to the Superintendent of the Park Board and some to members of the Board. These letters indicate that complainants have phoned repeatedly and have not received any satisfaction (see Appendix 51). It is only through a concerted and well-motivated attempt of the Sunset Nursery staff to mollify complaints, at least verbally, that this unsatisfactory situation is not more apparent.

There are no publications offered by the City to property owners, visitors or the general business community which outline the substantial contributions that the present boulevard trees make to the urban community generally, or to a beautiful and liveable Vancouver in particular.

Unlike many cities (see Appendix 52) there are no special publications which outline the Boulevard Tree Program, its policies and operation, general public responsibilities, or where to obtain assistance. Further, no attempt is made to directly involve the public in the program or provide public education concerning trees. Although a film sponsored by a major company had, at one time, been suggested (see Appendix 53), no fruitful outcome is apparent. It would seem that a tape/slide presentation could be made available for loan to schools, recreation centres and local associations or neighborhoods, and would receive substantial use.

At present, there is no attempt to solicit funds for the Boulevard Tree Program from the general public or City businesses, although some programs have been voluntarily underwritten in part by a variety of contributions. If a Boulevard Tree Trust Fund was initiated, a specific publication would be required to indicate the scope, intent and workings of the fund.

Although some general programs concerning trees have been taught at the VanDusen Gardens, it would seem that the facilities there would provide an ideal opportunity for a detailed course on the benefits, care and culture of vegetation in the urban environment. Interwoven through such a course could be an outline of the Vancouver Boulevard Tree Program, its aims and objectives. It is important to stress that, although

the proposed program is intended to be operationally self-sufficient, it is not suggested that it be ecologically or aesthetically separate from the City environment.

The involvement of school children in the program, both from a general education standpoint and in order to engender respect for trees and thus reduce vandalism, is a critical part of boulevard tree community relations. Use of general education material, for example "Project Learning Tree," should be encouraged in schools and its urban forestry and amenity tree subsections expanded.

Proclaiming Arbor Day or Tree Day is an effective way of concentrating media attention on trees once a year. Arbor Day tree planting ceremonies by civic leaders should not be overlooked. However, tree planting on school grounds or other special areas is an important direct involvement for children of all ages and where continuing interest can be maintained in a subsequent care of individual trees. Arbor Day packets of educational and promotional information have been prepared by the International Society of Arboriculture and the British Columbia Nursery Trades Association.

Innovative programs of "Adopt a Tree," school tree leaf collectives and similar programs have been affected in some jurisdictions. Only one article (see Appendix 54) on Vancouver's city tree has been found, and it might for example, be possible to sponsor a writing competition for children of different ages with set topics relating to city trees and a final award, or awards, given by an appropriate civic representative.

Major boulevard tree projects, such as tree planting, insect control, pruning or tree removal for replacement, can present undesirable and often outspoken public feedback, especially in a locality where no attempt has been made to appraise residents beforehand that such work is necessary. Other park departments (see Appendix 72) have successfully introduced pre-project handouts on maintenance and tree planting schemes. These very low cost measures can have a substantial return in improving public relations.

A recurring complaint from landscape architects, architects and developers, is the difficulty in obtaining accurate information from a single source which indicates the expectations, constraints, standards and

procedures which apply, or the plant material acceptable to the City in development projects.

A consistent source of unrecovered, direct and long-term "oncosts" to the Boulevard Tree Program are occasioned by unnecessary damage to street trees by construction workers, including those employed by the City Engineering Department. No specific measures or procedures are apparent that are aimed at reducing mechanical wounds or breakage during construction.

The use of press releases by the Park Board has, to date, been largely restricted to requests for watering of young trees during periods of drought. Coverage of special events, flowering times, special Fall colour, particular planting projects or other work of general interest has been minimal.

### Conclusions

A broad spectrum of opportunities are open to improve the identity, image, interaction, educational role and media coverage of the Boulevard Tree Program. Most of the effort is in innovative thinking. The cost-versus-return-ratio strongly favors a more aggressive stance by the Park Board and would serve as a model for other programs. Enthusiasm and time are essential ingredients, but the most important need is one of leadership and direction.

### Specific Recommendations

1. The Boulevard Tree Program should have a graphic symbol to provide it with a clear public identity. All publications and correspondence directly from the arboricultural group should show the symbol. Low cost adhesive stamps can be used on normal Park Board letterhead. More aggressive publicity, such as a launch of the boulevard tree 20-year plan etc., should be the subject of Park Board consideration.
2. The provision of clothing, badges and hard hat badges for the arboricultural group staff would provide a meaningful identity for work forces. No attempt at elitism is intended. Other groups within the Park Board might also benefit from their own special symbol.
3. Complaint handling should be upgraded to a more formal level. The use of pink telephone slips for office



records should be discontinued. A formal complaint and reply form should be developed. Complaints should be plotted over time by area to provide ready graphic indication of problem concentrations. This should provide a basis for the initial anticipatory maintenance schedules. A formal reply on the outcome of any complaint should be forwarded to the initiator. The extra workload will decrease with time as anticipatory maintenance replaces reactionary maintenance. The newly-appointed secretary at the Sunset Nursery will be able to handle this procedure if a number of problem form-letter replies are prepared.

4. A formal and consistent procedure for handling petitions should be developed. This should include a senior management interview with the proponents and an investigation as to why normal procedures have not accommodated their concerns. Prompt personal attention should characterize the handling of collective citizen complaints and if staff resolution is not possible, such petitions should be automatically turned over to the Park Board Commissioners.
5. It is recommended that a high quality color publication, similar to that for the VanDusen Gardens, outlining trees of special importance, historic areas, walks and views of interest to the resident or visitor, be prepared as a general promotion of the City with both Civic Pride and tourism in mind.
6. A bulletin outlining the goals and objectives, policies, legal obligations, constraints, benefits, history and premises of the Boulevard Tree Program should be prepared for distribution to property owners on request or when complaints are received.
7. A slide/tape show describing the Boulevard Tree Program, using a content similar to that in the previous recommendation but including good quality pictorial or graphic examples, should be available for loan to interested organizations. Sponsorship of this presentation and/or a film on the Boulevard Tree Program should be sought from a major company in Vancouver. In time a number of special topics may be developed on various aspects of the program and aimed at particular age groups. A co-operative project with MacMillan Bloedel Place should examine the usefulness of a slide show aimed at reducing vandalism.

8. The VanDusen Garden should offer seasonally-oriented courses which discuss Arboriculture in lay terms and which provide, along with general information on woody plants in the urban environment, an outline of the City's part in improving our living environment with the Parks and Boulevard Tree Programs.
9. Liaison with the Vancouver School Board should be encouraged to improve or expand the present teaching of urban botany, especially to younger children where it is important to instill an early sense of respect for vegetation. The use of "Project Learning Tree" and similar teacher aids for providing detailed information for more mature students should be investigated. A small pamphlet on career opportunities in Park Board activities including Arboriculture should be considered.
10. An Arbor Day package containing promotional, educational and reference material should be made available to schools in an effort to encourage interest in urban conditions and to reduce vandalism.
11. The City Arboriculturalist, with concurrence from Park Board and City Council, should develop innovative projects which involve youngsters and adults in field, educational or aesthetic projects. Junior tree warden cleanup and planting programs, writing competitions, art or photographic exhibitions are but a few examples.
12. In order to ensure that major projects do not cause unreasonable concern in local neighborhoods, and that the rationale for such projects is presented clearly to local residents, a set of door-hangers similar to those in Appendix 55 should be prepared. Where known outbreaks of pests or a particular control strategy has been adopted, handouts similar to Appendix 56 should be distributed in areas where the problem is most pronounced.
13. Developers and their professional advisers should be provided with a simple document which briefly reviews the City policy, legal requirements, procedures and acceptable tree species. Planting sub-standards and size of stock should be explicitly described.
14. A simple graphic leaflet, possibly in two or three languages, should be prepared on the basic requirements for tree protection during construction. City field construction forces, in particular, should be instructed to involve the Park Board staff in major work which will affect tree conditions.

15. A broader range of press releases concerning aspects of the Boulevard Tree Program, the seasonal development of trees in the City, specific projects or problems, should be prepared by the Park Board communication staff. The responsibility for initiating such press releases and gathering appropriate information should fall to the City Arborist. Specific items on vandalism should not be highlighted; however, editorials or similar approaches should be considered.

Note: If a major thrust is made in upgrading the general appearance of the City, through a program such as "Vista Vancouver," then the Boulevard Tree Program should be appropriately integrated in the overall scheme of publicity and publications.

16. A "speaker's kit" with slides, handouts, promotional material, list of information sources and prepared script should be developed at three levels for use by City staff in giving lectures either about the City generally or the street tree program specifically. The three levels that should be considered are (a) young children (b) teenage children (c) adults.

## TRAINING AND EDUCATION

### Introduction

Increasing complexity occasioned by more sophisticated technology and a demand for greater efficiency, coupled with fiscal constraints, necessitates a level of management expertise which includes planning, operation and integration of a complex program. Rapid changes in Arboricultural and Management Sciences require a constant awareness of, and exposure to, new methods and ideas if management staff are to meet the challenge of change.

Field staff will be required to be conversant with new data handling and input/output systems. Long-range planning and budgeting will play an increasing role in the operations, which will be based on a knowledge of workload analysis and crew productivity. External constraints and requirements, both legal and administrative, will necessitate well-trained field staff. The introduction of new materials, methods and equipment will require a comprehensive understanding of safety requirements. With upgraded expertise will come enhanced staff morale and pride of workmanship. With refined staff capabilities will come increased productivity.

### Discussion

Management knowledge in the areas of law, business practice, fiscal and organizational planning, staff management, communications, strategy and policy analysis, operations research and computer use will become essential managerial prerequisites in the next two decades, especially in the public sector. The rapid pace of changing technology means that staff cannot expect to stay up-to-date and operate an efficient, effective program without new expertise. A curtailment in staff growth can be predicted for all levels of government. Future emphasis will, therefore, be for upper middle management to be able to personally plan and practise cost effective operations.

At the present, senior supervisors and management responsible for the Boulevard Tree Program in the Park Board have not had an opportunity for exposure to in-house management courses, nor are incentives or time

provided for further education. Other jurisdictions have found that efforts in this area are well repaid in long-term efficiencies of operation and staff morale.

The present Boulevard Tree Program has not been supported with an active, aggressive safety and training program. Although the safety record is fairly good, changes in practice and equipment will necessitate a more concerted effort to upgrade safety standards. Externally, stringent Occupational Health and Safety Administration requirements in the United States, and a concomitant increased awareness in Canada, will mean a tightening of individual Workers' Compensation Board regulations. This has already started with the formation in B. C. of a Standing Committee on Utility Tree Trimming.

In addition to safety training, no organized arboricultural training program exists within the existing Boulevard Tree Program. This circumstance, coupled with insufficient supervision, has allowed some field practices to be accepted despite being detrimental and not sound tree care practice. Examples include poor staking and guying, and poor pruning. Lack of training in basic skills inevitably incurs long-term costs to the program - tree condition may deteriorate rather than improve as a result of attention.

The majority of Program staff are mature or reaching retirement. No organized program exists to inject younger, well-trained men into the process of developing a skilled, stable staff conversant with the specific boulevard tree resource and Park Board practices. An apprenticeship program for arboriculture does not exist in B. C. but would be a logical adjunct to the present horticultural scheme. A large public employer such as the City of Vancouver can provide the leadership and catalytic role in advocating and organizing such a scheme, which would yield short and long-term direct benefits to both the community and the Park Board.

### Conclusions

Management training is an essential cornerstone in developing a sound, organized, cost-effective program that interfaces successfully with other facets of City practice.

A brief interview with Mr. Roy Forster, jointly responsible with Mr. Dave Worrall for the horticultural apprenticeship program, yielded the following conclusions:

1. training is a weakness in the present Park Board system;
2. insufficient thought is given to long term staff planning; and
3. workloads have not been properly quantified and consequently some lay-offs, especially of able apprentices, have occurred.

There is only a small nucleus of high tree-climbers with no training to replace them and arboricultural training in general is a weak link in the Park Board system.

Vancouver is by no means unique in this regard - few municipalities either in Canada or the United States have developed an "in-house" arboricultural training program. Many municipalities rely entirely on commercial tree companies and "on the job experience" as the training basis for their field staff. Senior foremen and management staff normally have to come to municipal arboriculture from the related disciplines of forestry or horitculture.

No university undergraduate level arboricultural program is available in Canada. A number of community colleges (notably Humber College in Ontario) have various arboriculture courses as part of a broader curriculum. In the U.S. some university programs do exist but American graduates appear to have little problem finding jobs in that country. It can be concluded that finding appropriately trained management staff with experience in government may be particularly difficult for many Canadian municipalities. With regard to field staff, it appears essential to develop a skilled work force that can respond to the increasing management complexities and mechanization that will characterize municipal arboriculture between now and the end of this century.

If sufficient interest can be developed amongst Lower Mainland municipalities it is possible that a joint, day release, training program could be initiated at B.C.I.T. However, the difficulty of funding and organizing such an enterprise would be considerable and probably could not take effect for sometime to come. In the interim, it seems more realistic for the City of Vancouver to organize its own training program to ensure the basic level of competency amongst existing and newly recruited staff. Ongoing improvement and refresher courses could also be developed over the next 5 years.

### Specific Recommendations

1. Provision for education in the management sciences for senior Park Board management staff should be provided by the City now through day release or night courses at university or college level, in public administration or business administration.
2. Provision should be made for upgrading management training in the application of technical advances. In particular are the areas of urban landscape design and development, tree establishment and maintenance methods, plant propagation, equipment, materials, and information collection or handling systems; all are changing rapidly and require constant review and understanding in order to assess appropriateness for inclusion in the Boulevard Tree Program.
3. Budget provision should be made for funds which would allow staff directly responsible for the Boulevard Tree Program to attend two major North American Arboricultural Conferences per annum, and for a written report of these conferences to be prepared and submitted to the Boulevard Tree Committee of Park Board. Allowance should also be made for staff to attend similar local conferences or workshops on their own initiative.
4. A member of the Park Board Boulevard Tree Program management staff should make arrangements to be seated on the British Columbia Workers' Compensation Board Standing Joint Committee on Tree Trimming.
5. A Trades Training and Safety Officer should be appointed for the Boulevard Tree Program. This position should be shared with the Forestry and Horticultural Maintenance groups.
6. It is recommended that a complete safety program embracing all hazards associated with boulevard tree work be developed with the Workers' Compensation Board.
7. It is recommended that a Safety Practices Manual be prepared to cover tools and equipment, digging and planting practices, tree trimming and pruning, high tree work, cabling and bracing, operations in close proximity to electrical conductors and other utility facilities, tree take-down and removal, tree surgery, and pesticide use.

8. It is recommended that, where appropriate, trimming and pruning staff should be sent to the Workers' Compensation Board Utility Line Clearing Accreditation Course. This course should become a prerequisite for any employee working near energized, hazardous utilities.
9. Where necessary, all staff responsible for managing or executing a pest management program should attend the Provincial certification courses and hold the appropriate certificate from the Ministry of Environment. Staff responsible for boulevard tree spraying must hold the Provincial Certificate #4, Landscape and Garden Pest Abatement. It is strongly recommended that supervisors also hold this certificate.
10. Every encouragement, including financial incentives, should be given to staff who take recognized courses in Arboriculture, Tree Surgery, Urban Forestry, Amenity Horticulture or Landscape Architecture, in order to further their education. If such courses are supported by the Park Board, a minimum period of employment after completion of courses should be a pre-condition of support.
11. The Park Board should investigate the availability of training aids suitable for upgrading existing skills for present employees and providing basic information for new employees (see Appendix 57).
12. Individual foremen or working sub-foremen should receive sufficient formal basic instruction to enable them to undertake general on-the-job training of existing employees and specific instruction for new employees and apprentices.
13. A separate secure facility, or part of a facility, should be set aside for skilled training. In addition to providing classroom space, a protected area large enough to accommodate equipment should be considered. Such a facility would be shared with horticultural maintenance and forestry.
14. It is recommended that a detailed training manual covering all tasks (see Appendix 58) encountered by boulevard tree staff should be developed over time. Pressing needs are similar to those identified in the section on Specifications. New specifications might form the core of a new manual, however the two are not synonymous and a full training manual should follow under the joint auspices of the City Arborist and the Training and Safety Officer.



15. It is recommended that staff responsible for direct contact with the public should be exposed to a short course on inter-personal relations. In addition, staff in contact with the general public by phone should have sufficient basic technical knowledge to be able to elicit a maximum amount of information about a problem from a caller.
16. An approach should be made to the Director of the Industrial Training Branch of the B. C. Department of Labour to approve an apprenticeship scheme in Practical Arboriculture for British Columbia.
17. Apprentices from an arboricultural or the existing horticultural scheme should be employed in the Boulevard Tree Program and provided every opportunity to learn new skills, rotate through different aspects of the work, and contribute to the growth of the program.

Note: recommendations regarding public education are reported in the section on Community Relations.

## PROCEDURES AND PRACTICES

### Introduction

Procedures and Practices, whether written or implicitly understood and approved, provide the core operating structure for a boulevard tree program. They, after all other efforts to control or mold the program have exerted their influence or feedback, dictate how the end result will appear, how much it will cost, and how acceptable it is politically, publicly, and technically.

There is a common misuse of the sequence of the two management functions of procedures and practices - it is often seen written "practices and procedures." There is an important distinction between the functions. Practices, that is the methods employed for field tasks, should not be confused with procedures, which are those methods employed for administration of the program. Moreover procedures must prescribe practices rather than the converse, otherwise management control is lost and field practices establish procedures. As field practice is at the end of the chain of program events and dictates implementation of the program, it is critical that it receive full review and management guidance.

For field work to be accomplished in an orderly, efficient manner, meeting the standards and expectations set out in the overall program goal, it must flow from a simple explicit framework of stipulated reference points that match circumstances with approved and consistent courses of action. In this way, both functional and communication requirements are met, both internally and externally, and the program can proceed without conflict or ambiguity.

The form in which procedures and practices become incorporated into the structure and operation of the program will vary depending on content, intent, importance and expected recipients. Directives, manuals, organization and responsibility charts, standards and specifications are common examples for internal departmental control. Memoranda of agreement, operating policy and procedures, responsibility charts, budgets and formal administrative decisions are examples of external controls.

A thorough search of the existing boulevard tree program files and other written Park Board resources did not yield any indication that formal Procedures and Practices have been prepared on a consistent basis. In effect, field practice has largely dictated system procedure. As already suggested, this relinquishes control from management staff to the field without any system of checks and balances that would allow adequate appraisal or audit of performance.

Interviews with individual staff, research for this report, and the original concern lists were used to generate an outline of Procedures and Practices that should be addressed as the boulevard tree program continues to develop. These topics are given in Appendix 59 and include some items already discussed in greater depth in other chapters of this report. The more important topics are discussed here in separate parts for both Procedures and Practices.

#### Discussion Procedures

The section on Procedures has been sub-divided into six main categories; Planning, Finance, Procedural Systems, Procedural Records Communications and Resource Stewardship. Each category contains a discussion of those topics that, when viewed as a whole, provide the basic guidelines for operation of the program.

Formal Planning is a fundamental necessity in the management of a renewable resource such as boulevard trees that may outlive their planners, planters, managers, beneficiaries, and often the surrounding built environment. Such long-term perspective is not common-place in an urban world where change is often rapid and substantial. Older boulevard trees are often the most stable element in some neighborhoods, while it can be anticipated that the younger trees planted in the last two or three decades may enhance the streets of a city that will be largely re-built by the mid point of the next century.

Man's mode of living and travel may have been radically altered by 2050, yet, barring major war or catastrophe, it seems likely that the basic pattern of urban living will remain substantially the same. It is suggested then that a twenty year planning

horizon, that will take us to the doorstep of the 21st century, is by no means unrealistic in planning the development of the City of Vancouver's Boulevard Tree Program. Since the concept of real property and the grid-like organization of the City are unlikely to change substantially, and the desire for individual travel, though perhaps powered by alternative energy sources, seems unlikely to diminish, City streets and boulevards would still form the principal ground-based communication corridor. The emphasis on urban living and, in particular, a demand for constant improvement of the quality of urban environment, would seem to increase every year. Given these assumptions, there seems no technological, social or psychological trend that would indicate a diminished need for boulevard trees. On the contrary, recognition of the benefits discussed in the introduction to the program recommendations (page X) would seem to emphasize the present and future public desire for a "green" city.

The topics that comprise the Planning element of procedures may be summarized as: long-range planning, maintenance planning, replacement planning, staff planning, and research.

In the context of long-range planning, two concepts are suggested as important. The first is the Twenty Year Plan already mentioned and outlined in the section - Politics and the Twenty Year Plan. This framework provides the temporal targets for accomplishing various components of the program over a given period. Five year intervals are suggested as ideal time blocks for program reappraisal and adjustment.

The second long-range-planning tool is that of the Master Plan. A Boulevard Tree Master plan is suggested as the ideal operating blueprint for applying the goal and objectives of the approved program. It is envisaged that a Master Plan would be published as a self-contained document and would contain a thorough review of the boulevard tree program, as well as a street by street design analysis and recommendations.

In particular, it is envisaged that the Boulevard Tree Master Plan would embody the following components:

#### Part I

1. An introduction containing discussion of the use and benefits of boulevard trees in the City, an outline of the purpose of a Boulevard Tree Master

Plan, a discussion of the plan in relationship to Regional, City, and local area development plans, and a review of the relationship of the City Boulevard Tree Master Plan to the broader City objectives for management of urban green space and City appearance.

2. A description of the City that examines location, climate, original natural vegetation, and topography, as well as the layout of the City and City streets and the location of areas of historical, geographical or cultural interest. This section would also examine the physical makeup of the City in the context of existing land use and zoning, as well as social factors including identification of local neighborhoods and business districts.
3. A description of the City tree resource including documentation of the streets and trees forming part of the existing resource from the boulevard tree inventory. Also included would be a record of those streets with future potential for tree planting but without trees and without curbs and gutters, as well as finished streets that should be scheduled for planting. In addition to the street and tree inventory for both tree pits and tree lawns, a container inventory would also form part of the description of the existing resource.
4. A description of the City's boulevard tree management would outline the adopted goals and objectives for the City program, describe the criteria and outline the policies that support the program, document the legislation applicable to the resource, and report the procedure for obtaining funds for boulevard tree operations. In addition this section would state the responsibilities assigned to various departments or sections within the City and Park Board, as well as note the implicit responsibilities of others that interact with the boulevard tree program.

#### Part II

1. A discussion section reviewing the history of the present tree resource and an appraisal of its present condition, age, composition, and of its suitability for individual locations would form the start of the second major section of the Boulevard Tree Master Plan. In addition, this

section would identify areas for tree preservation, and areas needing renewal of the present boulevard tree resource. Further, such areas suitable for modification of the immediate tree environment, as might be possible through utility line relocation, would be determined.

2. A discussion section examining the constraints that affect boulevard tree management in the City, including funds and pace of other City development. For example, curb and gutter programs or major area development, would introduce this part of the plan. This section would also propose appropriate techniques for public participation in the development of the boulevard tree resource and comment on the relationship of the boulevard tree program to other City departments or projects. Where appropriate, administrative procedures, such as those in use for handling complaints, for permitting developer planting, or organizing Arbor Days and other similar topics pertinent to the overall program would also be discussed in this section of the master plan.

#### PART III

1. The next part of the plan that would outline design for the future, elements of design for City streets would be described in the context of the City from those aspects noted in the description section, while design criteria (visual, cultural, functional), design objectives, choice of species, and the function of designs would be discussed. Specific designs for new plantings and for replacement planting on existing streets would be prepared where appropriate, while general guidelines would be developed for other locations.

#### PART IV

1. This action section would be the actual Plan and timetable for implementation and execution of the Program. This section would identify principal responsibilities, funding, and the assumptions on which the Plan is based. The specific relationship of the proposed Plan to other City developments, the degree of flexibility in the program and a discussion of emphasis for priorities would be given in this section. Compatibility with proposed City Engineering improvements, phasing and logistics for new City tree planting and tree replacement, as well as expected assistance from

other agencies would be noted. Specific techniques or methods for input from the public and the business community would be developed. The bulk of the Plan would document the Establishment, Replacement and Maintenance proposed for individual streets. The plan would also include specific provision for review and revision during the time span of each program.

#### PART V

1. Finally, the Master Plan would conclude with any recommendations appropriate to the Boulevard Tree Program including research and development objectives, and list the staff and services in municipal arboriculture available from the City.

Maintenance planning is a fundamental approach to organizing the tasks of ongoing husbandry of the resource. It is the difference between anticipatory maintenance and reactionary maintenance. In the former case, it is a procedure that provides tree care on a regular basis before problems develop. It requires an intimate knowledge of the characteristics of the tree resource based on a complete street by street tree inventory, profiles and needs of individual tree species, site factors, and a detailed workload analysis. Anticipatory maintenance will provide, in the long term, a substantially cheaper and better cared-for resource than a reactionary program. This latter type of maintenance program relies heavily on public complaints, tree damage, tree death, excessive growth, or similar indicators to initiate maintenance. It cannot respond to, or check, the general decline in the quality of the tree resource, nor does it provide a cost-effective approach when viewed over the life span of most boulevard trees. The worst feature of this type of maintenance is that it allows poorly maintained trees to exist on City streets. These trees yield considerably less than their full potential of benefits to their location and will require costly and arboriculturally undesirable repair as they mature. Moreover, these trees can directly diminish public support for the overall program as it is perceived that such maintenance practices are a necessary part of a city boulevard tree program. At the present time, the City of Vancouver maintenance system is one that is largely reactionary in nature and has not differentiated between various levels of maintenance.

Designating "priority maintenance," "high maintenance" or "standard maintenance" areas is one planned method of determining specific intensities of maintenance that allow a targeting of funds and effort. Priority maintenance would be undertaken on short cycles (weeks or months) with a high quality of maintenance based on constant inspection. Priority areas would be those areas of intrinsic importance such as major downtown locations.

High maintenance areas would be those of an important nature, particularly as it relates to the overall impression of the City, such as main arterials. These locations would receive inspection, perhaps three times per year, and receive maintenance every six months or each year as workload required.

Standard maintenance areas, such as the many residential streets, would receive annual or bi-annual inspection and receive maintenance on an "as needed" basis, consistent with appropriate arboricultural practice.

The nature of high intensity use and, in some cases, more complex designs (e.g. species base plantings, tree grates, etc.) would probably warrant actual treatment on comparatively short cycles, whereas other locations would receive arboricultural work based on need as determined by inspection or by age (e.g. young tree summer watering) as against repetitive timed cycles that are not normally cost effective. Suggested designations of Priority and High Maintenance areas is given in Appendix 60 and Appendix 61 respectively.

Replacement planning is seen as a separate entity from establishment planning (both of which would be embodied in the Boulevard Tree Master Plan) since it has the potential for substantial public concern, and requires comprehensive logistics to undertake without substantial public inconvenience. It embodies a silvicultural practice that acknowledges that there is an ideal rotation time for trees, after which they become over-mature, hazardous, and very costly to maintain. As trees are comparatively long-lived, compared with man, it is not readily recognized that they do have an optimum life-span, particularly in a City boulevard setting where environmental stresses may weaken a tree or cause it to exhibit growth



characteristics incompatible with street use.

Thus the concept of City trees as a renewable resource must be developed, and a planned program implemented for the removal and replacement of those trees whose health or cost of maintenance outweighs their benefits. Removal can be "clear-cut", that is, all trees in a block are replaced at one time, or by gradual increase of age class diversity by selective removal and replacement of older trees. Although the latter is a more complex scheme to administer, it provides a more gradual visual and environmental rate of change than the instant impact of large tree removal over whole blocks. Moreover, as already mentioned, there can be considerable adverse public reaction to removal of large numbers of mature trees in one location at one time. Thus, a more gradual program may be more easily implemented and receive greater public acceptance. With an increased awareness and participation rate by the general public, it is possible that new single trees in an area could be given basic care (e.g. watering) and surveillance by adjacent home owners, thus relieving the Board of some time-consuming tasks.

Applied research is an important component of an active, thoughtful, well-planned boulevard tree program. Without local investigation and testing it is not possible to incorporate the best suited species, techniques, equipment, tools or materials into the program. If constant improvement is not an ongoing facet of administration, the program cannot hope to benefit from the constant advances of science and technology and obviously forsakes an essential requirement of the overall goals and objectives of the program. At the present time, there is no organized testing program nor a list of approved species, machinery, tools, or materials for the City of Vancouver program.

In order to adequately manage the Boulevard Tree Program, both from a budget standpoint and from a work planning standpoint, there is an essential need to determine the overall workload associated with both the existing and future programs. Such a workload analysis quantifies tasks, productivity and desired work standards, calculates manhours required to ade-

quately manage the program and, consequently, predicts the numbers of staff, necessary at particular time of the year, to accomplish all of the desired work to a pre-determined standard. Some Municipalities operate a productivity bonus scheme based on such an analysis. The City of Vancouver has neither a workload analysis nor a productivity bonus scheme at this time.

There are almost perennial complaints in the annual report of the Park Board concerning the financial status of the existing boulevard tree program. This appears to be as a consequence of three factors in recent times: inadequate records on the size of the boulevard tree resource and, thus, the real costs of management; the use of an unrealistic per tree basis for calculating the budget requirement; and a reluctance on the part of successive Councils to carefully examine need versus results and grant a sufficiently large appropriation on a continuing basis. Some legitimate doubt can be cast on the practice of combining the tree establishment and replacement budgets (more reasonably capital costs) with the normal operating budget required for ongoing maintenance. Moreover, the practice of relying on funds from a multiplicity of sources, especially for tree planting work, though flexible from a management standpoint, unnecessarily complicates the accounting procedures necessary to sustain the program. Such procedures effectively mask the true cost of the City's boulevard tree program.

There are three separate components that require examination in the context of Financial Management of the boulevard tree program. These are: Source of Funds, Budgets, and Accounting Procedures.

The principal source of funds for operating the existing program originates from funds allocated by Council on an annual basis. As can be seen from Table 5 these funds had amounted to \$2,600,564 up to 1970 and to \$2,287,954 between 1970 and 1978, making an overall total of about \$5 million vested in the Boulevard Tree Program by City Councils since 1914. In addition, operating funds are made available for the boulevard tree program through a multiplicity of accounts set up on a project specific basis (see "90" accounts, Appendix 62). Other monies are also forthcoming from the City

Engineering Department for capital works, from "new and non-renewable special allocations" (for example, emergency spraying) and indirectly from monies budgeted separately, as with the Surrey Nursery and major equipment purchases. In addition, the City has received Federal assistance in the past through N.I.P. and L.I.P. programs with some funds being allocated (on the appropriate cost-sharing basis) for tree planting programs. In general, ongoing maintenance money has not been available through these schemes.

The only mechanism for increasing the major allocation of tree maintenance funds in recent years has been the addition of a set percentage for inflation and a set sum for each new tree added to the total resource inventory. In 1978, these figures were 6% and \$6.00 per tree. This latter sum, presumably intended to enable the Board to undertake initial care (and replacement if required), is half that used by American cities of comparable size and similar boulevard tree programs. No effective check has been available to determine if the number of trees added to the budget reflects the number of trees actually planted. In fact, Table 7 suggests a numerical discrepancy over the past few years between actual planting and reported planting.

At present, no mechanism exists to accommodate private or corporate donations made directly to the boulevard tree program, nor have such funds been solicited by the Park Board. An instance is on record where a public official was killed in line of duty and fellow workers wished to plant a tree or trees in memorium. Such funds have been (and were) discouraged, on the grounds that it is impossible to make special exceptions in the program for management of individual trees.

The present budgeting system is particularly torturous and time consuming. There is little evidence that figures used for the boulevard tree budget are in any way realistic or related to actual needs (see also Table 6). The budget request process starts in September of each year and is not completed until January of the following year. To date, field foremen and the Boulevard Tree Supervisor have been little involved in the budgeting process - perhaps the most serious flaw in the present method. Each year, the boulevard tree budget has been developed by the Manager, Grounds Maintenance. This budget has not, however,

been developed from detailed projected work plans since neither a workload analysis nor boulevard tree inventory have been carried out. This budget is then sent to the Director of Operations and Maintenance. Here, the budget is incorporated with other components of the Operations and Maintenance Budget. After initial review and revision, it passes then to the Superintendent of the Park Board and, eventually, on to the Finance and Administration Committee of the Board. After passing these steps, the various budget components from the Park Board departments are then reviewed by a full meeting of the Park Board Commissioners. By early in the new year, the Park Board budget progresses to the City Finance Department and later to the Budget Review Committee. After redefinition of each component, the full budget is then passed to the Standing Committee on Finance for the City of Vancouver Council. At this stage there is an opportunity for appeals against proposed budget cuts and once this process has been completed the finalized budget is sent forward to the full City Council. In addition to the common practice of requiring a certain percentage reduction of the overall budget, there is also, of course, the opportunity for specific components of the budget to be rejected at any stage in the review process.

The accounting system for boulevard tree expenditures relies on three figure codes to identify wages, plant material, supplies or equipment, and credits for costs set against (at the time of this study) four "30" series accounts maintained for boulevard tree maintenance and tree purchases. These accounts are, street tree root pruning, street tree purchases, centre boulevard maintenance and street tree maintenance. Information on the disposition of funds for each account is contained in the Board of Parks and Recreation general ledger. This fairly recent computer printout is available on a monthly basis, but until recently had a restricted circulation and was not available to field foremen or the Boulevard Tree Supervisor.

A principal difficulty in using this accounting information as a management or budget tool, at present, is the fact that the establishment (except special projects), tree replacement and tree maintenance expenditures are all combined together under tree maintenance. Further, there is no provision in the field time sheets to record any productivity information. Consequently,

no unit costs are available for individual tasks. In addition, there is no record kept, by expenditure or by tasks, for individual management areas (shown on the City map at the back of this report).

This lack of unit costing, or of information on the monies required or spent for individual tasks and for groups of tasks, relegates the present accounting information to cost control purposes. Rather, this information should serve as a dynamic tool for budget preparation, identifying problem areas, determining equipment needs (e.g. trimlift productivity versus manual climbing), showing equity of expenditure by area or by arboricultural need and, of course, for developing the workload and cost projections for boulevard tree planning.

Procedural systems embody the most important component of organizational conduct required to shape the management of the boulevard tree program. These procedures include the operation principals that assign the responsibilities, decision-making powers, obligations, liabilities, supervision and evaluations that are related to personnel, and the system logistics that relate to priorities, scheduling, timing, supply, workload analysis and support services.

The broad allocation of responsibilities is discussed in the section on Organization & Responsibilities. However, there will be a need for review and discussion of individual responsibilities (as outlined in individual job descriptions; see Appendix 63) as the boulevard tree program develops into a more structured, formal and sophisticated operation. No clear-cut procedure exists for allocation of decision-making powers at present, except through precedent, job rank or (marginally) from existing job descriptions. This circumstance should change once the City Arborist is appointed and formal delegation of powers is assessed.

A question of obligation embraces a broad spectrum of concerns from employee/employer relations to questions of individual conscience and personal responsibility through to fulfillment of promises to other groups that interact with the program. A basic question is that of delineating the integrity and "morality" of the program as seen both by its sponsors-public, political and departmental- and by its employees. To ensure faithful

support, the program must be financially viable, fiscally sound, technically competent, socially acceptable, flexible, and responsive to district needs. Present evidence would indicate that essential prerequisites (particularly those tied to staff attitudes) are well established, while the technical, managerial and social elements of the program will readily yield to improvement. Although in general the program seems to have this strong credibility based on the positive and earnest attitudes of Park Board staff, to some extent the tree resource has suffered from this. The existing arboricultural staff have tried very hard to placate or overcome concerns which have arisen on a day-to-day basis. Had the staff been more complacent, most work delinquent, and the resource decadent, the present subtle decline of tree health would not have occurred and major problems would have developed. This in turn would have meant that major review and re-direction would have been precipitated by the large number of complaints. In contrast, the program has in fact sustained steady growth without major problems, but that growth has, of itself, contributed to the difficulty in maintaining adequate management without the more sophisticated budgeting, planning, design, establishment and maintenance procedures now being tried by other large municipalities.

The question of legal responsibility and liability for operations of the boulevard tree program, and the problems that could result from accidents attributed to or caused by City boulevard trees, is one necessitating some comment. The question of liabilities is one rightfully requiring legal opinion for an accurate appraisal; however, it appears that the City is certainly the principal party liable for boulevard trees. As the City Park Board is not a legal entity, it is unlikely that any action could be brought against it, but it is possible that individual officers, particularly those professionally charged with responsibility for the program, do assume a legal responsibility for safe practice in execution of the program. Other questions of liability were raised during the tenure of this study. However, again no legal resolution or opinion is possible without a full examination of circumstances that might be encountered and potential consequences. A few examples are explored here.

In the context of damage to vehicles caused by overhanging City trees, one case has been heard in the courts (see Appendix 64) but it is not thought by members of the Legal Department that this one case could necessarily be construed as indicative of a likely ruling in other cases of a similar nature. In recent months, a boulevard tree was blown over on a car in the West End after the tree roots were damaged during construction for road widening (see photographs). In this case the City accepted full liability.

Some tree species are known to be potentially hazardous and to be of concern to Park Board staff. For example, elm species (even without Dutch elm disease) can lose large limbs without warning. The possibility of this happening can be detected by close inspection, but liability for property damage or personal injury requires further investigation in order to establish required levels of maintenance procedures needed to minimize the City's liability in the event of such an accident. Similarly, the question of staff liability will become of increasing importance as greater emphasis is placed on large undesirable tree removal, often in difficult locations. Liability for property damage as a consequence of various pests, aphids, birds or damaging insects moving from boulevard trees to private property (e.g. Gypsy moth) may also become of increasing concern.

Supervision is an important consideration in operating the program. Effective supervision assumes that supervisors are adequately trained, have a clear picture of program standards and can allocate sufficient time to individual projects to ensure that correct advice can be given before irreparable methods have been employed. The present level of supervision in the Vancouver boulevard tree context (as judged by current practice, see also photographs) is not sufficient. The most important need is for improved standards of arboricultural practice to be established. It is not suggested that there is any fundamental flaw in the present choice of supervisory personnel. However, there may be some merit in reviewing recruitment procedures and advertising for field supervisory staff in other geographical locations in Western Canada.

Many municipalities are now placing greater emphasis on evaluating individual and crew performance. There are a number of methods for determining such performance in addition to basic quantity of work. In particular, assessments related to quality of work are important in arboricultural operations, since undesirable work is often irreparable. Performance evaluations may be conducted for a number of purposes ranging from workload analysis through salary incentives to providing non-pecuniary recognition of outstanding progress. Such evaluations may be carried formally or informally and, of course, from either a positive or negative aspect. This latter point is often forgotten or misused where performance assessment concentrates on imperfections or comparative differences of productivity, instead of building on positive performance with encouragement and training.

Procedure for establishing system logistics is fundamental to efficient operation of an undertaking the size of the Vancouver Boulevard Tree Program. It is coupled closely with the pre-operational planning discussed earlier. However, it concentrates more on the immediate future and provides systematic procedures for establishing task and location priorities, job scheduling on a daily and monthly basis, job timing, supply of consumables and adequate staff or equipment, the availability of, and need for, support services, both managerial and operational, and the assessment of anticipated workloads, both short term and long term. With the exception of workload analysis, which is not part of current procedure, it appears that present logistical planning meets the present management style. It is not clear that existing capabilities could accommodate a full anticipatory planned establishment and maintenance scheme without additional staff and training.

A major fault with the existing system of operation is the lack of an adequate Record-keeping strategy that allows rapid appraisal of current conditions. Consequently, it is extremely difficult to provide reliable projections for discussion on future needs, or to establish an accurate documented history of past decisions, rationale or accomplishments.



The major areas in which records are essential include base data on the resource, cost breakdowns by task, location and quantity, work programmed and completed, safety, and equipment records. At present the latter category is the only one where detailed records exist. In order to maintain adequate records, a system of forms is normally developed to ensure that information can be collected, transmitted, manipulated and stored with relative ease. At present no comprehensive set of record forms exists for the boulevard tree program.

In addition to the need for records, the program is of sufficient size to warrant a number of procedural documents, in particular, the provision of written policies, organization and responsibilities, the adopted procedures detailed from this chapter, standards and specifications, a safety manual, a training manual, equipment operating instructions and the Boulevard Tree Master Plan outlined in other sections of this report. Further, the incorporation of a resource profile system using air photo maps and showing, wherever possible, legal boundaries would form an important and accurate data-base for the Boulevard Tree Program.

Procedures for Communication can be broken into three main parts; intra-departmental, inter-departmental and community relations. As the arboricultural group is largely self-contained, and the Park Board a relatively small entity, the emphasis on intra-departmental communication is largely limited to two groups, the Finance Group and the Planning Group. In both cases, the Boulevard Tree Program could definitely supply more information on its plans and operations. Conversely, it is expected that the Park Board Planning Group would have substantial input in the preparation of the Boulevard Tree Master Plan, while the re-examination of budgeting and financial reporting would be a co-operative effort with the Finance Group.

Interdepartmental communication is one of the cornerstones on which the present program exists and will continue to exist if orderly development of the program is to be expected. The requirements for improved interdepartmental communication are discussed more fully in the section on Organization & Responsibilities. Similarly, the development of procedures for public communication, another essential ingredient for program success, are more fully described in the section on Community Relations.

The last major segment of procedures, is that concerned with overall stewardship of the resource. It can be viewed as having three parts: design, assessment and management. At the present time, there are no design guidelines or criteria for the City of Vancouver Boulevard Tree Program. Important topics that must be tackled in the preparation of appropriate design procedures include decisions on geographic, demographic or ethnic breakdown of the City, zoning constraints, view constraints, street classification and intensities of use, historic or aesthetic concerns, development of tree profiles prior to choice of species, proposals for species diversity, size of stock and establishment, spacing, and the extent of single species blocks. In addition, design compatibility with engineering constraints, street furniture, parking requirements, adequate pedestrian space on sidewalks, and future maintenance resources will require careful study.

As noted in the section on Inventory, overall resource assessment is an essential procedure required to establish new data on the size, location and condition of the resource, followed by a periodic inspection and sampling to update the information. Within this overall function, an important aspect of resource assessment relates, of course, to individual tree inspection and problem diagnosis. External signs of damage and stress must be assessed. The common procedure is to use ocular estimation on a common scale recorded by experienced staff. Internal or root analysis of mature trees for disease or decay can only be successfully accomplished by using boring or electronic methods. In addition to assessing the tree resource, increasing attention is being paid in other municipalities to assessing the growing medium provided for new trees at time of establishment, with detailed soil analysis and, during subsequent development, with leaf analysis, to determine nutrient and micro-nutrient requirements. At present, the City of Vancouver does not use any formal system for assessing tree health or vigor on an anticipatory planned basis.

Procedures for management of the resource include developing and implementing those systems that will dictate approved methodologies for establishment, maintenance and utilization of City trees after removal. Establishment procedures include the operation

of the City Nursery, purchase of growing stock from outside growers, design requirements and preferences between tree lawns and tree pits, bare root versus balled and burlapped stock and versus tree-spade planting, tree spacing in particular locations and, of course, adequate procedures for choice of species.

Procedures for maintenance include the setting and incorporation of standards in the work pattern, procedures adopted for determining appropriate replacement programs, the incorporation of anticipatory or reactionary maintenance in particular areas as determined by need, the procedures for detecting and treating insect or disease problems and the appropriate procedures for protection on or near construction sites.

#### Conclusion Procedures

Program procedures should rightfully dictate program practice. In the case of the boulevard tree program in Vancouver, this has not been the case with field practice often being the dominant factor. Inevitably, consistency of approach has not been maintained since the major strategies of planning, detailed financing and budgeting, compiling system procedures, record-keeping and resource management have not been articulated, particularly in written form.

Now that the boulevard tree resource has exceeded 100,000 trees with an annual budget approaching \$500,000, it is not possible to operate an efficient well-structured, well-planned and well-supported program without the detailed infra-structure discussed in this chapter. Consequently, the suggestions given here embody the heart of the functional recommendations intended to assist the continuing development of a viable Boulevard Tree Program for the City.

### Recommendations Procedures

1. In order to ensure that a long range plan for the development of the boulevard tree resource is adopted and implemented by 1985, it is strongly recommended that the initial data collection for the proposed section of the Boulevard Tree Master Plan (City description, resource description, boulevard tree management description, appraisal and discussion of the present resource, appraisal and discussion of the major constraints limiting implementation of the Boulevard Tree Program and discussion of design objectives for the future) be initiated as soon as possible to allow an orderly and complete compilation of information to be undertaken in the years 1980, 1981, 1982, and 1983, so that a full draft master plan can be prepared in 1984 for circulation and adoption in 1985.
  
2. Since the process of preparing the Boulevard Tree Master Plan will extend over a number of years, it is recommended that a flexible twenty-year plan be adopted, as an initial strategy by the Park Board in 1980, in order to outline the anticipated rate and direction of development for the boulevard tree program. It is further recommended that as details on the existing resource are collected and particular phases of development approved by City Council and the Board of Park Commissioners, the level of detail contained in the initial twenty-year plan should be increased until, by 1984, there will be a complete time-table for future development of the program ready for incorporation in the finalized Boulevard Tree Master Plan in 1985.
  
3. It is strongly recommended that a program of planned maintenance for young trees, for semi-mature trees and for mature trees, that takes into account both species and location, be phased in as quickly as possible, to replace the present reactionary procedure. This recommendation, which will allow for much improved maintenance standards over the next twenty years, is contingent on the recommendation for reorganization of the arboricultural group, the addition of the City Arborist, and a Foreman III, as well as on the proposed workload analysis and boulevard tree inventory. During the period of change it is recommended that greater emphasis be given

to targeting maintenance funds to priority areas and tasks, particularly those related to:

1. Young Trees;
  2. The Central Business District;
  3. Main Arterial Roads;
  4. Trees in Need of Major Repair or Surgery;
  5. Gerontic or Dead Trees in Need of Replacement;
  6. Large Trees in Need of Pruning; and
  7. Butchered Trees Below Overhead Utility Lines.
4. It is recommended that specific areas (as given in Appendices 60 and 61) should be designated as Priority and High maintenance areas (for example, the downtown business district and main arterial roads, respectively) in order to effectively increase the intensity of maintenance in these particular types of location. This will ensure that those areas of greatest need and most significant impact and return will be targeted for both funds and effort. It is anticipated that this can be accomplished without substantially compromising the quality of care for the resource in other locations as long as the recommendations for reorganization including the small tree crew be implemented at an early stage.
5. It is recommended that increasing attention should also be given to requirements for boulevard tree removal, beginning with dead or over-mature trees. In the latter case, a thorough examination is needed, not only of the larger growing species that have been on City streets since early in this century, but also the older flowering trees planted in the fifties and now nearing the end of their useful life span, and of undesirable species (hazardous, damaging and trees requiring extremely expensive maintenance) as well as badly mutilated trees under utility or trolley lines. It is recommended that the Park Board undertake a concerted effort to identify the major problem areas or locations for the replacement program, and that accurate and detailed documentation is prepared in order to support all tree removals. It is also recommended that a comprehensive public program be developed to involve and inform adjacent property owners on proposed tree removals and replacement. Further, it is recommended that, in blocks where a large number of trees are to be replaced, every effort be made to lessen the psychological and visual impact of the planned and

gradual replacement program. Where this is not possible, it is recommended that greater attention be paid to tree replacement with larger stock (see also recommendation for tree spade purchase).

6. The City has, at various times, been the recipient of gifts in the form of various styles of street planter. Many are still to be found on City streets but the plant material in most is in very poor condition. It is recommended that a procedural system be established for repairing, replanting, cleaning, tending and replacing these planters, particularly in the downtown area. Further, it is recommended that these planters should be considered as part of the responsibilities of the arboricultural group and that in addition to establishment and maintenance of woody stock, particularly compact evergreens, every opportunity be taken to include showy annuals during the summer season.
7. It is recommended that the arboricultural group consider the need for applied research in order to better determine the most appropriate trees, tree care methods, or materials and equipment for the City boulevard tree program. In the case of information on suitable trees, it is recommended that three avenues of approach should be considered. The first is linked to the boulevard tree inventory and would determine those desirable species already planted on City streets as judged by vigor, resistance to stress and insects or disease, appearance, and low maintenance requirements. It is possible that this analysis could be undertaken in conjunction with students and faculty from the two Lower Mainland universities. It is anticipated that the final product would be a street tree performance profile that would complete the basic tree profile outlined in Appendix 38. The second avenue of study recommended would be to establish test trials, possibly in conjunction with other Lower Mainland Parks Board and the nursery industry in order to determine the suitability, in this location, of trees not yet planted here or planted only in very limited numbers. These trials could include both arboretum and street trials. The third approach would be to collect examples of approved boulevard tree lists from other municipalities in the Pacific

Northwest or, where such lists do not exist, to collect and analyze the experience of other municipal arboriculture staff. It is possible that this project could be initiated and co-ordinated by the Pacific Northwest Chapter of the International Society of Arboriculture that was formed in Seattle, June of 1979.

It is recommended that the final development of these studies would be the compilation of tree choice guidelines for various heights and shapes of trees appropriate for use in the City of Vancouver.

8. It is recommended that, in order to prepare the "approved lists" of acceptable materials and tools for arboricultural work in the City (as recommended in this report), an ongoing program of field testing be initiated in order to determine the most suitable and cost-effective supplies for the program. Initial candidates should include tree ties, fertilizers, tree pit ground covers, hand and power saws and insulated pruning tools.
9. As mentioned in the discussion regarding methods, many jobs may be undertaken in a variety of ways (task method options). Some of these ways are safer, more productive, or arboriculturally more sound than others. In some cases, there is a quality to quantity trade-off depending on the method chosen. In order to establish the most appropriate method for use in the Vancouver program, it is recommended that the major tasks (given in Appendix 66) be examined for alternative methods, and that the most appropriate technique form the basis of the proposed standards (or specifications) discussed in that chapter. It is recommended that the first task examined should be that of large tree pruning, since current practice appears to be contrary to sound arboricultural methods.
10. There is a continual turnover of staff in almost all park boards. In addition to the problem of seasonal work, injury and normal attrition, almost all organizations will be faced with a substantial loss, particularly of experienced staff, in the next decade, as a block of similarly-aged employees retires. It is recommended that greater emphasis should be given to staff planning in the next five

years in order to link recruitment, training, identification of potential supervisors and workload to the overall program goals and objectives that will be contained in the Boulevard Tree Master Plan.

11. In order to broaden the funding base available to the boulevard tree program, it is recommended that there be a Boulevard Tree Trust Fund administered by appointed trustees to allow funds to be donated either privately or by corporations and foundations for projects in the twenty-year plan. It is further recommended that a fixed proportion of all donations be invested for long term maintenance.
12. The election of a new Federal Government will undoubtedly cause some government programs to be reviewed, reorganized, deleted or expanded. In this context, it is expected that municipal and employment aid programs will be changed. It is recommended that the Park Board staff responsible for the management of the Boulevard Tree Program keep very close contact with the appropriate government Departments during this transitional phase and that a complete inventory of government assistance programs that will, or could, benefit the Boulevard Tree Program be compiled and, where appropriate, incorporated in the Park Board planning and budget process.
13. Considerable operating costs are absorbed by the Boulevard Tree Program as a result of damage to boulevard trees caused by vehicle accidents, vandalism, construction and the activities of various City departments. It is strongly recommended that every effort be made to recover all external costs of damage or loss, particularly in the area of construction damage which is not presently covered as a specific item. Procedures for inspection and bonding exist through the present Building Permit process and it is recommended that they be used in conjunction with the recommendations for tree protection on construction sites to discourage the incidents of boulevard tree damage around these locations. In addition, it is recommended that, where City forces have damaged boulevard trees,



a billing procedure be instituted that will allow the Park Board to recover costs of repairing damage or replacing trees.

14. It is recommended that there should be continuing provision by City Council of capital funds from general revenue for all new and replacement tree planting, but that by 1982 these funds should be based on a detailed budget submission from the Park Board keyed to the boulevard tree twenty-year plan. In the meantime, it is recommended that this approach be coupled with a de-emphasis on special beautification project planting, except that provided for by the community through the Boulevard Tree Trust Fund, a partial de-emphasis in City-sponsored new planting and a stronger emphasis on replacement planting and existing tree maintenance.
15. It is recommended that, for reasons of budgeting simplicity and efficiency, and in order to clearly identify the true cost of the Boulevard Tree Program to the City, monies that are presently budgeted by other groups (as in the case of some capital programs - City Engineering Department - or maintenance - street light pruning and sewer maintenance) be part of the project assembled and submitted by the Park Board to City Council. This recommendation for fiscal self-sufficiency is also consistent with the recommendation that the Park Board become the lead agency responsible for the management of all boulevard trees in the City.
16. No complete review of funding alternatives for the Boulevard Tree Program has been undertaken, although a variety of mechanisms have been suggested (direct or indirect frontage taxation) and used (monies from City Council supplemental funds). It is, therefore, recommended that a more in-depth review of equitably generating both capital and maintenance funds be undertaken, including an examination of such innovative or little-used approaches as traffic fine assignment, tourist or convention taxes, allocation of a percentage of business taxes, dog "tail taxes", etc.

17. The Park Board has considerable expertise amongst its many employees. However, it is anticipated that the boulevard tree resource will require expert advice on particular problems, particularly those related to design, insect and disease management, tree selection, and possibly management practices. It is therefore recommended that adequate provision be made for such services each year in the budget and that the results of such consulting work be appropriately incorporated in the procedural systems and practices of the Boulevard Tree Program and appropriately reported on to the Board of Park Commissioners.
18. The seasonal perturbations in arboricultural work can be largely tempered by careful planning, however, some unpredicted jobs, emergency work and time-consuming tasks are amenable to or necessitate contract work. In addition, useful comparisons of cost, quality and quantity between contract work and direct labour can sometimes provide insights into the efficiency and productivity of the latter, allowing internal improvements to be made where possible. It is therefore recommended that adequate provision be made in the annual budget for some contract work, possibly in the areas of small tree maintenance and mature tree trimming (not pruning). Conversely, it is recommended that jobs such as Hydro pruning that do not benefit from current contracting practice should be undertaken by Park Board staff, at least until such time as adequate specifications, supervision and contractor training can be assured.
19. The present budget process that allows for a percentage for inflation and a sum for new trees added to the resource is comparatively simple when compared with zero-based budgeting, M.B.O. budgeting and similar methods based on justified need and work projections. A lack of information on the size of the boulevard tree resource, its condition and annual workload requirements has meant that no transition to detailed budgeting has been possible. As the recommendations from this report are implemented, it is recommended that every effort be made to reflect the expected increase of management information in the budget process, particularly in separating capital

establishment costs and replacement planting expenses from ongoing maintenance requests and in identifying proposed expenditures on individual tasks within the total program. It is further recommended that, in addition to the normal yearly budget, work begin on preparing projected five and ten year budgets in order to assist the City in determining long-range fiscal needs. These budgets can be refined and detailed as information becomes available on resource and area needs, and it is recommended that by the time the Boulevard Tree Master Plan is ready for implementation in 1985, the twenty-year plan can be tied directly to expected budget requirements up to 1995.

20. As noted in the text of this chapter, the present accounting system does not distinguish unit costs, area allocation, task type or task method. Without such information, it is extremely difficult to determine any realistic picture of the expenses that underlie the Boulevard Tree Program, or to anticipate where economies or increases might affect or benefit present practice and, consequently, long term maintenance costs or tree health. It is, therefore, recommended that the present field forms be revised to indicate productivity by appropriate units (number of trees etc.) by location (management sector), by task code (see Appendix 66) and, where appropriate, by task method (for example, backpack spraying versus hydraulic sprayer). It is further recommended that this information be compiled on a monthly basis, and that crew foremen have access to a circulated copy of the appropriate parts of the accounts ledger in order to balance work priority with remaining funds available in the budget period.
21. No recent review has been undertaken of individual responsibilities within the management system for the boulevard tree program. Consequently, it is recommended that the respective roles of the management and supervisory staff be clarified and documented, and where necessary, job descriptions be reviewed and updated. In addition to analyzing the respective roles of each group or individual, it is recommended that the decision-making powers of each level be clearly defined, particularly in order to separate and identify responsibility for

policy decisions, management decisions and technical decisions.

22. As discussed in the body of this chapter, concern has been expressed regarding the liabilities that accrue from the operation of the boulevard tree program. It is recommended that the Park Board approach the Legal Department of the City for a review of both statute and common law in this regard. In this way, it may be possible to anticipate and minimize any potential problems and, where necessary, institute appropriate field practices to inspect or control boulevard trees.
23. Continued growth and expansion of the boulevard tree resource, particularly since the sixties, has meant that the workload associated with establishment and maintenance has increased substantially. However, no procedures have developed to link workload, productivity, staffing and desired condition of the tree resource. Despite the less desirable reactive maintenance approach, a work backlog has developed stretching back as far as 1973 (see Table 8 ). Consequently, it is not known whether the present staff complement (see Table 9 ) is too great or too few in order to adequately care for the boulevard tree resource to the standard implicit in the suggested goals and objectives. Certainly, from an organizational sense and appraisal of tree condition, it can be determined that some areas are inadequately managed (for example small trees and tree surgery). Implementation of a more structured management scheme as advocated by this report may help improve productivity, but without a thorough workload analysis it is not possible to accurately predict staff requirements for any given maintenance standard. It is, therefore, recommended that early attention be given to establish a procedure for workload analysis in each management sector, and that this information be appropriately incorporated in the budgeting process and in the finalized twenty-year plan.
24. Supervisory procedure, particularly between management and field staff and by foremen of individual crews, is not adequate to ensure efficiency of planning or high quantity or quality of arbori-

cultural practice. It is therefore recommended that supervisory training at appropriate levels be undertaken on a regular basis. This training should emphasize management methods, men management skills, community relations and technical competence.

25. Work evaluation has not been carried out on a regular basis and, consequently, some undesirable work practices have become established. These are more fully discussed in the next section of this chapter. However, it is obvious that work quality and quantity requires close inspection and evaluation by senior staff on a regular basis. Where work is exceptional, provision should be made for awards, recognition and praise; when work is satisfactory by encouragement and when it is less than satisfactory by clear and decisive action. It is further recommended that the Board of Park Commissioners consider periodic field visits to inspect aspects of the boulevard tree resource that are of interest or concern. In this way, both public and staff awareness of the Board's interest is shown, while the Commissioners benefit from firsthand experience of field situations.
26. The City does not presently employ any piece-work system in the establishment or maintenance of boulevard trees. Although there are recognized difficulties in administering such a system, some other municipalities have found that, with regular supervision and clear work standards, it is possible to increase productivity without sacrificing job quality. It is recommended that the Park Board give serious consideration to the concept of productivity bonuses over the next few years. Although administrative constraints, the collective agreement and personnel resistance may be first encountered, the introduction of work standards, as suggested by this study, provides an ideal opportunity for limited trials to be undertaken, if administrative and perceptual barriers can be overcome. It is recommended, however, that such an approach should be limited and coupled to proposed training and safety programs, as well as directly supervised by senior Park Board management.
27. Work scheduling has been, to a large extent, governed by seasonal demands in the past. New arboricultural

techniques (for example tree spades and anti-transpirants used in tree transplanting) and broader diversity of work (greater emphasis on small tree maintenance and tree surgery) will allow a more even planned approach. It is, therefore, recommended that greater thought be given to work scheduling within the framework of predicted maintenance, in order to stabilize the work force as much as possible. This, in turn, allows staff to be retained, intensively trained, and given a broader variety of work over the year, consistent with the skills of a full arboricultural tradesman (see other recommendations in this report).

28. A critical factor in design and choice of species is ensuring that appropriate procedures exist to locate and purchase, or contract grow or grow in the Surrey Nursery, appropriate species to a height or condition suitable for boulevard or container use. In order to do this, adequate predictions of demand must be prepared now for the mid and late 1980 plantings. It is, therefore, recommended that an early determination of anticipated planting locations and design requirements be translated into supply requirements, particularly as it pertains to large stock, uncommon species or lining out stock for the Surrey Nursery.
29. The Surrey Nursery is not a permanent facility owned by the City of Vancouver. It is currently a location on informal lease from the G.V.R.D. As noted elsewhere in this report, it lacks proper security, equipment, records, cost control, growing conditions and advanced nursery management. As it seems unreasonable to put substantial investment into such a temporary facility, it is, therefore, recommended that a full and complete review of nursery needs be completed, and appropriate arrangements made to secure a long-term lease on this or another site suitable for growing on nursery stock. If it is found not possible to negotiate an appropriate lease for the Surrey Nursery, it is strongly recommended that a nursery site closer to the City of Vancouver be procured, if at all possible.

30. A firm commitment has now been made by the Federal Government to metrification in Canada. In the shade tree industry the Metric Commission approved the formation of a subsection (8.17) committee in late 1975, and this group has met periodically since that time in order to produce metric guidelines, standards and recommendations for changeover in materials and supply specifications, and in business systems. Since metric units will be the working measure for the complete shade tree industry by the end of 1980, it is recommended that the Park Board start to convert the boulevard tree operation to metric measure and complete the planning, training and practical changeover no later than 1981.
31. The boulevard tree program relies heavily on a number of support services as noted elsewhere in this report. Few, if any, formal procedures or agreements exist between the Park Board and these groups. Much of the communication in the past has been strictly verbal and, although there is no reason to discontinue this flexible practice, it is strongly recommended that typewritten confirming memos to file, to the Park Board and to the party concerned should underscore verbal decisions. A major reason for this procedure is to enable a historical record of the program to be developed and for operating experience to be incorporated in the planning process.
32. The boulevard tree program has a wide variety of information used by it and developed from it. This trend will increase considerably as more intensive management is exerted and as the resource grows. This information will extend from synthesis of records to complete publications. It is recommended that full cognizance be made of the need for:
  1. Safety bulletins and manuals;
  2. Equipment bulletins and manuals;
  3. Organization charts;
  4. Policy and procedure bulletins;
  5. Standards and specifications;
  6. Training manuals;
  7. A formal subject filing system; and
  8. Budget supplements;

9. Community relation brochures; and
10. A formal Boulevard Tree Master Plan.

33. A Major inadequacy in the current system of management is the almost complete lack of comprehensive records. In particular, it is recommended that a comprehensive record system should be developed and implemented as soon as possible for:

1. Resource inventory;
2. Workload assessment;
3. Work to be undertaken by type and area;
4. Work to be completed by type and area;
5. Cost breakdown by -
  - (a) production units,
  - (b) task type and record,
  - (c) geographical area;
6. Staff availability;
7. Equipment availability;
8. Problem areas (for example vandalism and sewer complaints);
9. Historical trees;
10. Tree condition; and
11. Stores on hand.

34. In order to enhance communication and understanding within the various departments of the City as to the goals, developments, changes, promotions and other newsworthy items appropriate to the Boulevard Tree Program, it is recommended that the Park Board publish a simple bi-monthly news sheet on the program. It is suggested that the procedure could be for the City Arborist and Supervisor of Arboriculture to collect or solicit suitable information that would be compiled by the communications group and submitted to the Director of Operations and the Superintendent prior to publication in a manner similar for the preparation and release of information to the general public.



35. In order to facilitate a formal review and report on the progress of the various projects within the Boulevard Tree Program, it is recommended that bi-weekly meetings be held on a regular basis between the City Arborist, the Supervisor of Arboriculture and the Director of Operations.
36. A crucial element in the successful implementation and management of a large boulevard tree program is that of design. Such design must recognize a variety of broad objectives such as visual suitability, street use and engineering compatibility, long-term maintainability, and realistic cost. In addition, a variety of site specific objectives such as appropriate design time horizon, citizen acceptance, compatibility with traffic and transit, utility and street fixtures, neighborhood character, and the benefits outlined in the introduction of this report must be considered. Further, the designs chosen must utilize to the best advantage the principles of space articulation, definition and contrast, screening and privacy, linkage and unification, spacial and visual variety and spacial dimension, by utilizing the broad range of design components such as form, size, texture, density, color and seasonal variety offered by those tree species that are suitable for street use. It is recommended that every effort be made to enunciate those factors that are appropriate to street design in the City of Vancouver and to place within that context design guidelines for boulevard tree planting.

Further, it is recommended that these guidelines should be sensitive to the historical, ethnic, and social character of the City while recognizing the current constraints of zoning, street use, sidewalks or tree lawn size and condition, pace of development and changing emphasis in some commercial and residential neighborhoods. It is anticipated, and recommended, that specific design plans will be incorporated in the Boulevard Tree Master Plan by 1985 for those areas of the City that remain to be planted.

37. Since the development of design plans for specific districts will take some time, it is expected that some tree planting will continue, although it

is recommended that large-scale tree planting (particularly beautification planting) be de-emphasized until adequate maintenance can be offered those trees already in place. It is recommended that placement of trees in the next five years be, at the very least, a joint effort of the Park Board and City Engineering rather than the responsibility of the Engineering Department alone. Ideally, there should be a broader design input starting in the Fall of 1979 and this should be increased as the suggested design committee starts to develop local plans.

38. In many locations, particularly in residential neighborhoods, choice of species is governed by street design and particularly provision for an adequate tree lawn. It is recommended that, as the curb and gutter program progresses, or as sidewalks are replaced in other locations, a thorough review should be made of the general guidelines used for sidewalk-to-curb separation, and that every effort be made to provide, on a site-specific basis, the maximum span for tree growth consistent with other engineering space requirements. In particular, it is recommended that a procedure be developed whereby the City Arborist may participate in the planning process for new sidewalk installations.
39. It can be seen from numerous locations (for example Broadway and Alberni Streets) that inappropriate species or size of species are still planted as part of the present Boulevard Tree Program.

This single factor accounts for, and will account for, the most burdensome and expensive component of the program at least until 1990. Not only are there significant numbers of mature trees in locations that dictate their immediate removal for safety or cost reasons, but in the past few years new plantings have relied on a narrow spectrum of species, many of which, although contained at this time, will require substantial maintenance in order to minimize disruption to utilities, to sidewalks and roadways, and to freedom of movement, in the street right of way, for both traffic and pedestrians.

While recognizing that the supply of species is to some extent governed by the nursery industry and by the availability of stock from the Surrey Nursery now, it is very strongly recommended that much greater emphasis be placed on appropriate choice of species in residential, commercial and industrial areas, on arterial roads, and below aerial services. The apparent underlying rule that it is better to plant something rather than nothing at all be dispensed with. There seems no excuse for repeating the mistakes of the past which can be seen growing often in a badly mutilated state in various locations in the City. Many "compatible" tree species and cultivars are available and it is also strongly recommended that an inventory of potentially suitable species be prepared and a comprehensive profile (see Appendix 38) be compiled on each in order to fully examine their suitability for use or testing in Vancouver. (see also recommendations concerning policy and research)

40. As already noted in other parts of this report, no ongoing procedure has been established to quantifiably assess the overall state of the tree resource, nor to diagnose the condition of individual trees exhibiting dieback or decay symptoms. In addition some species are characteristically more prone to structural defects than others. It is recommended that the boulevard tree inventory have a specific component for data collection on tree condition and that as the tree inventory advances, trend analysis be used to determine species that should undergo close annual scrutiny. Further, it is recommended that the practical experience of field personnel should be documented and, wherever possible, hazardous species or individuals identified and recorded.
41. In order to fulfill the expressed goal of providing a boulevard tree resource in perpetuity, as is recommended in the opening to this report, and to provide gradual boulevard tree replacement without severe visual impact, it is necessary to ensure that there is sufficient age class diversity amongst the trees within the City and within various blocks of the City. This will require the street tree inventory to establish an actual age of trees and, in conjunction with possible life span information for each species, predict areas requiring

boulevard tree replacement. If such areas are to retain some species on a sustained resource basis, it will be necessary to gradually replace individual trees until the whole block is replanted and the stock revitalized. Although this will be a long-range management procedure, it is recommended that:

1. priority areas for such management be established;
  2. various techniques tested for both gradual replacement and complete replacement with various tree sizes; and
  3. the results of these studies be gradually incorporated into the Boulevard Tree Master Plan provisions for each five year period.
42. At the present time, tree leaves are the only resource derived from the tree program that are successfully utilized. The increasing interest in, and numbers of, wood-burning fireplaces probably provides a ready market for firewood. In addition, some larger species of hardwood may have considerable value (\$1,000 per 1,000 board feet), if adequate procedures can be instituted to ensure recovery of sound main-stems when replacement programs necessitate removal of mature trees. When such utilization is uneconomic or impractical, such timber may possibly be converted to rough or finished lumber or to timber products by City or Park Board staff for the many construction and development projects undertaken. It is therefore recommended that every effort be made to capitalize on the boulevard tree resource, even after it has served its initial function, in order to demonstrate sound economic, social and professional philosophies in the management of the resource and to ensure that the maximum benefits are derived from it.
43. In order to reduce the incidence of vandalism on City trees, which appears to be substantial and growing, it is recommended that there be an appropriate procedure to ensure that perpetrators are caught whenever possible, charged, convicted, and required to pay restitution to the City. The magnitude of the problem should be documented and the public, police, judiciary, school boards and juvenile case-workers be made aware of the problem and encouraged, or enlisted, to suggest solutions to the problem. It is further recommended that practical solutions that will reduce the vulnerability of trees and incidence of damage (including appropriate size and establishment, adequate low branching, proper tree ties and

tall enough stakes, continuous maintenance and, where necessary, tree guards) should be investigated and adopted.

44. In order to assist in the continuous surveillance of trees in the City, and as a supplement to the permanent staff additions and reorganization suggested in the chapter on organization, it is further recommended that thought be given to establishing a system of paid (or voluntary) Assistant Tree Wardens. These wardens could, on a regular basis, inspect and report as to the condition of trees in their designated blocks. Expenditures for remuneration and clothing would be relatively small while the extent of interest and information would be considerable. Retired citizens with an interest in plant material might provide a large reservoir of interested people, while the VanDusen Botanical Gardens could provide facilities for basic training.
45. In some locations, privately planted trees and shrubs have been allowed to remain on City streets. In addition, trees on private property have been allowed to overhang the street right-of-way, often growing above or into, the crown of desirable boulevard trees. It is recommended that appropriate procedure including, where necessary, visits to the property in question or written requests and registered notification, be given to encroaching property owners in order to contain this increasing problem. However, there are some locations where private planting may have been approved or where the choice of species and standard of care is not in conflict with the overall goals and objectives of the boulevard tree program, and in these cases it is recommended that notification be given to these owners concerning the encroachment but that the existing plant material be allowed to remain, but not be replaced.
46. A considerable amount of irreversible physical damage to boulevard trees, or more indirectly to their growing medium, occurs as a result of construction projects. Although in some cases construction hoardings may affect some protection, in the greater majority of instances this is not the present procedure. It is strongly recommended that inspection of each construction site including:
  1. specific appraisal of the condition of the boulevard tree;
  2. submission by the developer of a plan for saving or protecting trees in the widest area likely to be affected by construction (at the very least the full property frontage);

3. a plan and bond for returning the tree lawn and boulevard trees to their original condition or appropriate and approved replacement and guarantee for one year after planting; and
4. the final inspection and approval of the site by the City Arborist or his designate and the Building Inspector be undertaken in order to protect boulevard trees from construction damage.

In the case of City forces undertaking construction work in similar circumstances, it is recommended that a similar procedure be followed with the exception of Step 3, although restoration and replacement of trees would still be a direct charge from the Arboricultural Group to the City Department concerned.

47. As has been demonstrated by the accidental introduction of the damaging insect Gypsy Moth (*Porthetria dispar*) into the Kitsilano area of Vancouver, the City boulevard tree resource is possibly vulnerable to a number of diseases and insects not normally found in British Columbia. In order to meet the potential threat from these pests, it is recommended that suitable strategies be developed in conjunction with the government agencies responsible in order to prevent or detect and minimize any of these problems. In particular, it is recommended that a review be made of the principal hazards (for example Dutch elm disease *Ceratocystis ulmi*, Oak wilt - *Ceratocystis fagacearum*, Japanese Beetle - *Popillia japonica* and Winter Moth - *Operophtera brumata*) and that appropriate Pest Profiles as outlined in the Lepidoptera example contained in Appendix 65 should be prepared for each problem identified and anticipatory Integrated Pest Management approach be developed for each.
48. It is recommended that the Superintendent of Parks should take the lead in recommending the formation of an Inter-agency Pest Management Task Force, with representation from the Federal and Provincial Departments of Agriculture and Forestry, from the Lower Mainland municipalities and from the University of British Columbia and Simon Fraser University, in order to deliberate over and finalize strategies for eradication or containment and control of severely damaging insects and diseases of urban trees.

49. Insect and disease management of incipient or endemic populations of indigenous pests on Vancouver boulevard trees has not received adequate attention. In particular, problems and complaints related to (for example) aphids, scale insects, tussock moths, tent caterpillars, leaf tiers, loopers, wasps and anthracnose require more investigation as to incidents and extent, as well as to integrated management opportunities. Other municipalities (notably in California) have had reported success with biological approaches to boulevard tree pest management and it is recommended that fuller attention be paid to this work and, if necessary, appropriate consulting services engaged to design and recommend suitable programs for Vancouver.
50. Despite some protection afforded by Vancouver Island, Vancouver can be exposed to very high winds at various times of the year, and has been known to receive hurricane force winds. In addition, unusual weather, including heavy falls of wet snow and glazed ice, do occur periodically. Some species of boulevard tree, trees in need of pruning to improve the crown to root ratio, and trees still in leaf in late fall when winter weather starts, are particularly vulnerable to excessive damage. Although staff on call and emergency telephone numbers are provided for at the Works Yard, it is recommended that a formal strategy be developed to deal with any catastrophic occurrence that might directly involve the boulevard tree system, including major blowdown, ice or snow damage, fire or similar events. It is also recommended that all of the arboricultural staff be incorporated in, and appraised of, such plans, which should be prepared in conjunction with the Emergency Program Department, Streets and Traffic divisions of the City Engineering Department, the Transit Authority and B. C. Hydro.
51. Permissions for sidewalk crossings are an inevitable outcome of change and development in the City. On streets with tree plantings, there is a continuing requirement for trees to be removed in order to accommodate such crossings. The procedure for informing the Arboricultural Group already exists, however it is recommended that this procedure be augmented by providing written memoranda to the Park Board Superintendent or Arborist as crossing requests are received. It is also recommended that the site be inspected and that wherever possible trees be removed intact, with the cost borne by the crossing proponent. Where trees are too large to be moved, the City should be reimbursed for the full appraised value of the trees destroyed.

As already noted, field practice is at the end of the long chain of ideas, policies, procedures, and controls that govern the Boulevard Tree Program. Field practice then, is the crucial step that implements the goals and objectives of the program. The success with which these expectations can be met is predicated on the quantity and quality of work for each task that comprises ongoing establishment, maintenance and replacement. This, in turn, is dictated by the training, experience and attitude of field staff, and by the intensity and quality of direct supervision.

Even if planning, organization, structure, and direction are weak, it is still possible to have an extremely creditable tree resource if field staff are concerned and conscientious. The converse is, unfortunately, not the case. Poor quality field practice will largely negate the best of planning and intentions. Other infrastructure notwithstanding, it is skilled field work that will govern the good health and appearance of each individual boulevard tree in the City.

Present practice is constrained by four important factors:

1. lack of adequate funding for a program with over 100,000 trees;
2. insufficient training and supervision;
3. a workload disproportionately large to the present field staff directly responsible for boulevard trees; and
4. an inadequate knowledge of any basic aims and standards for the program.

A conscious effort has been made to address these concerns in other chapters of this report. Despite various structural and procedural inadequacies in the overall program, this cannot absolve the field staff from the criticism that some current practice would not meet basic arboricultural standards currently accepted in other jurisdictions.

The general health and vitality of boulevard trees in the City is presently declining, as judged by the poor survival of many young trees, slow growth rates of established trees, incidents of disease and insect infestations, degree of damage and number of defects in many locations, advanced age classes of various



short-lived species and excessive crown density for many semi-mature trees in most locations. The general quality of workmanship could be improved when judged by present quality of tree establishment, young tree care, mature tree pruning, attention to wound repair and tree vigor, and current approaches to pest management. Based on these assessments, it can be argued that improvement is both necessary and possible.

The basic elements of field practice can be simply outlined as: mandate, men, motivation, methods, materials, and machinery or tools. As already noted, each of these factors will influence the quantity and quality of productivity in field tasks and, ultimately, the condition of boulevard trees and success of the Boulevard Tree Program. Since both the general health and vigor of the overall tree resource is substandard and some present practices are contributing to this condition, the following section examines some of the topics that comprise each element of field practice.

The reason for discussing mandate as an element of field practice is to clarify the authority that is given within the Arboricultural Group to individual work teams. At the present time, tree assignments are influenced by practical constraints such as manpower availability, season, and expediency, as well as work priority and overall group structure through foreman and sub-foreman responsibilities and job title. Reorganization of the group to broaden the scope of some responsibilities and better define others, is given in the section on Responsibilities and Organization. However, it is at the functional level that explicit responsibilities, both of supervisory personnel and of individual crew members, must be relayed and understood. Although individual job descriptions and the Union Collective Agreement outline formal responsibilities and procedural conduct, verbal communication is still heavily relied upon for allocating scope, location and type of work. Although the standards referred to in the next chapter will formalize how work should be conducted, they cannot substitute for clear assignment of tasks and responsibilities. A number of mechanisms are commonly used for this type of communication, both from supervisor to foreman and from foreman to crew leaders and crew members. Weekly planning meetings, informal site discussions, tailboard dis-

cussions and dynamic feedback such as daily or weekly appraisals are simple examples. Highly sensitized interpersonal communication and followup should be seen as critically important in determining the desired execution of each task and ensuring the overall success of the program.

Field staff responsible for the Boulevard Tree Program thus play the most instrumental part in attaining the goals and objectives set for it. Closely linked to the actions of the staff themselves are their motivations and expectations. Important considerations for job practice relate to the broadest interpretation of working conditions. With few exceptions, arboricultural jobs are both arduous and hazardous, requiring excellent health and stamina. It should not be concluded from this that they are in any way labouring jobs. Arboriculture demands a high level of skill, patience, and sensitivity for the plant material. Arboriculture attracts a particular type of individual, often with above-average intelligence, practical knowledge, independence, and with pride and interest not always found in other vocations. In addition, most arboricultural staff in Western Canada are self-taught through job experience and their own initiative. Strong motivation, either latent or as an overt quality, is a characteristic of many staff employed in municipal arboriculture. Most have served for many years, contributing to a stable work force.

This background provides an ideal opportunity for the employer to invest in the work force in general, and in specific individuals in particular. The very stability of the work force can be a disadvantage in not providing advancement opportunities for good employees. The Park Board can, however, provide both opportunity and incentive, by instituting a scheme of arboricultural trades training (see section on Training), by reviewing individual performance on an annual basis, and by re-assessing job descriptions and remuneration. Some disenchantment is evident at present from the practice of advancing staff temporarily for part of the season and then returning them to a lower grade after a prolonged period of supervision. More thought could be given to year-round responsibility for a group of tasks with high seasonal activity. It seems that more attention should be paid to training, aspirations and morale in order to enhance individual esteem, and to appearance, working conditions, safety and job quality, to improve overall esprit-de-corps.

At the present time, the boulevard tree staff are all men since few women have had any arboricultural training. In other jurisdictions this is not acceptable, and steps are being taken to remedy this situation. The Park Board may choose to be either progressive by taking on women for field staff positions, in order to provide training, or take a more passive stance by waiting until the qualified applicant comes forward for any job opening. In the parallel horticultural trades training program a number of women have shown themselves to be particularly adept at plant management and care and it would seem that every effort should be made to extend this pool of expertise to arboriculture.

In order to undertake the tasks that form the implementation stages of establishment, maintenance and eventual removal and replacement of boulevard trees, a number of methods may be employed. For each task there are a number of ways of accomplishing the aim of a task (task method options). Within any option there are a number of discreet steps that collectively accomplish the end result. It is possible to detail these steps (task method breakdown). In this way acceptable practice can be reviewed, accepted or rejected. These task methods and method breakdowns are an important step in formalizing approved field practice. Where necessary, it is possible to develop work standards (see following section) and to prepare detailed training manual sections.

Coupled with staff conscientiousness, approved task methods become the other turnkey that will dictate the efficacy of the Boulevard Tree Program. Some methods currently in use are not conducive to high-quality, long-term tree care. For example, the practice of leaving budded species in place after they have been vandalized, often at stake height, causes an unsightly mass of suckers on a broken stem. These trees will produce uncontained sucker growth from weak, adventitious bud bases and can never make a safe, simply maintained, beautiful boulevard tree. Another example is the practice of using tape to tie trees to support stakes. Although foam rubber has been used between some trees (it soon breaks down to hard granules from air pollution and causes permanent wet spots on the bark, possibly allowing the entry of fungi), the effect of tying trees to a single stake is to provide a fulcrum for

the tree to move against, soon causing severe bark damage (refer to Volume II photographs). Many small and medium size trees have been damaged in this way and it is perhaps the most flagrant example of poor arboricultural practice.

The beautiful beech on Granville are in danger of severe damage from three causes: the high intensity feature lights are burning large holes in the bark, some tree guards have bolts damaging the stem of trees; and a number of tree grates are biting into the trunk of the trees at their base. Tree care has been carried out on such long cycles that trimming is often no longer possible and heavy pruning is required in many locations, leaving large undesirable cuts on mature trees. Branch removal often does not follow accepted "drop-crotch" pruning techniques and in many places cambium damage at the branch collar is prevalent. Throughout the system, tree wound dressings, which may enhance wound healing and reduce adventitious sucker growth, have not been accepted as common practice. Inbalanced trimming, especially along the Hydro system, and power saw pollarding are two other undesirable practices seen in some locations. A practice coupled with tree pruning that is both very damaging to the tree and unsightly, is the use of tree spurs for mature tree climbing. The sharp spikes that bite into the tree leave brutal scars in the bark and ample opportunity for fungal establishment in the wounds or in bleeding sap.

These are only a few examples of work practice that requires careful review and discussion with field staff, and adoption of revised techniques supported by improved supervision. A more complete review of tasks requiring method analysis is given in Appendix 66.

As already mentioned under methods, a number of materials that should be used for the program are not part of present practice. Most apparent examples are the lack of proper tree ties and sufficiently tall tree stakes, no use of tree paint, no fertilizer recommendations based on site-specific conditions or species, no use of tree wrap to prevent summer sun-scald on new trees, no insecticide or fungicide recommendations linked to Vancouver boulevard tree requirements, no use of anti-dessicants in tree transportation from the nursery, no use of pheromone trapping devices or similar methods for insect detection, no viral or disease testing, no use of soil tests prior to planting, and no use of growth regulators or inhibitors either for roots or tree crowns.

Significant advances have been made over the last decade in developing and introducing arboricultural materials. The Park Board has lagged behind progressive municipalities and has no program for testing or adopting new materials.

Substantial advances have been made in mechanizing arboriculture in the last two decades. In particular, new equipment for lifting, planting, moving, fertilizing, root pruning, trimming and crown pruning, spraying, and utilizing boulevard trees are now on the market and have been purchased by many of the more progressive municipalities. In addition, new hand tools have been developed for hydraulic pruning, tree surgery, tree misting, and tree decay diagnosis. Despite high capital cost for heavy machinery, other jurisdictions have found that increases in quantity and quality of work offset the initial investment. In the same vein, improved hand tools provide increased productivity and quality of work coupled with improved staff morale from using properly designed equipment. (See equipment Appendix 70)

In the area of office management, the use of micro computer inventories, computer graphics and mapping, air photo interpretation equipment, "intelligent" typewriters with text editing capability, color photography, microfilm record storage and similar techniques are commonplace. Neither the Park Board office nor the Sunset Nursery have availed themselves of these advances, which should be reviewed in the light of advanced management for the City Boulevard Tree Program.

In addition, the Sunset Nursery, as base of operations for the Arboricultural Group, lacks many basic essentials for smooth operation of a normal office. In particular, ability to generate, file, or distribute correspondence is hampered by the unavailability of modern typewriting, file system, or photocopying facilities. At a time when emphasis is being placed on making Park Board operations more efficient these deficiencies seem particularly inappropriate.

### Conclusions Practices

There is a general decline in the condition of the boulevard tree resource and it is suggested that this can be attributed to lack of adequate funding, supervision, training, work standards and, to some extent, staffing. However, an important contributor is poor work practice.

Some work practices have become established without review, and these do not always provide desirable results. Use of small caliper stock in high traffic areas, inappropriate choice of species often on arterial roads, and poor establishment or maintenance techniques are prime examples. In addition, insufficient attention has been paid to keeping abreast of new developments in arboricultural materials and equipment, compounding the problem of adequate productivity needed to cope with a resource base that has increased by three to four thousand trees per year over the last decade. The resource has also changed in character somewhat, with an emphasis on downtown and beautification areas that have an increased maintenance requirement compared with residential areas.

If work practices are not improved, and an adequate permanent work force assigned to the Boulevard Tree Program, there is every likelihood that there will be a substantial loss to the City compared to the potential that can be realized from past investment, and the present tree source now growing on City streets. If program emphasis continues to be on tree planting without concomitant attention to young, mature and semi-mature tree management on a comprehensive scale, there will be an accelerated decline in the overall condition of the resource and the possibility of very costly, unexpected expenses in the next decade.

The recommendations made here are an initial start to upgrading field practice in all aspects. Although every effort has been made to include all problem areas, others will come to light as a result of this report. It is hoped that these too will be catalogued, examined and remedied so that, by 1985, the Boulevard Tree Master Plan can be implemented from a bench mark of competent documented work practices.

### Recommendations

1. It is recommended that greater emphasis be placed by the Arboricultural Supervisor (later in conjunction with the City Arborist) on discussions of task methods and expected standards of work with individual crew foremen prior to each week's work or when different jobs are initiated. In conjunction with fuller review of specific tasks at this stage, it is also suggested that more intensive supervision of crews is necessary for some time to allow for effective implementation of the revised standards of work outlined in the Standards and Specifications section of this report.
2. It is recommended that, in order to facilitate improved communication between and amongst foremen, an appropriate period be set aside at the beginning or end of each week by the Boulevard Tree Supervisor for review with all foremen as a group, the past week's work accomplished by the Arboricultural section, the proposed work for the following period, any major problems encountered or suggestions for change, and discussion of any important developments in the overall management of the boulevard tree program. It is recommended that brief minutes of these meetings should be made, and maintained.
3. It is suggested that individual crew foremen or subforemen be encouraged to give greater attention to informal crew review of work to be undertaken with "tailboard" discussions, "wet weather" sessions or at similar opportunities. In particular, feedback from foreman or supervisor observations of individual or crew performance (quality or quantity of work and safety practices) should be incorporated.
4. A fundamental cornerstone for improving the boulevard tree program on an ongoing basis is the incorporation of innovative, pertinent skill improvement for individual crew members. It is, therefore, recommended that every effort be made to improve training opportunities within the Boulevard Tree Program. Day release for attending community college courses, incorporation of a formal apprenticeship program, and organized training for existing and newly recruited staff (as discussed in the section on Training), rotation through different phases of

the work (within the constraints of the Collective Agreement) and greater emphasis on "on the job" training by supervisory staff are important considerations.

5. In order to engender and enhance an individual and crew pride in the Boulevard Tree Program and to ensure that outstanding performance or ideas are recognized, it is recommended that full consideration be given to awards for both outstanding individual and crew efforts over a given period and for innovative suggestions that will represent savings to the Park Board or significant improvement in the quality of the boulevard tree resource.
6. Practice of advancing staff to temporary supervisory positions, are in part due to the seasonality of work, has been the source of discontent. It is recommended that, as the revised crew organization is implemented, every effort should be made to spread various tasks, and job responsibilities of equal merit, throughout the year, so that the necessity for this practice is minimized.
7. No boulevard tree program can be sustained or progress without conscientious staff. Working conditions, identity, and sense of worth play an important role in morale and work quality. It is recommended that training, safety, productivity, advancement opportunities, job descriptions and salary be reviewed on an ongoing basis. If possible and appropriate, an incentive scheme for arboricultural work crews similar to that employed by the City of Toronto might be considered.
8. Although the current accident record of the staff engaged in boulevard tree work is not one warranting concern at present, the introduction of new techniques and equipment, coupled with greater emphasis on removal of large gerontic trees, will increase the need for improved safety training. It is recommended that full discussion of the various changes in methods and direction of the Boulevard Tree Program be a part of safety meeting agendas on an ongoing basis with potential work hazards carefully reviewed. It is further recommended that the Worker's Compensation Board be asked to provide a review of those accidents



encountered by the tree companies operating in B.C., and that the circumstances of these accidents be discussed at safety meetings.

9. It is recommended that, in conjunction with the development of an apprenticeship scheme for training future arboricultural staff, the Board make a conscientious effort to bring women into the work force. Despite the rigorous nature of some arboricultural tasks, experience in other jurisdictions has shown that women are capable and interested in this vocation, thus providing a large new reservoir of untapped potential employees for a trade that has had some difficulty recruiting men with arboricultural skills or experience.
10. General appearance of crew members and equipment is an important factor both in engendering employee pride and in public recognition of Park Board and crew identity. It is, therefore, recommended that a Boulevard Tree Program logo be designed and made available as a badge for staff jackets and as a decal for equipment and vehicles permanently assigned to the arboricultural group. Further, it is recommended that the Park Board consider at least two issues of improved work clothes per year for boulevard tree staff, and that good general appearance be a subject of discussion with staff to indicate (without imposition) the desire for minimum standards of presentation consistent with individual freedoms and Provincial safety requirements.
11. Task methods and, to some extent, the individual components of tasks (task method breakdown) will be gradually incorporated in work standards (or general specifications). However, it is recommended that crews and crew foremen be given every opportunity to participate in the discussions that will occur before specific standards are adopted. In this way, the important experience of field staff will be properly reflected in approved practices.
12. A number of field practices are presently employed or tolerated, which are detrimental to the condition or appearance of the tree resource. Included are the practices of:
  1. Climbing mature trees with tree spikes;

2. Taping trees to stakes instead of using proper tree ties;
3. Using single small stakes for very tall newly planted trees;
4. Power saw pollarding in some locations, particularly below hydro lines;
5. Inbalanced pruning of tree crowns, particularly around low-strung feeder cables;
6. Large branch pruning in mature trees necessitated by very long cycles between pruning;
7. Stub cutting of branches in fast-growing species instead of drop crotch pruning;
8. Inadequate undercutting of branches, allowing bark damage at the branch collar with main stems;
9. Allowing large wounds, particularly on sucker-ing species, to go untreated with fortified tree wound dressing and thus allowing massive sucker growth;
10. Planting of tall growing species below low overhead obstructions, such as trolley or hydro wires;
11. Planting small growing (and maintenance intensive) trees (e.g. Mongo pine) at the base of larger boulevard trees, particularly where curb side planting is permitted;
12. The retention of broken, budded species allowing prolific sucker growth that will not form an aesthetically appropriate or safe new leader;
13. The practice of tunnel pruning to allow hydro or trolley lines to pass through the crown of large trees; and

14. The retention of large over-mature (maple) dangerous (elm) cavity prone (Mountain ash) unsightly (disease or virus-infected cherry) untidy (catulpa) or dead (West End) trees.

It is strongly recommended that these practices be phased out as soon as is practicable.

13. A number of beneficial practices that would enhance the condition or vigor of the resource, or allow early warning of impending problems, are not employed in the present boulevard tree program. These include:

1. Regular inspection and recording (on appropriate forms) of damaged or diseased trees, and collection of this data by species and geographical location;
2. Soil testing of the growing medium used in tree planting to check for pH nutrition, and trace element requirements for the species being established;
3. Leaf sampling of representative species and locations for nutrient and trace element deficiencies, particularly in young and semi-mature tree plantings;
4. Disease surveys, particularly for diseases in the flowering tree component of the boulevard tree resource;
5. Insect surveys for determining the need for management measures, either during infestation or against over-wintering stages;
6. Use of bark mulch or suitable ground cover (clover etc.) to suppress weed growth at the base of trees in tree pits in order to improve appearance and reduce the incidents of dog problems; and
7. Sterilizing tools used in tree work where any likelihood of infection of other trees exists.

It is recommended that consideration be given to implementing these practices where appropriate.

14. It is recommended that a review be made of those expendable materials used by the boulevard tree group for tree maintenance. Existing tree ties, short tree stakes and rapid release fertilizer are examples of items that could be improved. In addition, the proposed use of tree paint, tree wraps, insecticides and fungicides, anti-transpirants and sewer chemicals for root control will require some investigation of appropriate materials developed for arboricultural practice. It is also recommended that, once comparative testing of various materials has been accomplished, appropriate products will be put on an "Approved List" for information to the purchasing staff.
15. Productivity and quality of work are substantially affected by the quality, appropriateness and care given to hand tools used on the various tasks involved in establishment and maintenance. In particular, it is recommended that those tools which are of a personal nature (this would include long-handled pruning tools, hand saws, tree surgery tools, and items of a similar nature) be formally assigned to individuals who would then be personally responsible for their care and upkeep.
16. If the Park Board follows the recommendation to purchase at least one new insulated trim lift device, it is recommended that a full complement of appropriate hand tools (small power saw, hydraulic pruning tools, wound painting equipment etc.) should be acquired at the same time.
17. As greater emphasis is placed on tree inspection, it is recommended that the purchase of two tree borers and possibly a Shigoneter for decay detection be considered. As other diagnostic aids are thought necessary (for example soil testing kit, soil probe, binocular microscope, air pollution damage charts) these too would be added to the diagnostic tool inventory.
18. The arboricultural industry has become highly mechanized in the last decade. Some pieces of equipment, despite high capital cost, can substantially improve quality and/or quantity of work in jobs that are time consuming when done

manually. It is recommended that the Park Board should consider replacement of its existing tree stumper and replacement of one hydraulic spray truck. In addition, it is recommended that, in conjunction with the workload analysis, a thorough investigation be made into the purchase of:

1. An insulated trim lift for hydro line and trolley tree trimming;
  2. A tree spade for nursery tree lifting, tree saving and tree planting in tree lawns and centre boulevards;
  3. A mechanized tree root pruner;
  4. A portable mill for rough lumber production;
  5. An adequately sized tractor with front end loader for the Surrey Nursery;
  6. An appropriate number of new field trailers for the reorganized arboricultural group crews;
  7. A truck mounted air blast sprayer; and
  8. Two additional crew-cab trucks and one club-cab truck.
19. In order to support the office operation at the Sunset Nursery, it is recommended that the arboricultural group purchase:
1. A photocopier;
  2. An electric typewriter;
  3. A set of legal-sized lateral filing cabinets;
  4. A map cabinet; and
  5. An electric calculator with paper tape.
20. Provision should be made for adequate tree care, security, drainage and tree lifting at the Surrey Nursery. (See also major recommendations concerning the Surrey Nursery)

21. It is recommended that the present practice of bare root lifting, transportation and planting should be examined in the context of tree survival, initial vigor and planting check, in addition to the limitations that this technique may impose on the length of the available planting season.
22. It is recommended that considerably more thought be given to choice of species for particular locations between the time that this report is reviewed and the finalizing of detail design recommendations for the Boulevard Tree Master Plan. The nursery practice of close growing stock until over twenty feet in height should be discouraged, as should the planting of relatively small stock in areas where damage is high. For example, it is recommended that no stock less than eight to ten centimetres D.B.H. should be planted near schools, or in high density commercial areas (for example in the downtown core).
23. At present, staff are extremely difficult to contact during the day, even in the event of an emergency, without actually going to the work site. With the recommendations contained in this report with regard to work scheduling it is likely that crew movements will occur during one day. In addition the roles of the City Arborist, Arboricultural Supervisor, Foremen, and Tree Wardens require that they be readily contacted. It is, therefore, recommended that a full investigation be undertaken of the benefits and costs of fitting the Arboricultural Group vehicles with two-way radios.

## PROGRAM STANDARDS AND SPECIFICATIONS

### Introduction

The mass of organizational and administrative detail which accompanies any large program can often obscure the basic jobs which are the backbone of the undertaking. In the case of the Boulevard Tree Program, the major functions are administration, planning, design, pre-establishment, establishment, maintenance and replacement. This section addresses the tasks which fall within the last four functions and include the operations of nursery practice, planting and establishment, small tree maintenance, general tree maintenance, removal and replacement. The detail tasks involved in these six categories of operation are shown in Appendix 66. There are approximately 50 separate and discreet tasks involved in carrying out these operations. Each task can be done (task method) in a number of ways (task method options) often with different tools and producing different results in terms of productivity and quality. Each task can be further subdivided into individual steps (task method breakdown)

Obviously there are major safety considerations for each task which relate to the sequence and content of each step. In some cases, task methods or some steps are prescribed by law, as in the case of the application of pesticides and tree pruning near energized conductors. Work standards would identify approved methods in the case of other tasks.

### Discussion

The choice of particular task methods used in the boulevard tree program at present is largely left to the judgement of the individual foreman in the field. Although practical experience is most important, no thorough audit has been conducted on current methods and no handbook of accepted or approved methods has been compiled.

In a small program with direct senior supervision and a stable work force, this practice is not a cause for concern. However, in a program of the scale now encompassed by the Boulevard Tree Program, with staff temporarily assigned from other groups, and with a number of experienced staff and supervisors due to retire in the next few years in addition to staff turnover, it is important to reconsider the situation.

Moreover, with a greater emphasis on efficiency, productivity and mechanization, it becomes imperative to establish some basic set performance requirements which enable control or quantitative and qualitative assessment to be applied to work practices.

In other jurisdictions, notably in the United States, Ontario and in Manitoba, the trend is for arboricultural industries or employers that are unwilling to police their own activities to become subject to stringent government regulation. Inevitably, there is some loss of work flexibility. In the United States, there has been a rapid increase in litigation and insurance costs. Rigorous program management, coupled with safety and operating standards, can pre-empt this trend toward regulation if introduced before major problems occur.

The majority of work carried out in the Boulevard Tree Program is undertaken by Park Board staff, and very little by contract labour. Although some suggestions have been made that the Park Board is only a contractor to the City Engineering Department, there is no contractual evidence for this. In particular, there are no job specifications for individual projects as would be expected in such an arrangement. Where beautification projects have been carried out under outside contract, some simple specifications have been produced by the Special Projects Group in the City Engineer's Office (see Appendix 67). It does not appear that any formal attempt has been made to apply these specifications to the Park Board. As far as can be determined, boulevard tree work has normally been carried out by Park Board staff or by temporary employees directly supervised by Board staff. It should be noted that specifications are normally deemed to be "project specific" and may form part of a tender document or Form of Agreement. Standards, on the other hand, apply to general practices and prescribe the minimum approved methods and procedures for any particular work or set of tasks.

Within the Park Board, no work standards specifically pertaining to the Boulevard Tree Program were found. A search of the files unearthed a short general guide to tree trimming (see Appendix 68) but this could not be construed to be a work standard.



Without work standards or project specifications it is not possible for program management to adequately establish field control, nor specify accountability for individual or team operations. Also, if these management guidelines are lacking, it is not possible to identify specific methods that are flawed and produce undesirable results, or methods that conflict with systems or techniques used by other parties to manage their responsibilities in the street right of way.

With a spectrum of well prepared standards (for an example see Appendix 69) or specifications, it is possible to set quality targets, provide basic training guides, comply with legal and safety requirements, defend current practices and establish a bench-mark for future system improvement.

Note: Some items often incorporated in standards or specifications (for example, approved tree species, size of stock, planting distances and similar topics) are included in the section on Constraints, or discussed in the paragraph on Design Guidelines in the section on Procedures.

### Conclusions

Standards or universal specifications that stipulate the minimum requirements and prescribed methods for many of the tasks given in Appendix 66 would substantially assist the future progress of the Boulevard Tree Program, provide the basis for a teaching manual, and permit an orderly transition of expertise as staff retire from the Park Board.

In particular, standards for nursery practice, planting and establishment, small tree maintenance, general tree maintenance, tree moving and tree replacement, would seem imperative. In addition, guidelines on the diagnosis of tree ailments, construction protection, lights and trees, preventative maintenance and safe practices would provide more specific guidance for field staff.

Specifications for work carried out by other Park Board staff for the Arboricultural Group, or by other City departments for, or on behalf of, the Arboricultural Group, would allow a more uniform performance and accountability to be exerted by the proposed City Arborist.

Detailed project specifications for contract work would allow more control over outside commercial companies when undertaking work for the Boulevard Tree Program.

#### Specific Recommendations

1. It is recommended that detailed standards or, where more appropriate, universal specifications be prepared for:
  - a. nursery practice;
  - b. new tree planting aftercare;
  - c. small tree maintenance;
  - d. special practices in beautification areas;
  - e. container maintenance;
  - f. general pruning;
  - g. tree surgery;
  - h. pest management;
  - i. large tree maintenance;
  - j. utility tree work;
  - k. large tree moving;
  - l. large tree removal;
  - m. construction protection for trees;
  - n. general safe work practices and
  - o. utilization and recycling.

Note: It is suggested that maintenance in this context should include but not be limited to:

trimming  
 low branching  
 crown thinning  
 staking or guying  
 watering  
 fertilizing  
 mulching  
 wrapping  
 water sprout or sucker control  
 tree base or pit vegetation control

2. It is recommended that detailed project specifications be prepared for any substantial arboricultural work to be undertaken for the Arboricultural Group by any other group or by a commercial contractor.
3. It is recommended that other City Departments whose operations are impinged upon by the growth of boulevard trees or by the operations of the

Park Board Arboricultural Group be urged to prepare formal standards for their maintenance requirements. An example is safety pruning requirements desired by the Streets Division of the City Engineering Department.

4. It is recommended that those agencies that are not part of the City Government but whose activities are affected by the growth of boulevard trees, most notably the Utility Companies, be urged to co-operate with the Park Board in establishing formal minimum standards of maintenance.
5. It is recommended that the Park Board make contact with the Workers' Compensation Board of B. C. to establish a specific committee for arboricultural practice with a view to preparing minimum acceptable procedures for safe work in the trade.

## LIBRARY AND INFORMATION ORGANIZATION

### Introduction

The management of boulevard trees covers a wide assortment of topics, and embraces at least the disciplines of Arboriculture, Urban Forestry, Horticulture, and Landscape Architecture. It may also include aspects of parks management, pest management, wild life management, conservation, agriculture, Arboreta, nursery trades, education and environmental science. A number of professional journals, which review future and current developments in these areas, can be obtained at little or no cost.

To keep abreast of this information is an essential component in the ongoing education of both management and practical field staff responsible for the Boulevard Tree Program.

The efficient organization of information underlies an efficient program. This includes filing of correspondence, records, memoranda, pictures, plans or reports, and eventually provides an important historical reference for the program. This is especially important where the resource is one which probably outlives the working life of individual staff. At the very minimum, the planning horizon for boulevard tree management should be 1,000 weeks, whereas the average staff member will not contribute greater than 2,000 weeks to a program that, in turn, may be managing a resource lasting from 3,500 to 5,000 weeks.

### Discussion

There has been some past discussion concerning establishment of a small library adjacent to the Superintendent's office at the Park Board headquarters on Beach Avenue. Plans for this library have not come to fruition and, at present, the area is used as a small discussion room. Present staff own a small number of text books, and a few have been purchased over the years by the Park Board. No resource material of consequence exists either at the Sunset Nursery or at the Surrey Nursery. The current price of textbooks range between \$20 and \$50. It is, therefore, unreasonable to expect staff to invest in a comprehensive, personal library.

Present spasmodic circulation of a few journals does not insure proper staff exposure to technical advances, experience in other jurisdictions, or evaluation of new products or plant material.

No detailed filing system, which allows ready organization, logging or retrieval of individual information on the Boulevard Tree Program, exists either at the Park Board or at the Sunset Nursery. Consequently, complaints, correspondence, requests, work orders and similar information becomes misfiled, misplaced or lost. Although a system of filing is recorded as having been introduced at the Sunset Nursery in 1961, almost no copies of memoranda or correspondence exist.

### Conclusions

In order to continue the process of updating the Boulevard Tree Program, it will be necessary for staff to keep abreast of developments in other jurisdictions and in the technical fields appropriate to their responsibilities. No effective and efficient program can exist without an organized and detailed filing system, appropriate records of work undertaken, or commitments made.

### Specific Recommendations

1. That the Park Board establish, at one central location, a small reference library of textbooks, published papers, journals, annual reports, bulletins and leaflets to cover the aspects of Arboriculture, Urban Forestry, Horticulture and Landscape Architecture attended to by the Board. Ongoing responsibility for this library should rest with the City Arborist. The many papers and articles collected during the course of this study could form a nucleus for this library.
2. That, where necessary, the Park Board pay the subscription to those societies which produce an important technical journal or newsletter, on the condition that the member in whose name the membership is held provides all of the benefits of membership (including the journals) to the Board.
3. That the Park Board circulate to appropriate staff, with an attached signing list, those journals of general interest and education. These journals should then be returned to the Central Library for cataloguing.

4. That the Park Board review the current filing practice, both at the Park Board Office and Sunset Nursery, with a view to implementing a simple, yet uniform, topic listing for all classes of information pertinent to the Boulevard Tree Program. In addition, a decimal index should be prepared to aid filing and retrieval.
5. The Park Board should ensure that all internal memoranda to City Departments or within the Board, and all external correspondence, be typed in a normal business format with at least one copy to the Arboricultural Section files and one copy to the Park Board Office Central Registry. A concerted effort should be made to ensure that carbon copies are sent to interested parties.
6. A short glossary of technical terms should be prepared for eventual inclusion in program publications and in teaching manuals.

Note: A list of suggested journals is contained in Appendix 71.

TABLE 1TREES PLANTED ON BOULEVARDS 1926-27

Balsam	20	Prunus Pisardi
Bute	17	Tulip
Cambridge	186	Spanish Chestnut
Charles	50	Elm
Haro	4	Norway Maple
Heather	102	" "
Jervis - Barclay	6	Oak
Larch	60	Oak
Nelson	34	Catalpa
Spruce	98	Norway Maple
Vine	20	Oak
3rd Ave. West	34	Norway Maple
6th Ave. West	252	" "
8th Ave. West	68	" "
10th Ave. West	72	" "
10th Ave. West	93	Catalpa
10th Ave. East	260	Horse Chestnut
12th Ave. West	95	Elm
12th Ave. East	100	Catalpa
12th Ave. East	115	Elm
15th Ave. West	12	Birch
22nd Ave. East	12	Tulip
(Renfrew Park)		
	<u>1,710</u>	

SUMMARY

Birch	12
Catalpa	227
Chestnut (Horse)	260
" (Spanish)	186
Elm	260
Norway Maple	630
Oak	86
Prunis Prisadi	20
Tulip	<u>29</u>
	1,710

Model Boulevards (1926)	244
General Planting (1926)	346
" " (1927)	<u>1,120</u>
	1,710

TABLE 2

TYPICAL ANNUAL WORK PROGRAM  
1963

"...The street tree program progressed favourably with 25 enquiries answered by the Park Board arborist on such problems as planting, pruning and removing trees. Through co-operation with the City Street Lighting Department, some 650 trees were removed and many others were pruned to improve street lighting.

Another 1,350 trees that were dead, dangerous or interfering with underground services were removed while line clearance was performed for B. C. Telephone and for B. C. Hydro. To maintain a balance in decorative boulevard trees, 1,400 young trees were planted during the year."

Quoted from 1963 Annual Report

1.	Street Trees-Planting	\$ 2,443.40
2.	B. C. Hydro & Power-Pruning-1963	18,973.30
3.	B. C. Telephone Const-Pruning-1963	1,218.95
4.	B. C. Telephone-Tree Removals	8,366.99
5.	Prov. Gov. Bridge Road Trees	8,966.75
6.	B. C. Tel. Dist. #1 Pruning	2,248.48
7.	B. C. Tel. Dist. #2 Pruning	13,834.25
8.	C.M.H. Skeena Project Trees	346.50
9.	Street Ends, Triangles, etc.	8,858.40
10.	Blvd. Tree Removals	16,905.90
11.	Surrey Tree Farm	3,560.00
12.	Street Tree Maintenance	<u>97,305.74</u>
		\$183,028.66



TABLE 3

CONTRIBUTIONS BY B. C. HYDRO FOR TREE PRUNING AND  
TREE REMOVAL IN THE CITY OF VANCOUVER SINCE 1930

<u>YEAR</u>	<u>DOLLARS SPENT PRUNING</u>	<u>DOLLARS SPENT FOR REMOVAL</u>	<u>TOTAL</u>
1930	\$ 4,025.53		
1931	4,230.14		
1932			
1933			
1934	4,774.30		
1935	2,382.10		
1936	3,132.81		
1937	1,559.72		
1938	4,510.61		
1939	5,812.16		
1940			
1941			
1942	4,797.45		
1943	6,500.00		
1944	10,123.30		
1945	14,739.94		
1946	6,274.73		
1947	14,647.00		
1948	15,391.51		
1949	13,173.88		
1950	8,663.75		
1951	18,625.18	5,796.00	24,421.18
1952	14,864.04	985.00	15,849.04
1953	34,848.00	N.F.	
1954	12,675.00	N.F.	
1955	20,736.00	5,059.00	25,795.00
1956	14,022.00	N.F.	

<u>YEAR</u>	<u>DOLLARS SPENT PRUNING</u>	<u>DOLLARS SPENT FOR REMOVAL</u>	<u>TOTAL</u>
1957	\$15,946.00	0	
1958	13,892.85	0	
1959	23,693.00	0	
1960	6,750.56	0	\$ 6,750.56
1961	17,268.68	0	17,268.68
1962	19,156.30	0	19,156.30
1963	18,970.30	0	18,970.30
1964	25,196.84	0	25,196.84
1965	10,680.15	0	10,680.15
1966	23,378.71	0	23,378.71
1967	49,131.46	0	49,131.46
1968	20,818.05	0	20,818.05
1969	9,958.23	0	9,958.23
1970	71,572.28	0	71,572.28
1971	14,895.89	0	14,895.89
1972	48,669.38	0	48,669.38
1973	37,710.15	0	37,710.15
1974	39,040.16	0	39,040.16
1975			
1976			
1977			
1978			

TABLE 4

CONTRIBUTIONS BY B. C. TELEPHONE  
 FOR TREE PRUNING AND TREE REMOVAL  
IN THE CITY OF VANCOUVER SINCE 1930

<u>YEAR</u>	<u>\$ SPENT PRUNING</u>	<u>\$ SPENT REMOVAL</u>	<u>TOTAL</u>
1930	742.07		
1931	2,848.94		
1932			
1933	461.18		
1934	687.53		
1935	1,282.37		
1936	2,122.03		
1937	106.18		
1938	3,229.17		
1939	2,498.10		
1940			
1941			
1942	5,409.74		
1943	8,000.00		
1944	8,554.30		
1945	11,426.84		
1946	7,313.06		
1947	10,738.00		
1948	8,249.08		
1949	21,895.74		
1950	8,940.62		
1951	14,024.08	\$5,292.95	
1952	28,372.00	494.00	
1953	30,440.00	2,931.00	
1954	20,931.00	835.00	
1955	34,278.00	N.F.	
1956	17,831.00	N.F.	
1957	29,297.00	Ø	
1958	33,726.26	Ø	
1959	19,377.98	Ø	
1960	7,205.24	Ø	\$7,205.24
1961	4,570.31	Ø	4,570.31
1962	9,689.86	Ø	9,689.86
1963	16,082.73	Ø	16,082.73
1964	3,846.98	Ø	3,846.98
1965	4,728.66	Ø	4,728.66
1966	1,973.05	Ø	1,973.05
1967	3,464.92	Ø	3,464.92
1968	5,061.56	Ø	5,061.56
1969	2,696.12	Ø	2,696.12

<u>YEAR</u>	<u>\$ SPENT PRUNING</u>	<u>\$ SPENT REMOVAL</u>	<u>TOTAL</u>
1970	\$8,002.16	Ø	\$8,002.16
1971	2,583.56	Ø	2,583.56
1972	2,656.27	Ø	2,656.27
1973	1,963.43	Ø	1,963.43
1974	2,301.30	Ø	2,301.30
1975			
1976			
1977			
1978			

TABLE 5

FUNDS INVESTED BY CITY COUNCIL IN THE BOULEVARD TREE  
RESOURCE SINCE 1914

<u>YEAR</u>	<u>PRUNING</u>	<u>REMOVAL</u>	<u>PLANTING</u>	<u>SPRAYING</u>	<u>STREET ENDS</u>	<u>SPECIAL FUNDS</u>	<u>TOTAL</u>
1914							\$ 1,728.34
1915							975.50
1916							228.29
1917	\$ 500.00	\$ 550.00	\$ 165.36				1,215.36
1918	\$ 328.42		355.33				683.75
1919							302.78
1920							
1921		724.15					1,127.73
1922		General Maintenance -		\$ 843.25		\$ 658.15	1,501.40
1923							783.16
1924						737.17	737.17
1925				\$ 1,071.46		632.77	1,704.23
1926		637.98		498.78		5,061.70	6,421.82
1927		187.35	3,262.30	902.02			6,944.45
1928		994.83	2,904.02	984.21			9,237.31
1929							13,027.01
1930	7,029.76		6,044.50	213.97		634.00	13,918.23
1931	2,243.22	333.40	2,643.69	387.92		2,823.19	10,507.68
1932	347.34	29.56	261.12			899.24	7,526.48
1933	General Maintenance	-	2,263.85	Storm Damage	-	504.00	2,707.85
1934	General Maintenance	-	5,560.57	Storm Damage	-	606.90	6,167.47
1935			180.34	General Maint.	-	5,193.39	5,373.73
1936			3,016.33	General Maint.	-	5,012.60	8,028.99
1937							4,992.99
1938							4,997.68
1939							4,999.59
1940							4,999.11
1941			172.37				6,633.85
1942							6,895.10



FOOTNOTES-TABLE 5

- 1914 - In 1914 Gore street ends, intersections and boulevards were included together. A number of areas were turned over by City Council to the Board. Most of the work appears to have been grading and seeding, although some monies were spent for boulevard trees and for the care of boulevard trees in the nursery.
- 1915 - New streets were turned over to the Board but comments on maintenance are essentially the same.
- 1918 - Planting and maintenance appears to have been overspent by \$183.75 in comparison to City Council's grant of only \$500.00.
- 1919 - A further \$581.62 was spent for repair from storm damage but it is not possible to tell how much of that was spent on boulevard trees.
- 1922 - The figures arrived at assume the Special Grant of \$658.15 was for tree purchases and the maintenance figure was arrived at subtracting street intersection costs from total boulevard expenditures.
- 1923 - This sum is probably too small since tree inspections were still charged to the account of street ends and intersections.
- 1924 - As above. (1923)
- 1925 - As above. (1923)
- 1926 - A major step forward was made this year after a \$5,000 special grant to establish model boulevards in each Ward City except Ward 2, after a visit to Victoria (cost for visit and photographs \$224.25).
- 1927 - In addition to the figures in the table, \$1,455.63 was spent on model boulevard improvement and \$1,137.15 was spent on model boulevard maintenance.

- 1928 - The total for general boulevards was \$6,887.31; for Connaught Park boulevards \$1,500.00 and for removal of dead trees in the West End \$850.00.
- 1929 - An extremely detailed outline on boulevard tree expenditures is given in the accounts for this year.
- 1930 - The sum under Special Grants should be read as miscellaneous expenditures under maintenance and not as a special grant.
- 1932 - For some reason, payroll of \$5,989.22 was not split up by tasks. The general supplies figure may or may not include 638 trees supplied by the nursery and valued at \$858.60.
- 1941 - Includes \$1,501.48 spent on tree planting for centre boulevards.
- 1942 - Includes \$1,572.78 for tree planting on centre boulevards.
- 1943 - Included is a special grant for \$2,000.00 for low branching in the West End to protect fire truck operators.
- 1947 - Does not include an unknown sum for Bylaw tree removals in Kitsilano and Fairview.
- 1950 - \$214.45 was spent in 1949 and 1950 for tree removals billed to the City Electrical Department, and this year completed the expenditure of \$100,000.00 for tree removals under Bylaw 2903 from 1945.
- 1952 - Tree removal monies came from 1951 Bylaw 3220C and 1952 Bylaw 3287.
- 1953 - Tree removal monies came from 1952 Bylaw 3287 and 1953 Bylaw 3344C.
- 1954 - Tree removal monies came from 1953 Bylaw 3344C and 1954 Bylaw 3416C.
- 1955 - Tree removal monies came from 1954 Bylaw 3416C and 1955 Bylaw 3416C.



- 1956 - Tree removal monies came from 1955 Bylaw 3416C and 1956 Bylaw 5571. B. C. Telephone tree removal account showed an unspent credit of \$439.00.
  
- 1957 - Tree removal monies came from 1956 Bylaw 5571 and 1957 Bylaw 3655C. The City Electrical Department credited the 1956 Bylaw 5571 with \$4,214.00 for removal of trees interfering with street lights and the 1957 Bylaw 3655C with \$11,540.00 for the same reason. These amounts are included in the tables.
  
- 1958 - Tree removal monies came from 1957 Bylaw 3655C and 1958 Bylaw 3690. The 1958 Bylaw was credited with \$6,730.00 for removal of trees interfering with street lights. Average cost of tree removal was \$20.00 per tree.
  
- 1959 - Tree removal monies came from 1958 Bylaw 3690, and 1959 Bylaw . \$2,450 contributed for removal of those trees interfering with street lighting.
  
- 1960 - Tree removal monies came from 1959 Bylaw and 1960 Bylaw . \$6,000 was contributed for removal of trees interfering with street lights.
  
- 1961 - Monies were received from City Council as a special non-recurring event. \$4,000.00 for tree plantings, and almost \$5,400.00 from City Engineering for planting on Burrard St.
  
- 1962 - Includes \$13,224.96 for severe storm damage. The Hydro pruning is now for B.C. Hydro and Power Authority instead of B. C. Electric and was \$7,346.99 overspent.
  
- 1963 - \$7,022.00 expenditure in excess of credit for B. C. Hydro tree pruning. \$6,404.94 appears to have been brought forward from the \$25,000.00 Tree Removal Fund established under 1960 Bylaw 4843, while an additional \$11,660.00 came from street lighting. \$8,966.75 was received from the Provincial Government for tree planting on Bridge Road.

- 1964 - Tree removals used up the balance of \$1,489.04 from 1960 Bylaw and \$993.24 from City Lighting. \$440 was spent for Surrey Tree Farm. It is not clear whether the new and non-recurring supplemental appropriations under 1-500 is for tree purchases or tree planting.
- 1965 - Planters \$977.50, street lighting \$625.00.
- 1966 - Street light pruning \$624.00, Surrey Tree Farm drains \$3,125.15.
- 1967 - Street lighting \$625.00.
- 1968 - Street lighting \$625.00. Sunset and Surrey Nurseries combined and, therefore, Surrey Boulevard Tree Nursery costs not available.
- 1969 - Sunset and Surrey Nurseries combined and, therefore, Surrey Boulevard Tree Nursery costs not available.
- 1970 - Same as 1969 as regarding Surrey Nursery. B. C. Hydro expenditures outweighed receipts by \$31,000.
- 1972 - Flat rate tree removals noted in the tables, though carried out by Park Board are carried out by street lighting. B. C. Hydro credits were exceeded by expenditures by \$13,497.90.
- 1973 - Does not include any expenses other than maintenance.
- 1974 - From 1974 onwards considerable sums were spent on beautification planting including \$18,380.70 Granville Mall (and downtown tree planting \$12,000 as an example). Although projects at Kerrisdale and other locations had monies spent which are difficult to trace for the proportion that should relate to boulevard tree planting. Receipts were outweighed by expenditures in the amount of \$24,917.14 from B. C. Hydro.

TABLE 6.

RECENT TREE PLANTINGS BY: NUMBER, YEAR AND LOCATION

YEAR	DISTRICT										TOTALS
	1	2	3	4	5	6	7	8	9	10	
1963	0	0	416	35	0	9	153	157	89	19	878
1964	0	0	158	115	0	0	173	45	35	0	526
1965	0	177	17	51	142	169	229	379	44	12	1,220
1966	0	0	95	0	32	14	80	200	131	77	629
1967	0	425	46	0	409	184	36	16	88	301	1,505
1968	0	229	452	356	505	675	247	421	573	318	3,776
1969	49	116	104	25	161	161	170	363	266	363	1,778
1970	0	17	5	38	193	21	0	314	251	8	847
1971	0	28	76	85	129	385	53	130	473	189	1,548
1972	0	97	75	71	483	238	35	182	270	217	1,668
1973	491	199	103	17	387	359	29	369	347	57	2,358
1974	489	75	131	70	329	193	7	317	317	128	2,056
1975	82	213	98	23	213	332	7	19	45	586	1,618
1976	430	230	0	19	576	373	7	14	168	733	2,550
1977	59	160	81	203	66	107	41	247	407	110	1,481
1978			67		323	271		79	322	188	1,250
	1,600	1,966	1,924	1,108	3,948	3,491	1,267	3,252	3,826	3,306	25,688

1st District 5 3,948  
 2nd District 9 3,826  
 3rd District 6 3,491  
 4th District 10 3,306  
 5th District 8 3,252  
 6th District 2 1,966  
 7th District 3 1,924  
 8th District 1 1,600  
 9th District 7 1,267  
 10th District 4 1,108

Note: See map for District Boundaries.

TABLE 7.

INFORMATION ON THE CITY OF VANCOUVER STREET TREE  
PROGRAM COMPILED FROM ANNUAL REPORTS

YEAR	PLANTED	PRUNED	REMOVED	SPRAYED	TOTAL NO. ON STREET	CALLS	LETTERS
1914	N F						
1915	N F						
1916	N F						
1917	314						
1918	N F						
1919	N F						
1920	295	50	106				
1921	875						
1922	N F						
1923	N F						
1924	N F						
1925	N F						
1926	346						
1927	1,710						
1928	1,200		111	Laconium Scale	30,000		
1929	1,268	218	242				
1930	2,245						
1931	N F						
1932			600		30,000		
1933	1,770	Attended to 450 re-staked					
1934	N F						
1935	N F						
1936	4,400						
1937	3,440						
1938	4,161						

YEAR	PLANTED	PRUNED	REMOVED	SPRAYED	TOTAL NO. ON STREET	CALLS	LETTERS
1939	3,631						
1940	N F						
1941	N F						
1942	N F						
1943	N F				80,000		
1944	N F						
1945	N F						
1946	N F		460				
1947	N F				80,000		
1948	N F				80,000		
1949	N F				80,000		
1950	N F						
1951		-			80,000		
1952	987				80,000		
1953	2,800				80,000		
1954	2,105				80,000		
1955	N F		1,320				
1956	845				80,000		
1957	2,320		1,300		80,000		
1958	3,140				80,000		
1959	2,296				82,000		
1960	2,061		1,317		82,000	1,500	237
1961	2,500						
1962	1,465	10,000				3,782	
1963	1,400		2,000			3,225	
1964	2,650	10% of total	1,531		80,000 lge. 30,000 small		

YEAR	PLANTED	PRUNED	REMOVED	SPRAYED	TOTAL NO. ON STREET	CALLS	LETTERS
1965	2,132		1,634		100,000	2,734	276
1966	N F						
1967	3,249		983			4,336	365
						(Report shows breakdown of phone calls)	
1968	3,340	1,400	956	2,900		4,379	278
1969	3,126	5,794 trim. 2,324 pruned	1,007	17,317			
1970	3,472	N F	1,528	20,238		3,268	317
1971	2,500	N F	200	16,262			
1972	2,850						
1973	3,600	3,500	225	7,700		1,875	
1974	4,332	5,755	325	4,100		2,050	N F
1975	2,989	2,500	300	8,000	140,000 (60,000 flo- wering)	2,000	60
1976	3,200	4,600	120	4,489	145,000 (40,000 flo- wering)	1,100	65
1977	3,462	1,136	100	2,000	150,000	1,000	40
1978							

### Footnote

Cost: 1968 - 8,956 trees treated  $8,956 \div 186,808.40 = \$208$  per tree

Cost: 1974 - 14,502 trees treated  $14,502 \div 305,510.24 = \$210$  per tree.

Since 1950, 14,846 trees are recorded removed with eleven years not reporting or any figures of death or vandalism.

In the same period, 62,811 trees are reported to have been planted with three years not reporting.

If a conservative 20,000 trees were removed from the resource and 62,000 added, the net gain is 42,000.

If this is added to the reported 80,000 trees at the beginning of the period, there is a discrepancy of 28,000 trees compared with the figure reported for 1977.

A further discrepancy exists between Annual Report planting since 1963 and those counted from the actual planting records in the amount of 19,644.

TABLE 8

TREES REPORTED DAMAGED OR DESTROYED  
BY VEHICLES

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For the Period 1974 - March 1st 1978

DISTRICT NUMBER	1974	1975	YEAR 1976	1977	To March 78	\$ VALUE CHARGED FOR REPLACEMENT
1	4	1	0	14	5	4,325.00
2	2	3	4	11	4	2,450.00
3	4	4	4	10	10	4,860.00
4	6	2	6	12	8	5,134.00
5	6	4	7	16	8	6,724.00
6	4	4	5	11	6	4,710.00
7	4	0	3	2	5	2,240.00
8	12	2	1	10	4	6,285.00
9	3	5	7	9		2,855.00
10	5	2	7	11	8	3,155.00
TOTALS	50	27	44	106	58	42,738.00

NOTE: This table is compiled from available Pink Telephone Slips of the Sunset Nursery. The records are incomplete but may show trends.

The average cost, from available information, indicates reported vehicle/tree accidents of about \$855 per month but this will rise substantially with the apparent increase in accidents in the last few years and with the higher replacement costs occasioned by inflation.

If the trend for 1978 continued over 300 accidents would be reflected with an average replacement cost of \$300 to \$500 per tree (\$120,000).



TABLE 9.

PRESENT MANPOWER REQUIREMENTS - WINTER OPERATION

General Pruning:	10 personnel
Hydro Pruning:	6 personnel
General Forestry Practice:	10 personnel
Surrey Tree Farm Operations:	2 personnel
Stump Removal:	2 personnel
Spraying:	2 personnel
Tree Planting:	12 personnel
L.I.P. Program:	12 personnel
Extra Truck and Tractor:	2 personnel
Office Operations:	<u>1 person</u>
TOTAL	59

PRESENT MANPOWER REQUIREMENTS - SUMMER OPERATION

General Forestry Operations:	10 personnel
Surrey Tree Farm:	3 personnel
Spraying or Watering:	2-4 personnel
Center Boulevards:	5 personnel
Small Tree Maintenance:	3 personnel
Gardening Operations:	3 personnel
Office:	<u>1 personnel</u>
TOTAL	40

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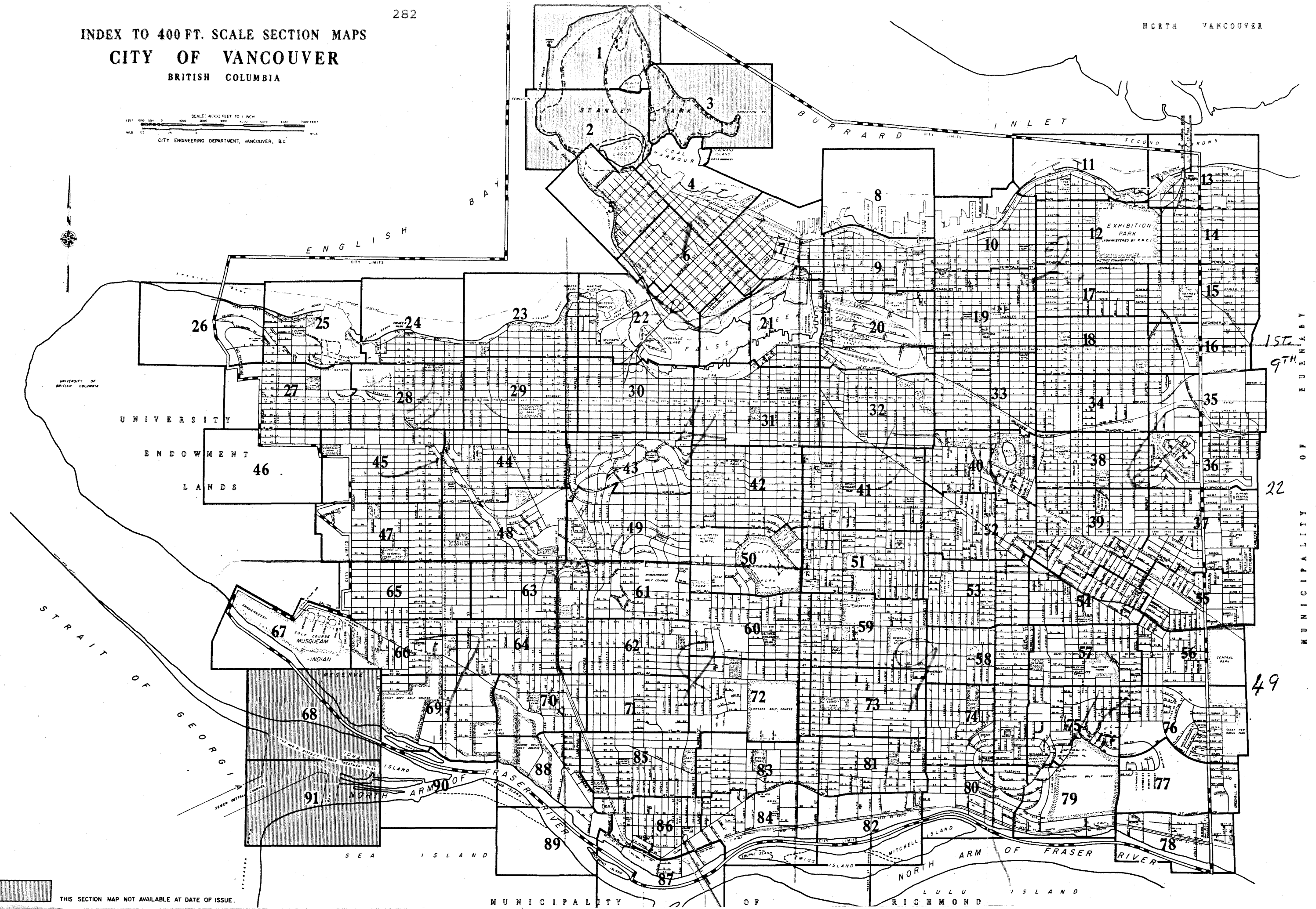
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# INDEX TO 400 FT. SCALE SECTION MAPS CITY OF VANCOUVER BRITISH COLUMBIA

SCALE: 4000 FEET TO 1 INCH  
CITY ENGINEERING DEPARTMENT, VANCOUVER, B.C.

NORTH VANCOUVER



MAY 1970  
AUG 1969  
APR 1968  
REVISED

THIS SECTION MAP NOT AVAILABLE AT DATE OF ISSUE.

MUNICIPALITY

OF

RICHMOND