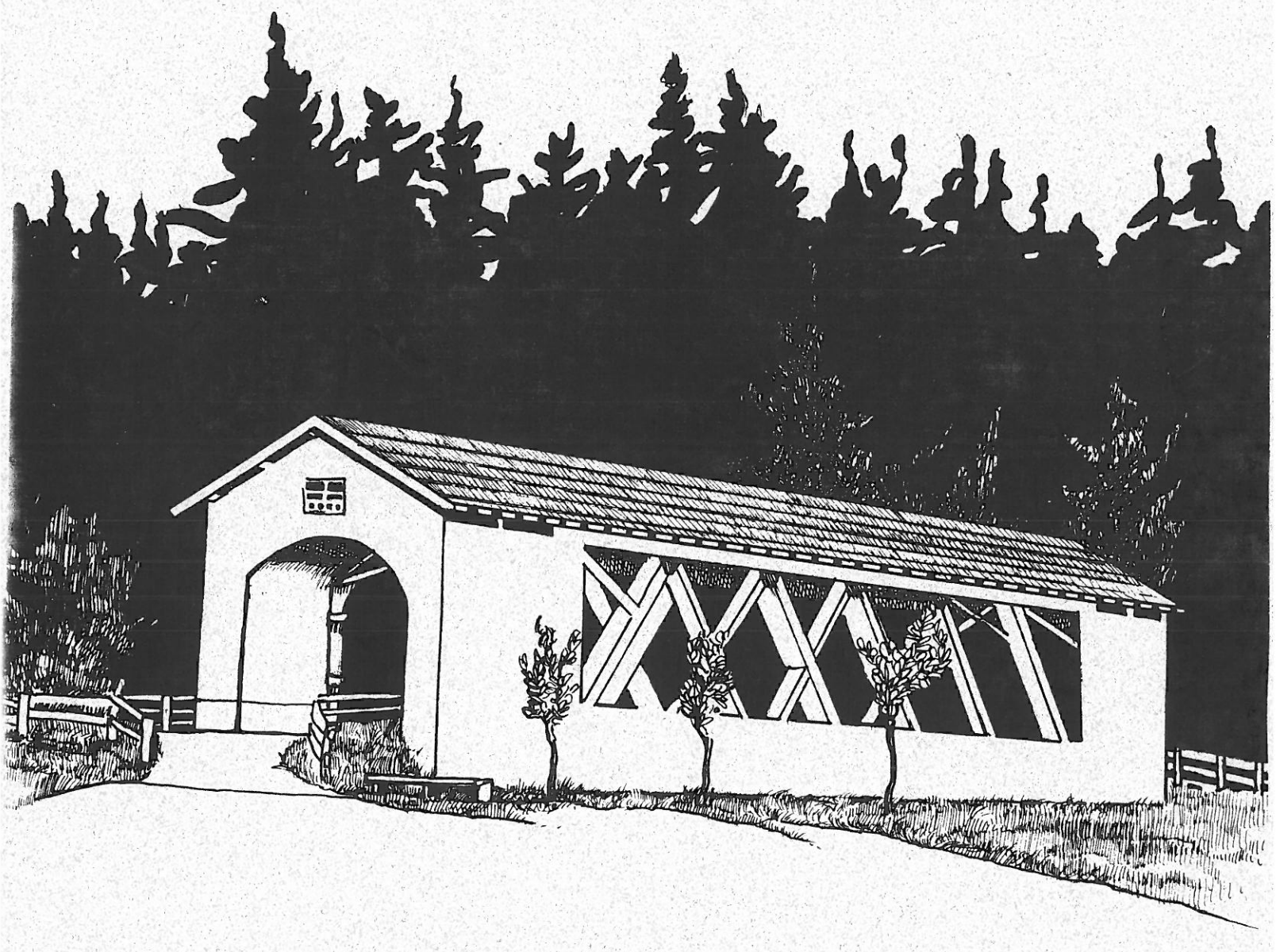
City of Sweet Home

Street and Park Tree Planting Plan



Arboreal Enterprises and MLP Associates

June 1993

STREET AND PARK TREE PLANTING PLAN

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EXECUTIVE SUMMARY

The City of Sweet Home has an estimated 1250 trees of over 30 different species growing on public right-of-ways. Sixty percent of these trees are conifers, typically Douglas-fir; 10 percent are flowering cherry and the remaining 30 percent are other broadleaf trees. The number of trees and planting spaces per mile on the City right-of-way is low, only 70 trees per mile, compared with the typical 200 trees per mile. There are few opportunities for tree planting in the right-of-way due to the narrow right-of-way width, low number of streets with planting strips and the existing uses of the right-of-way for parking and drainage.

It is the goal of Sweet Home's urban forestry program to facilitate the development of attractive residential, commercial, and industrial areas through the planting of trees. The design of the tree plantings should: (1) link the residential, commercial, and industrial areas with a common theme; and (2) enhance existing landscapes and buildings. Arboreal Enterprises and MLP Associates have recommended that the City take several steps toward accomplishing this goal. We recommend the following:

1) Public Awareness:

Emphasize proper pruning and planting;

Encourage tree planting on private property adjacent to the street; and

Encourage planting of species to match or complement street names.

2) Tree Planting:

Design and construct a raised planting bed in the Median of Highway 20 between 9th and 18th that would be suited for low growing ornamental plants;

Design and construct planting islands for trees and other landscape plants throughout the downtown area; and

Work with landowners on cooperative projects to plant trees and landscape private property, including parking areas, vacant property, and front yards.

3) Parks:

Northside Park, plant four or five large shade trees to define and enhance the parks boundary and entrance;

Nandina Pocket Park, involve the local community in a landscaping project that includes a provision for follow-up maintenance by local volunteers;

Clover Memorial Park, revitalize the entryway planting facing westbound Highway 20 with a new landscape design, and inspect and maintain the large shade trees framing the entrance to the covered footbridge; and

Sankey Park, evaluate the grove of Douglas-fir trees for hazards.

4) Mission, Goals, Policies and Ordinances:

Adopt the mission, goals and policies presented in Chapter 2;

Comprehensive Plan, incorporate tree-supportive policies particularly modifications to street widths to include space for tree planting;

Subdivisions, include provisions for tree planting strips;

Zoning, develop additional measures to preserve and protect trees during development;

Tree Ordinance, expand the maintenance specifications and include them in a new maintenance specification manual, adopt the tree planting specifications presented in this report, develop incentives to encourage tree planting on public property; and

Franchise Agreements with Utilities, work with the utilities to develop standards for line clearance and to develop tree removal replacement programs.

5) Maintenance:

Provide training to city crews in proper tree care and hazard tree identification;

Develop a tree maintenance plan based on work need information from a complete tree inventory.

Implementing these recommendations over the next five years is likely to result in increased tree planting on private property and increased commitment to the planting and maintenance of trees in Sweet Home's Parks. Use of species on the preferred species list and of species that match or complement street names will lead to an increased number of deciduous tree species. No additional planting theme was selected for the community, however, planting deciduous trees that attain heights of greater than 35 feet will make the most impact. Medium and large trees are easily seen and will readily verify Sweet Home's Tree City USA status.

ACKNOWLEDGEMENTS

Arboreal Enterprises and MLP Associates thanks the City of Sweet Home Tree Commission for their diligence in completing the sample inventory and for their involvement in the public meetings. Specifically we would like to mention the work and efforts of Howard Dew, Chair of the Street Tree Commission; Rod Bardell; David Furtwangler; Don Menear; Roy Neighbors; Mona Waibel; and David Sypher. The City Manager, Dan Dean, and the City Planner, Aneta Synan contributed both to the public involvement process and the development of this report. Aneta Synan was especially helpful in coordinating meetings, and responding to our questions.

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CHAPTER ONE -- INTRODUCTION

Trees planted in parks, along city streets and in people's yards are Sweet Home's urban forest. This urban forest adds to the character and livability of Sweet Home. As a Tree City USA award recipient the City of Sweet Home and the Sweet Home Tree Commission have shown their commitment to the planting and care of their urban forest.

The City of Sweet Home was awarded an Urban and Community Forestry Assistance Grant from the Oregon Department of Forestry to develop a Street and Park Tree Planting Plan. A Street and Park Tree Planting Plan provides a basis for the development and coordination of tree planting projects.

The City of Sweet Home contracted with Arboreal Enterprises, an urban and community forestry consultant, and MLP Associates, urban planning and public involvement specialists, to assist with the development of the Street and Park Tree Planting Plan. The project includes: (1) an initial sample inventory of Sweet Home's street trees; (2) training to conduct a more detailed inventory of street and park trees; (3) a review of Sweet Home's ordinances, regulations, and policies regarding tree planting and care; (4) and development of an prioritized list of urban forestry projects based on goals and objectives developed by the Community and the Tree Commission.

The report presents design guidelines and standards for street tree planting on arterial, collector and local streets. These standards include spacing requirements, a preferred species list and a list of trees not recommended for planting. Strategies to encourage the planting of trees by residents are also presented. Tree maintenance is only mentioned to the extent that it influences planting projects. A detailed maintenance plan was beyond the scope of this project.

CHAPTER TWO -- MISSION, GOALS AND POLICIES

2.1 INTRODUCTION

The development of a mission statement, goals and policies was accomplished through public surveys, meeting with the public and the Tree Commission and discussions with the Aneta Synan, the City Planner. Appendix A and B describes the public involvement process used to develop the mission statement, goals and policies.

2.2 MISSION STATEMENT

The following is the mission statement developed by the Sweet Home Tree Commission, and the community:

> **The City of Sweet Home is undergoing a transition from timber-dependency to a diversified multi-resource economy. Several economic objectives such as recruiting new business, retaining existing business, and attracting retirees depend on an attractive, healthy urban appearance and environment. The economic health and appearance of the urban environment are critical to Sweet Home's health and quality of life. A comprehensive tree planting program will improve the health and appearance of Sweet Home's urban environment on a long term, systematic basis. Special consideration will be made for planting appropriate species and for a long term tree maintenance program.**
>
> **It is the goal of this program to facilitate the development of attractive residential, commercial, and industrial areas through the planting of trees. The design of the tree plantings should: (1) link the residential, commercial, and industrial areas with a common theme; and (2) enhance existing landscapes and buildings.**

2.3 GOALS

The goals of Sweet Home's Street and Park tree planting plan are:

1. To improve the visual quality of the city by creating a consistent pattern of tree planting along all rights-of-ways within the City through the use of a tree planting theme;

2. To enhance air, water, and land resource qualities within the community and to provide noise buffers;

3. To provide tree-related educational opportunities for all citizens of Sweet Home;

4. To fulfill peoples emotional needs for "peace" and "restfulness"; and

5. To compensate for the heat released from road surfaces, cool the area adjacent to paved surfaces and to sequester carbon released from the use of fossil fuels.

2.4 POLICIES

The adoption of policies can be used to help implement the Street and Park Tree Planting Plan. We provide an analysis of existing tree-related policies in Chapter 4.

Table 2-1 provides a list of policy statements recommended for adoption by the City of Sweet Home. To develop these policy statements, we presented a list of potential policies to individuals attending the public meeting. Participants were asked to refine and prioritize potential implementing policies for the Street and Park Tree Planting Plan.

TABLE 1. Policy Statements
The City of Sweet Home shall adopt and periodically revise tree planting and maintenance standards.
The City of Sweet Home shall encourage the planting of trees listed on a preferred species list.
The City of Sweet Home shall encourage residents to plant trees in their front yards and on the public right-of-way.
In areas that permit the use of large trees, the City of Sweet Home will encourage the planting of trees that attain heights of greater than 35 feet.
The City of Sweet Home shall encourage the replanting of at least one tree for every tree that is removed.
The City of Sweet Home shall work with utility companies and adjacent property owners to remove and replace trees that are or will grow into powerlines.
The feasibility of using planting strips to provide space for trees within the public right-of-way on all new development and road construction shall be investigated prior to construction.

Source: Arboreal Enterprises/MLP Associates, 1993.

2.5 CONCLUSION

The mission statement, goals, and policy statements presented in this chapter should be adopted by the City Council and the Tree Commission.

Specific projects that will lead to the implementation of the mission statement, goals and policy statements are described in Chapter Six: Projects and Implementation Strategies.

Implementation of a policy to adopt planting and maintenance standards will require reconciliation of differences between existing ordinances and the proposed planting standards presented in Chapter Five.

Although this report primarily addresses tree planting, additional ideas and projects that will help implement the mission, goals and polices will be discussed in detail in Chapter Six: Projects and Implementation Strategies.

CHAPTER THREE -- SAMPLE INVENTORY

Knowledge of existing trees, maintenance needs and planting spaces is vital to making informed decisions about species to recommend for planting.

3.1 OVERVIEW

To develop a street tree planting strategy for the City of Sweet Home it was necessary to determine the number, kind and quality of Sweet Home's trees. A sample street tree survey was used to obtain this information. The inventory was conducted by the Sweet Home Tree Commission and the City of Sweet Home. The sample design, inventory training and analysis of the data was conducted by Mike Reichenbach of Arboreal Enterprises.

3.2 METHODOLOGY

The purpose of the sample inventory was to:

1. Identify the approximate number of trees located within the 41 miles of city right-of-way;

2. Identify the species composition;

3. Identify trees that should not be used in Sweet Home because of the existing number planted or insect and disease problems;

4. Identify opportunities for planting projects;

5. Identify opportunities to correct potential conflicts through maintenance or removal and replacement;

6. Identify current planting practices; and

7. Estimate the number of planting spaces for small, medium and large trees.

The survey design was based on a stratified random sample. The City was divided into 12 zones based on zoning classifications. Samples were then taken from each zone. Sample units consisted on the interior perimeter of a city block, or in areas where sampling blocks was not feasible both sides of the street for a predetermined distance. This distance was marked on a map prior to the survey. The number of areas to sample in each zone was

determined by dividing the number of possible sample units by 3 and rounding to the next highest integer.[1]

The information collected included: (1) tree species; (2) the number of trees by three diameter classes: less than 4", 4 to 12" and greater than 12"; (3) condition of the tree: OK, needs work, and dead; (4) the number of planting spaces on public right-of-ways and in private front yards for each of three growspaces: restricted planting area, limited root space, and ample growing area; (5) for both public right-of-ways and private front yards, the number of trees directly under utility lines and candidates for removal replacement; and (6) for both public right-of-ways and private front yards, the number of topped or severely pruned trees.

The tabulated sample inventory data for Sweet Home is in Appendix C.

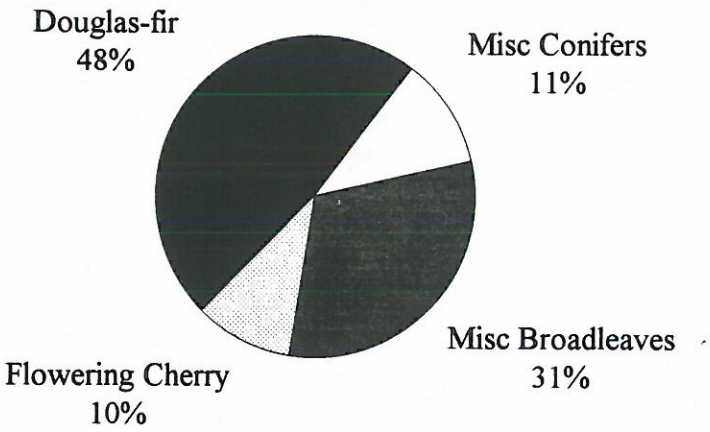
3.3 KEY FINDINGS

In addition to the type of road surface, the presence of curbs and sidewalks, trees have a major influence on the character of a community's streets. Sweet Home's streets typically lack a planting strip between the curb and sidewalk, therefore opportunities for planting are mainly on private property.

3.3.1 NUMBER AND SPECIES OF TREES

The City of Sweet Home has approximately 41 miles of city streets. Of this, the sample inventory represents all streets but the downtown area bounded by Nandina, 9th Street, Kalmia and 14th Street. Excluding this area, it is estimated that the City of Sweet Home has 1250 trees representing over 30 species. Sixty percent of the trees growing on the right-of-ways are conifers, typically Douglas-fir; 10 percent of the trees are flowering cherry; and the remaining 30 percent are other broadleaf trees. See Figure 3.1 Tree Species.

FIGURE 3.1
TREE SPECIES BY PERCENT



3.3.2 TREES PER MILE

Using an average spacing of 50 feet, a well-planted street that has curb and gutter has approximately 200 spaces per mile for small, medium and large trees. A spacing of 50 feet accounts for driveways, sidewalks, cross-streets and other areas not suited for planting trees.

Sweet Home has an average of 32 trees per mile. The majority of Sweet Home's streets do not have curb and gutter and the area that might be used for planting is used for parking, water runoff or other uses. In most cases, this limits the opportunities for planting to the front yard of the adjacent homeowner. To encourage tree planting along the City streets, the city should encourage planting in front yards through information and incentive strategies. These are described in Chapter 7.

3.3.3 TREE SIZE

Twenty-six percent of Sweet Home's trees are less than four inches in diameter or are generally young trees. Thirty-three percent are four to 12 inches in diameter. The remaining 41 percent are larger than 12 inches in diameter.

Deciduous trees that attain heights of more than 35 feet account for less than 18 percent of Sweet Home's trees. Conifers which attain heights of greater than 50 feet, and in many cases well over 100 feet, account for nearly 60 percent of the trees found

along public right-of-ways. The remaining 22 percent are deciduous trees that attain heights of less than 35 feet.

Deciduous trees that attain heights of less than 35 feet can easily blend into the surrounding landscape. This will be especially true in Sweet Home since the majority of the trees are large conifers. For deciduous trees to be recognized as part of the urban or community landscape they must be planted in all existing spaces and they should be species that attain heights of greater than 35 feet. The larger and taller deciduous trees will help to build the image of Sweet Home as a Tree City USA.

3.3.4 CONDITION

The majority of Sweet Home's trees do not need any pruning or work to correct defects. Flowering cherry was found to be more likely than Sweet Home's other deciduous trees to need work. Many of the other deciduous trees that need work need it as a result of previous bad pruning practices such as topping. No dead trees were found during the sample inventory.

Topped trees were noticeable through-out Sweet Home. For every five trees on public property one tree visible from the roadway was topped.

3.3.5 PLANTING NEEDS

The total estimated number of spaces available for planting trees on the public right-of-way is estimated at 1642; 1100 for trees that attain heights of less than 35 feet, 206 for trees that attain heights of between 35 feet and 50 feet; and 336 for trees that attain heights of more than 50 feet.

A conservative estimate of planting spaces on private property but adjacent to the right-of-way was also made. The total number of trees that could be planted on private property is estimated at 871; with 52 percent of the space for trees under 35 feet, 10 percent for trees between 35 and 50 feet; and 38 percent for trees that attain heights of greater than 50 feet. More space was available on private property than on the public right-of-way for planting trees that attain heights of greater than 35'.

3.4 CONCLUSIONS REGARDING MANAGEMENT AND PLANTING

3.4.1 REGULAR TREE MAINTENANCE

The issue of who should maintain trees on public right-of-ways should be resolved. Sweet Home Municipal Code Chapter 12.16, Public Trees, Shrubs and Bushes includes a provision that requires the abutting property owner to maintain the trees in the public right-of-way. The City of Sweet Home should consider deleting this section of the ordinance. One way to encourage the planting of trees in the right-of-way would be for the City to agree to care for those trees. This is not to imply that the abutting homeowner should not take reasonable care to water, fertilize and train young trees. However, any maintenance that requires special skills or training including but not limited to pruning limbs higher than one can easily reach, or tree removal should be the responsibility of the city. The crew time associated with such a maintenance program can be can be estimated from the sample inventory. It is estimated that on a five year rotation maintaining each tree currently on the City right-of-way would take 480 man hours per year. This is based on an average of two man hours maintenance time per tree. We recommend that a more detailed cost analysis be conducted.

3.4.2 HAZARD TREE INSPECTION AND TREE MONITORING

Regardless of who maintains the trees, a systematic system of monitoring the trees on public rights-of-way should be established. In many liability cases it is the city and not the abutting property owner that is held liable for damages or injury from the failure of a tree in the public right-of-way.[2] A systematic inspection should assess work needs to correct defects in the existing trees. Once identified a risk rating can be assigned and priorities set for correcting the defect.

3.4.3 TREE REMOVAL AND REPLACEMENT

Implementing a policy to replace trees that have been removed, and adopting a policy to permit the removal and replacement of trees that are damaging or will damage or intefere with utilities, sidewalks, curbs or streets can increase the value of Sweet Home's urban forest.

As an integral part of a tree care and planting program it should be a policy to plant or encourage the planting of at least one tree for every tree that is removed. This practice is common in communities with active tree management programs.

Removal of trees that interfere with electric, water, or sewer utilities or with streets, sidewalks and curbs should be considered as one option to reduce maintenance costs. Many utility companies have implemented a tree removal and replacement program for trees growing directly beneath power lines. Trees that require regular and extensive trimming for clearance from utility wires are often unsightly. Removing these trees and replacing them with a tree suited for growth under the lines will improve the appearance of the community and reduce line clearance costs. Tree removal is not always necessary to mitigate conflict. For example, when trees interfere with sidewalks, consider moving the sidewalk rather than removing the tree.

3.4.4 IMPLICATIONS FOR PLANTING

Planting new trees should be limited to species with low maintenance requirements and to trees suited to the particular site and space available.

Street tree plantings should not be made up of more than 10 percent of any one species of tree and nor any more than 25 percent of one genera. For example, if Norway maples are already 10 percent of the estimated total tree population it's use should not be recommended. The reason for limiting the percentage of any one specie is based on increased risks of disease outbreaks and the resulting control costs and loss of value.

The planting of conifers, especially Douglas-fir should be discouraged. Many of the native conifers attain too large a size for use along city streets. The year round shade they provide is not often desired. The planting of large deciduous trees, where space permits, should be encouraged. Deciduous trees offer variety, large deciduous trees are easily visible without being oversized and they allow sunlight through in the winter when it is most desired.

Cherry species in Sweet Home account for over 10 percent of the tree species. Flowering cherry is a tree that has been overused in many communities. While this is not the case in Sweet Home, it should be used only for those projects that specifically require the landscape effect created by the flowering cherry.

3.5 CONCLUSION

Opportunities for planting along right-of-ways in Sweet Home are limited. This limitation is due to the narrow right-of-way widths in Sweet Home and the use of the right-of-way for parking and water drainage. Even if all spaces were filled, including those on private property, the number of trees per street mile (both sides of the street) would only be 96.

More trees per mile were found in areas with planting strips. If Sweet Home is to have an image of having trees then:

- Property owners should be encouraged through information and incentive strategies to plant trees in the front yards of their homes;

- New development should include space for trees, either a planting strip or large front yards for planting;

- Developers should be required to plant trees as a part of the development or deposit a fee into an account designated for planting and maintenance;

- Where appropriate, especially along arterials, new road construction or road reconstruction should include space between the curb and sidewalk for tree planting (three feet for small trees, six feet for medium sized trees, and eight feet for large trees). Since large trees create the image of the urban forest designing space for large trees should be a priority; and

- To encourage tree planting on the public right-of-way as part of a complete urban forestry program, the City of Sweet Home should agree to maintain those trees after they reach a height where it is beyond the ability of a homeowner to safely continue their maintenance.

With the exception of the recommendation to create space for *large* trees these goals are compatible with the desires of those participating in the public involvement process. The fears associated with large trees as reported at these meetings may be due to the number of large Douglas-fir trees in the community, particularly along the right-of-ways. Failure of a deciduous tree is not often associated with the damage and injury that can be caused by the failure of a conifer. Also deciduous trees do not block the winter sun to the extent that conifers do. These issues should be explored further in relation to Sweet Home's tree planting program.

Due to the narrow right-of-way the use of planting strips may be only appropriate along major arterials, to accent intersections and subdivision entries and in other special use areas. Separating the sidewalk from the street with a planting strip places a greater distance between traffic and pedestrians. This may increase public safety. The advantage of encouraging planting in front yards rather than in the public right-of-way is to reduce maintenance costs or the perception that the city should maintain trees in the public right-of-way.

3.6 REFERENCES FOR CHAPTER THREE

1. R. Jaenson, N. Bassuk, S. Schwager and d. Headley. A statistical method for the accurate and rapid sampling of urban street tree populations. In Journal of Arboriculture, Volume 18 Number 4 July 1992.

2. Merullo, Victor D. 1989. *The Law of Trees*. Merullo, Reister & Swinford Attorneys and Counselors at Law, 772 S. Front Street, Columbus, Ohio 43206. p. 37.

CHAPTER FOUR -- TREE PLANTING AND CURRENT POLICY

4.1 INTRODUCTION

Public policy is an important component of a coordinated urban forestry program. Municipal plans, policies, and ordinances can all affect tree-related activities in a community. As a part of the Street and Park Tree Planting Plan for the City of Sweet Home, we reviewed the following community plans and policies:

1. The *Sweet Home Comprehensive Plan* prepared by the Sweet Home Comprehensive Plan Task Force. The Plan was initially adopted in June 1981, and acknowledged by the Land Conservation and Development Commission in April, 1982. The plan was revised during periodic review in May, 1989.

2. The *Sweet Home Municipal Code*, Title 16—Subdivisions; Title 17—Zoning; and Chapter 12.16—Public Trees, Shrubs and Bushes. These sections of the municipal code have been adopted at various dates.

3. *Franchise agreements*, granted to Pacific Power & Light by Ordinance No. 779 in 1979 and Granted to Telephone Utilities of Oregon, Inc. by Ordinance No. 1045 in 1992.

In this analysis we have taken a broad perspective which encompasses policies that could impact *existing* trees on public and private property as well as future plantings. This chapter provides an evaluation of current municipal policies with respect to trees and landscaping, summarizes findings, and provides recommendations for each policy identified as pertaining to or guiding landscape improvements.

4.2 SWEET HOME COMPREHENSIVE PLAN

Comprehensive land-use plans are required for all municipalities in Oregon under Oregon Revised Statutes (ORS) Chapter 197. Comprehensive plans consist of two broad sections: (1) a factual base containing information about the existing and anticipated needs and characteristics of the community; and (2) policies based on analysis of factual data. The Sweet Home Comprehensive Plan is the official policy guide for land-use and development decisions within the Sweet Home urban growth boundary (UGB). The Sweet Home Comprehensive Plan addresses land-use, public facilities, transportation, housing, and urbanization. Of these, land-use, public facilities and transportation policies have both direct and indirect impact on the Sweet Home's urban forestry and tree planting programs.

Our analysis indicates there are several opportunities to incorporate tree-supportive policies and recommendations into the Comprehensive Plan. Understanding that amendments to Comprehensive Plans can require substantial efforts, most of the following recommended modifications could occur in collaboration with other Plan amendments or as a part of the next periodic review process.

4.2.1 LAND-USE ELEMENT

The Land-Use Element of the Plan is intended to serve as a guide to "indicate land and policies for residential, commercial, industrial, resource, and other uses with special consideration given to resource conservation and development, and to energy and environmental concerns." Factors considered in the determination of the location and amount of land needed for various uses include: projected growth and development patterns, facilities and services needed, and natural conditions valued for resource purposes or which create hazards for development (e.g., unstable soils, steep slopes, etc.).

Our review of the Land Use Element indicates no policies that directly relate to trees. However, several policies exist which indirectly encourage the conservation of trees during development. Many of these policies are designed to regulate development in areas with steep slopes or unstable soils. (see General Development Policies 8 and 10, p. LU 8; Residential Land Use Policy 12(g) and 15, p. LU 12-13).

Conservation of open space is one method of conserving the urban forest. Although designation of open space is not directly related to street tree plantings, it is nonetheless an important component of the urban forest. The Comprehensive Plan outlines several policies with respect to open space (see General Development Policies 3 and 4, p. LU 7; Residential Land use Policy 13(f), p. LU 12). These policies generally encourage designation of open space, particularly near the many waterbodies within the community.

Landscaping is another activity that can enhance the urban forest. Although specific landscaping requirements are outlined in the municipal ordinances, several broad policies relating to landscaping are found in the Comprehensive Plan. Several policies encourage the use of landscaping to buffer residential areas from commercial and industrial uses. However, landscaping, specifically tree planting is not mentioned within the Land-Use Element (see Commercial Land Use Policy 14, p. LU 17; Industrial Land Use Policy 8, p. LU 19).

Other policies are designed to conserve scenic resources within the community. The Plan outlines a Development Limitation Overlay land use classification that is designed to protect areas which are not suitable for intensive development because of physical limitations, historical significance, or scenic value. The overlay may be

suitable for certain activities such as resource conservation or outdoor recreation, but is not intended for areas which are well suited for forestry (Sweet Home Comprehensive Plan, p. LU-6). Because of this language, it is unlikely that this overlay has been used for the conservation of trees within the community.

RECOMMENDATIONS:

Our analysis indicates there are several opportunities to incorporate tree-supportive policies and recommendations into the Land-Use Element of the Plan. Recommended amendments or modifications to Comprehensive Plan Policies are presented below.

- Add language in the General Development Policies and Standards that *encourages* the retention of healthy, well-sited trees during development.

- Add street trees to residential land-use policy 12(d) (p. LU 12). This policy could be modified to read:

  "Assure sufficient street widths to provide for necessary driving and parking lanes, curbs, gutters, sidewalks, *tree planting strips*, and utility placements." We recognize that the narrow right-of-way in Sweet Home may preclude the use of tree planting strips in most areas. There is, however, opportunity to use tree planting strips on major arterials, and to accent intersections. Both uses may improve public safety.

- Modify Commercial Land Use Policy 14 (p. LU 17) and Industrial Land Use Policy 8 (p. LU 19) to specifically mention the use of trees in buffers and landscaping consistent with the municipal tree ordinance.

4.2.2 PUBLIC FACILITIES ELEMENT

The Public Facilities Element of the Comprehensive Plan is intended to indicate general locations, development policies, and priorities for public facilities needed in the community. This plan element is important because the timing and placement of public facilities (e.g., emergency services, parks, schools, sewers and storm drains, solid waste, water, etc.) can influence the rate and location of the community's growth.

The Plan recommends specific standards for park facilities. The Plan identifies five types of park facilities: city-wide parks, neighborhood parks, playfields, park/school, and special facilities. With the exception of special facilities, landscaping is specifically mentioned in each of these park types as a facility that should be

considered during development. However, trees are not specifically mentioned as a component of landscaping.

Policy 4 in the section on Solid Waste, Storm Drainage, and Utilities (see p. PF 11) states "the use of nonstructural controls (land use policies and regulations) should be implemented where appropriate to insure proper utilization and enhancement of natural occurring runoff-control features" (Sweet Home Comprehensive Plan, p. PF 11). The policy recommends that consideration of building and zoning code amendments be considered that would regulate clearings and grading along the South Santiam River, and the Ames and Wiley Creek drainages.

RECOMMENDATIONS:

- Specifically incorporate trees into the park standards. This could be done as a component of landscaping, or could be a separate recommended facility.

- Develop tree planting and maintenance standards for all new park facilities within the community. These standards should at a minimum address opportunities for tree planting, species selection, and maintenance. The tree planting standards are in Chapter 5.

- Solid Waste, Storm Drainage, and Utility policy 4 should recognize that trees can significantly impact soil, slope, and streambank stability and recommend that modifications to the building and zoning ordinances specifically address the issue of tree retention during development.

4.2.3 TRANSPORTATION ELEMENT

The Transportation Element of the Comprehensive Plan is intended to indicate locations, development policies, and priorities in the street network, as well as other transportation modes. The development of streets and highways (and public facilities) and other transportation facilities also impacts the rate and location of community growth.

Policy 3(b) of the Design and Improvement Standards (p. T-8) recognizes the greater value of neighborhoods with curbs, sidewalks, and paved streets. The value of street trees is not mentioned in this section.

The Street Improvement Recommendations suggest improvement of roadside conditions by replacing open ditches or other unimproved areas with curbs and gutters on all designated arterial and collectors, and encourages sidewalk development on the entire major street network (Street Improvement Recommendations 1(f) and 1(i), p.

T-9). On arterial and collector streets standards leave 16 feet of space for the sidewalk and a planting strip for both sides of the road. Assuming a five foot walk the planting strip would be only three feet wide. If medium or large trees are to be planted the minimum width needed would be four feet. Without provision for increasing the width of the right-of-way, decreasing the width of the sidewalk, and decreasing the width of the street planting medium and large trees will generally be limited to private property.

RECOMMENDATIONS:

- Modify Design and Improvement Standard 3(c) (p. T-8) to include recognition of the value of street trees to neighborhoods. Residential streets do more than just provide access or convey traffic. Streets are an integral part of the neighborhood and trees are an integral part of the streetscape. Trees add to the value and character of the surrounding homes and are a public asset.

- Adopt policies that require a review of the feasibility of planting strips along new arterial and collector streets.

4.3 SWEET HOME MUNICIPAL CODE

The Sweet Home Municipal Code is the primary means to implement the *Sweet Home Comprehensive Plan*. Three sections of the Code are relevant to the Street Tree Planting Plan: (1) Title 16—Subdivisions; (2) Title 17—Zoning; and (3) Chapter 12.16—Public Trees, Shrubs and Bushes. In this section we review relevant portions of the Municipal Code and make recommendations with respect to how the Code could be modified to better support the Tree Planting Plan and the urban forest in general.

4.3.1 TITLE 16—SUBDIVISIONS

The purpose of Title 16 is to establish standards and procedures for the subdivision and partitioning of land within the city. Among other things, Title 16 is designed to provide for the "protection, conservation, and proper use of land" (Sweet Home Municipal Code, Section 16.04.010(F)).

Section 16.12.030(2) of the Subdivision regulations require drainage easements be dedicated where subdivisions or partitions are traversed by watercourses such as drainage ways, channels or streams. The ordinance encourages multiple use of drainage channels including utility strips, transportation corridors for bicycles or pedestrians, or as natural greenways. Preservation of riparian vegetation, including trees, is important wildlife habitat and can help control streambank erosion.

The ordinance requires developers to submit a Tentative Plan for all subdivisions. Section 16.16.090 of the ordinance requires developers to document existing site conditions, including "Natural features such as rock outcroppings, marshes, wooded areas, and isolated preservable trees." This is a useful provision in helping City staff review subdivision proposals with respect to retaining trees during development.

RECOMMENDATIONS:

- If the City desires to increase the number of street trees, that is trees planted in the right-of-way, Section 16.12—Design Standards should be amended to include a section on sidewalks with planting strips. This would also require amending the comprehensive plan to allow greater right-of-way widths. The Comprehensive Plan contains policies that encourage the provision of sidewalks in new residential areas. The subdivision ordinance could specify design standards for sidewalks *and* tree planting strips in certain areas. Street tree plantings may not be desirable in all new subdivisions.

Because the subdivision ordinance does not contain language pertaining to sidewalks, the City would need to make a policy decision with respect to who would pay for sidewalks and street tree plantings. Many communities require developers to plant trees along city streets or to pay a tree planting fee based on lineal feet of street front. Cities that utilize a fee system maintain more control over species selection and quality than cities that require developers to purchase and plant the trees.

4.3.2 TITLE 17—ZONING

Title 17 of the Sweet Home Municipal Code, known as the city zoning ordinance, is designed to promote the public health, safety and general welfare, to assist in implementation of the general plan, and to assist in implementing statewide planning goals and guidelines (Section 17.04.020). The city zoning ordinance was initially adopted in 1974. Provisions of the city zoning ordinance relating to trees are described below.

Section 17.08.050 establishes clear-vision areas at intersections. Clear-vision areas provide for trees in the areas provided all branches and foliage are removed to a height of eight feet above grade. Clear-vision area requirements are 20 feet in most zones and 10 feet where alleys exist.

Chapter 17.20 establishes zones which specify allowable land uses on specific properties. Zones are established for residential, commercial, industrial, and other uses within the community. In general, the city zoning ordinance does not establish specific landscaping requirements for individual zoning districts.

However, the Commercial Highway Zone (C-2) requires development plans which show the location landscaping on the site. Further, the city manager may impose conditions related to the location and nature of landscaping and screening (Section 17.36.040(C) and 17.36.040(D)).

Chapter 17.48 of the city zoning code establishes the Planned Unit Development (PUD) zone. The purpose of the PUD zone is to "provide opportunities to create more desirable environments through the application of flexible and diversified land development standards..." (Section 17.48.010). The PUD zone can be established in combination with a residential, commercial, or industrial zone. Developers are required to submit a preliminary development plan to the planning commission for tentative approval of the project. The plan must show existing natural features such as trees, streams and topography and landscaping, screening and fencing proposals (Section 17.48.030(A)).

After the preliminary plan is approved, the developer must submit a general development plan and program. The general development plan must include a preliminary tree planting and landscaping plan, including areas of ground cover and approximate finished grades, slopes, banks, and ditches. The plan must also show all existing trees over six inches in diameter and groves of trees. Finally, the development must indicate trees which will be removed during development (Section 17.48.040).

The Planned Recreational Commercial Zone (PRC) contains provisions similar to the PUD zone. Again, the code requires existing features such as trees, streams, and natural topography to be included in a PRC development plan for development of uses other than a single family or two-family residence within a PRC zone.

RECOMMENDATIONS:

- Adopt the planting standards proposed in Chapter 5. These standards prohibit the planting of trees within the clear vision zones specified in the zoning ordinance and in the tree ordinance.

- Add a provision to Section 17.48.050—Action and Findings by Planning Commission and Council which requires tree planting plans developed for PUDs to be consistent with the tree species list, provided in the appendix; the tree planting standards, listed in Chapter 5; and the Tree Ordinance.

- Add language to Section 17.48.070—PUD Development Standards, which encourages the retention of healthy, well sited trees during the PUD review process.

- Encourage the retention and planting of trees during development within the Planned Recreational Commercial (PRC) zone.

- As part of the preliminary development plan a map and description of not only what trees will be preserved during development should be included with a detailed plan for how those trees will be preserved.[1]

4.3.3 CHAPTER 12.16—PUBLIC TREES, SHRUBS AND BUSHES

Chapter 12.16 of the Sweet Home Municipal Ordinance addresses Public Trees, Shrubs and Bushes (hereafter called the Tree Ordinance). The Tree Ordinance was adopted in 1989 by municipal ordinance no. 1007. Major components of the Tree Ordinance are described below.

Section 12.16.020 of the Tree Ordinance provides enabling language for the creation of a Street Tree Commission. The duties of the Street Tree Commission are to:

> "study, investigate and develop and/or update annually, and administer a written plan for the care, preservation, pruning, replanting, removal, or disposition of street trees and park trees" (Sweet Home Municipal Ordinance, 12.16.030).

The Tree Ordinance also requires the Commission to compile a list of acceptable species of trees, shrubs, bushes and other woody plant material and make the list available to the public. A list of preferred tree species is included in Appendix E. The City of Sweet Home should adopt this list.

The Tree Ordinance requires landowners to bear the responsibility and cost of maintenance and care of the street trees abutting their property, and requires the inspection and removal of defective conditions as necessary (Section 12.16.050). This provides an excellent opportunity for the City to develop a partnership with private landowners in the care and maintenance of street trees. To facilitate this partnership materials on proper tree care should be developed.

Pruning of limbs higher than one can easily reach requires special training. If volunteers, or abutting homeowners are used to maintain trees on publicly owned property or on the rights-of-way then they should receive training specifically about the American National Standard for Tree Care Operations (ANSI Z133.1).[2]

Maintenance responsibility for public trees can be divided between tasks that are commonly and easily performed by the landowner on their own property. These might include watering, fertilization, and low branch pruning. Low branch pruning

would entail only removing branches that are low enough and small enough to be cut with handtools without climbing, the use of ladders or other devices. We recommend that the ordinance clarify the division of responsibility between the City of Sweet Home and the landowner.

Section 12.16.060 B does not prohibit landowners from planting street trees provided that their selection is in accordance with the list of acceptable species and other regulations. Many communities, rather than not prohibiting tree planting, will encourage the planting of trees. Also some communities will require the landowner to obtain a free planting permit. A permit process would provide the City of Sweet Home with the opportunity to provide the landowner with planting and care information for the newly planted tree. The permit would also enable the City to more closely monitor the species being planted and enter information about the planting directly into the tree inventory database. Incentives for planting could also be developed. One incentive would be to share the cost of the tree with the landowner.

The Tree Ordinance contains general language concerning the removal of dangerous or nuisance trees in Section 12.16.070. This section allows the City to prune trees on private lands where it interferes with street lights, or with the visibility or traffic control devices or signs. The removal of dead, dangerous, or diseased park, private, or street tree when the tree is a hazard to life or property or harbors insects of disease which constitute a potential threat to other trees within the City.

Section 12.16.070(C) allows the city to remove, or permits the city to require landowners to remove or trim any dangerous or nuisance tree on private property or any tree in a dedicated right-of-way. The City may remove trees where the landowner fails to act within 30 days and can assess the costs as a lien against the property. The City of Sweet Home should consider deleting the provisions of 12.16.070(C) which permit the city to require the property owner to remove or trim a tree "in a dedicated right-of-way abutting upon the owner's property". There are several reasons for not requiring the homeowner to remove and maintain trees abutting their property:

1. Pruning and removal of trees requires specific skills and equipment not generally available to the homeowner;

2. The hazards associated with tree removal and tree pruning have led to the development of safety standards. These minimum safety standards are not commonly known by the general public. Failure to follow the guidelines can lead to death or permanent injury; and

3. The public benefits from well and uniformly maintained trees growing in the public right-of-way. In some communities where the homeowners have maintained right-of-way trees topping is more common. Topping leads to an increased risk of tree failure. Tree failure can result in property damage and injury to people. The homeowner may have little incentive to maintain the tree properly to prevent future tree failure. In many liability cases, "it has been held or recognized that the public authority is liable for damages caused by the fall of a tree ... standing within the limits of a street or highway ...".[3] The control of pruning practices to achieve a uniform standard can be more effectively implemented if the city maintains the responsibility for maintenance.

The City of Sweet Home should weigh the costs of this increased service against the potential benefits. In addition to labor, costs will include training crews and keeping them trained, purchase of equipment, and possible increases in insurance rates for workers compensation.

Sections 12.16.080 through 12.16.100 specify standards for street tree plantings. These standards specify spacing of trees, planting distance from the curb and sidewalk, and planting distances from street corners, fire plugs, and street lights. These sections could be replaced with language that refers to a planting standards manual. Much of this manual has been written and is included in Chapter Five and in Appendix E.

The responsibility for refining these standards, ensuring consistency with existing ordinances and periodically updating this manual should be assigned to the Tree Commission. The advantages of a separate manual include the ability to be more detailed in describing specifications without causing the ordinance to become unwieldy and enabling a regular review and updating without having to change the ordinance.

If these sections are left in place, several changes should be made to reflect current arboricultural practices. In section 12.16.080 spacing between plantings should be determined by the mature spread of the tree. To reflect this new language could be added stating, "no trees shall be planted closer than 1/2 the sum of their mature spread" the old language specifying set distances should be made into a general guideline.

In Section 12.16.090 several small trees are adapted to growth in planting strips of less than four feet. To allow for the planting of these trees modification to this section should be made to allow planting of trees in planting strips with a minimum width of 3 feet. If this change is made the minimum space from the curb and sidewalk to small trees should be 1.5 feet. One modification might be made in Section 12.16.100 to allow the planting of small trees as close as 10 feet from a light

pole. This would still allow the light to effectively illuminate the street while allowing for street tree plantings. The modifications described will make the existing ordinance consistent with the standards described in Chapter 5.

Pruning and corner clearance standards for trees on private property are specified in Section 12.16.110. Additional maintenance standards should be developed and placed in a maintenance standards manual. This manual should be referenced in the municipal code and authority for writing, and revising the document should be given to the Tree Commission.

Section 12.16.120 pertains to the abuse or mutilation of trees. This section should specifically define tree topping as mutilation and prohibit the topping of public trees.

Section 12.16.140 allows the City to require the property owner to replace trees at his expense. This section should define the circumstances by which the City may require such replacement. If replacement is for wrongful removal of a publicly owned tree, fines at least equivalent to the appraised value of the tree should be imposed. Precedent for double and treble damages can be found in state statutes. The value of trees should be determined using the Guide for Plant Appraisal, 1992 as published by the International Society of Arboriculture.

RECOMMENDATIONS:

- Expand the responsibilities of the Street Tree Commission to include developing and reviewing planting and maintenance standards. It would also be appropriate to rename the Street Tree Commission to just the "Tree Commission."

- Standards for the maintenance of trees should be reviewed and modified as needed. For example, common clearance heights from pedestrian walks, residential streets, and arterial streets are 8 feet, 12 feet, and 14 feet respectively.[4] The current City of Sweet Home standard requires 10 feet over the roadway. This and other maintenance specifications may be need to be revised and expanded.

- Develop standards for and information about tree care for the landowner. In addition, it may be useful to provide training sessions or other technical assistance to interested landowners on tree care and maintenance topics.

- Rather than just permitting landowners to plant trees on public property, implement an incentive program that encourages the planting of trees on private property and on public property where appropriate.

- More clearly define the responsibility of the City of Sweet Home and of the landowner regarding the care of public trees.

- After reviewing potential costs, consider deleting the provisions of 12.16.070 (C) which require the property owner to remove or trim trees "in a dedicated right-of-way abutting upon the owner's property".

- Amend section 12.16.080 to reflect a spacing between trees equal to 1/2 their mature crown spread.

- Amend Section 12.16.090 to change the parkway strip requirement from four feet to 2.5 feet for certain species of smaller trees.

- Amend Section 12.16.100 to allow the planting of small trees as close as 10 feet from a light pole.

- Add a statement defining and prohibiting the topping of trees to Section 12.16.120.

- In section 12.16.140 clarify the circumstances by which the City may require a landowner to replant trees that have been removed from adjacent to the landowners property.

- Sweet Home should add a section on penalties for non-compliance with the provisions of the Tree Ordinance.

- A brochure on Sweet Home's urban forestry program and ordinances pertaining to trees should be developed so that Sweet Home's residents are informed.

- Add a requirement that property owners need to obtain a permit to remove trees from the public rights-of-way. A section should be added to the maintenance standards which describes the criteria used to determine whether or not a permit will be issued.

- Add a section on penalties and assessment of damages. The International Society of Arboriculture publishes a Guide for Plant Appraisal. This guide should be referred in the ordinance.[5]

4.4 FRANCHISE AGREEMENTS

Two franchise agreements were reviewed, Ordinance No. 779 Between the City of Sweet Home and Pacific Power and Light, and Ordinance No. 1045 between the City of Sweet Home and Telephone Utilities of Oregon, Inc. dba PTI Communications.

4.4.1 Ordinance No. 779 Pacific Power and Light

Section 8 of this ordinance gives the right of trimming trees which might interfere with the distribution of electricity to Pacific Power and Light. This is consistent with state law which requires utilities to trim trees. However, this section does not require trimming to conform to accepted standards for line clearance. We recommend that the City of Sweet Home work with the utility to develop standards for trimming.

The franchise agreement might also include provisions for a tree removal replacement program. The tree removal replacement program might specify replacement of each removed tree with one 2" or larger tree, two 1" trees and so on. If seedlings are used they should be protected with a tree shelter.

The franchise agreement should include a provision where the utility notifies the City prior to the pruning or removal of trees in the public rights-of-way or on public property. As a part of good public relations with residents, the City can then pass the information to residents in the affected areas.

Consolidation of utility lines onto fewer poles should be encouraged. This will improve the appearance of the community and reduce the conflict between wires and trees.

If new construction requires tree removal or future trimming of existing trees the loss in value of those trees should be appraised using the International Society of Arboriculture's Guide for Plant Appraisal, 1992, and the City reimbursed by the dollar value of the loss.

The City of Sweet Home should agree to plant only those trees under utility wires which from a list of trees that has been approved by the utility company.

4.4.2 Ordinance 1045, Telephone Utilities of Oregon.

No reference to the impact on trees is made in the franchise with the Telephone Utilities of Oregon. The City of Sweet Home should develop a standards guide for trimming and planting trees under telephone lines. This document may be very similar to the one developed for Pacific Power and Light.

4.5 CONCLUSION

To effectively guide the development and implementation of an urban and community forestry program, the City of Sweet Home should implement the recommendations in this Chapter. Changes to the Comprehensive Plan can be made as the city proceeds with the next periodic review. Changes to ordinances should be started soon after the adoption of the Street and Park Tree Planting Plan. The City and the Street Tree Commission should review the tree planting program at least once every five years.

Additional information on ordinances is in Appendix D.

4.6 REFERENCES FOR CHAPTER FOUR

1. Yingling, Earl L., Charles A. Keeley, Silas Little, and James Burtis, Jr. 1979. "Reducing Damage To Shade and Woodland Trees From Construction Activities", in Journal of Arboriculture. May 1979 Vol. 5. No. 5.

2. *American National Standard For Tree Care Operations.* ANSI Inc., 1430 Broadway, New York, NY 10018.

3. Merullo, Victor D. 1989. *The Law of Trees.* Merullo, Reister & Swinford, Attorneys and Counselors at Law, 772 S Front Street, Columbus, Ohio 43206. p. 37.

4. *Municipal Tree Manual.* Publication of the International Society of Arboriculture. PO Box GG Savoy IL 61874.

5. International Society of Arboriculture. 1992. *Guide for Plant Appraisal, Eighth Edition.* PO Box GG Savoy, IL 61874. 217/328-2032.

CHAPTER FIVE -- DESIGN STANDARDS

The street tree planting standards presented in this chapter address spacing, species diversity, size at planting, grade, type of planting stock, and species selection.

5.1 SPACE FOR STREET TREE PLANTING

The design of planting areas should include adequate space for the growth of the tree's roots and top. The minimum spacings listed in Table 5.1 and the guidelines presented in this chapter should serve as a guide to the minimum amount of space needed for trees.[1,2,3] Planting deciduous trees that attain heights of greater than 35 feet will have a greater impact on the visual quality of the street and neighborhood. A minimum planting width of four feet is required for trees attaining heights of between 35 and 50 feet.

Existing planting areas in Sweet Home may be categorized into two types of growspaces; no curb or open, and planting strip. Other types of planting spaces include tree well and planting islands or bubble planters. Each of these types of areas and their advantages and disadvantages is described in the following sections.

5.1.1 NO CURB OR OPEN

In areas with no curb the right-of-way is often used for both drainage and as a parking area. In these areas planting trees in the right-of-way is not compatible with the existing use. Tree planting should be encouraged on private property, in locations that are in full view of the street.

In open planting areas the street has only a curb or the curb and sidewalk are placed together with no planting strip. The planting area is located between the property line and the sidewalk or curb or is on private property. This design has the advantage of allowing a much greater area for the tree roots to spread with reduced risk of damaging the curb and sidewalk. Trees should be located between one and four feet from the sidewalk depending on the species. With this design it is more difficult to develop a coherent street tree planting design, even if the design just specifies a row of trees on either side of the street. Typically the adjacent landowner utilizes the area between the property line and the sidewalk as an extension of the front yard and the landscape design of the each individual landowner dominates. As in areas with no curb tree planting should be encouraged on private property.

The disadvantage of encouraging planting on private property is that the City has less control of species selection and spacing of the new plantings. Since the trees are set

back from the right-of-way the street may not have the feel of being tree lined. Also, there is no guarantee that every space available for trees will be filled. The advantages include, more space for the trees growth, and the elimination of the need for the city to maintain the trees. Figure 5-1 shows the difference in visual quality of an area with and without a planting strip.

We recommend that Sweet Home encourage the planting of trees on private property in locations that permit full public view of the trees. This effort should start with and information and educational program of how to select, plant and care for trees. To encourage the filling of every available space we also recommend that a cost-share program be implemented. Several approaches might be taken either singly or in combination, these include: 1) The City could purchase of trees at wholesale prices then resell them to qualified landowners; 2) The City could assist landowners plant trees at no cost to the landowner; or 3) A coupon redeemable at local nurseries for a percentage off the retail price of trees could be offered to qualified residents. A qualified landowner is a person owning property with tree planting locations that would be in full public view.

5.1.2 PLANTING STRIP

The space between the curb and sidewalk is often called the parkway or planting strip. This also defines planting areas dividing lanes of traffic or median planting strips. To accommodate large trees it should be a minimum of eight feet wide, for medium-sized trees it should be a minimum of four feet wide, and for small trees a minimum of two and one-half feet wide. Trees grown in spaces that are too small will have a reduced life span, develop insect and disease problems, and become stunted by the limited growing space. The roots of trees growing in confined areas may also damage sidewalks, curbs, and building foundations. Trees selected for planting between the curb and sidewalk should be selected to attain as large of a mature size as space for planting makes possible.

The transportation element of Sweet Home's comprehensive plan sets street standards. These standards specify right-of-way widths that are inadequate for the planting of medium and large trees in a planting strip. In addition, many of Sweet Home's existing streets do not and can not be improved to meet the minimum standards specified in the Comprehensive Plan. With these restrictions the use of planting strips as an area for tree planting may not be practical. In cases where planting strips of at least four feet can not be incorporated into the street design we recommend that the curb and sidewalk be placed together with no planting strip and that the City encourage homeowners to plant trees in their front yards.

FIGURE 5-1 SPACE FOR TREES

Trees that attain heights of greater than 50 feet planted on private property in full view from the street can have the same or greater effect than trees of smaller stature that are planted in a narrow planting strip.

Tree planting strips create a more unified appearance. They also separate the traffic lanes from the pedestrian walk. In Sweet Home, the use of tree planting strips should be encouraged along major arterials, to accent intersections, and to create a more unified appearance along selected streets. Tree planting strips should be incorporated into the design for new sidewalks along Highway 20. In general the use of tree planting strips will be limited.

5.1.3 TREE WELLS OR SIDEWALK CUTOUTS

Downtown business districts often require this type of planting design. In these areas, sections of the sidewalk must be cut and removed prior to tree planting. Space limitations such as underground and overhead utilities, signs, store entrances, and parking spaces must be considered when locating a planting space. The sidewalk cutout should have a minimum of 16 square feet of area. Tree selection should be limited to small trees that can tolerate reduced soil volumes.

Tree planting in the downtown area should be combined with the use of planting islands, flower boxes, hanging baskets or other landscape features to create a unified approach to the downtown landscape. Before any planting is started in the downtown area a detailed plan showing the locations of the plantings should be completed and the project should have the support of merchants in the downtown area.

5.1.4 PLANTING ISLANDS OR BUBBLE PLANTINGS

A planting island or bubble planting is an area 6 by 8 feet or larger which has been designed for the planting of trees and shrubs. This area usually extends out into the street. Planting islands have the advantage of being more visible and making a bigger impact on the streetscape. Larger plants can also be used and seating areas can incorporated into the landscape design. Space for the planting islands should be designed into street construction.

An effective landscape design for downtown Sweet Home would incorporate the use of bubble planting areas, with sidewalk cutouts and flower boxes. The potential location of bubble planters should be determined after examining traffic patterns. Bubble planting areas are not necessarily required in pairs or at every intersection. The design should increase pedestrian safety and improve traffic flow. Figure 5-2 illustrates the use of a bubble planting.

FIGURE 5-2 CONCEPT DRAWING OF A BUBBLE PLANTER AT THE NORTHEAST CORNER OF 13TH AVENUE AND LONG STREET

5.2 SPACING

The existence of treeless areas along city streets does not necessarily indicate a planting space is available. Planting spaces are defined by the type of roadway, the distance between the curb and sidewalk, adjacent trees and structures, crosswalks, driveways, existing use patterns and presence of overhead and underground utilities.

A street that has all planting spaces filled will have approximately 200 trees per mile. This is an average spacing of just over 50 feet. It includes space for crosswalks, driveways, streets and other obstructions. Minimum spacing requirements for small, medium and large trees are listed in Table 5-1.[4]

TABLE 5-1 MINIMUM SPACE REQUIREMENTS FOR STREET TREE PLANTINGS[5,6,7]

NOTE: DISTANCES ARE MINIMUMS FROM THE CENTER OF THE TREE	SMALL TREES <35'	MEDIUM TREES 35 TO 50'	LARGE TREES >50'
1. Total width of planting area	2.5 to 4 FEET	4 to 8 FEET	> 8 FEET
2. Distance from back of curb or sidewalk	1.5 FEET	3 FEET	4 FEET
3. Distance from alley or drive	10 FEET	10 FEET	10 FEET
4. Distance from cross-walkway	4 FEET	6 FEET	6 FEET
5. Distance from face of curb at cross street	20 FEET	20 FEET	20 FEET
6. Distance from stop-sign or signal	30-50 FT	30-50 FT	30-50 FT
7. Distance between trees	1/2 the sum of the mature crown spread, generally 20-30 FT	1/2 the sum of the mature crown spread, generally 30-50 FT	1/2 the sum of the mature crown spread, generally 40-60 FT
8. Distance from water meter or sewer service	4 FEET	6 FEET	6 FEET
9. Distance from utility or light pole	10 FEET	30 FEET	30 FEET
10. Distance from building	5 FEET	10 FEET	25 FEET

SOURCE: ARBOREAL ENTERPRISES, 1992

5.2.1 WIDTH OF PLANTING AREA

No tree planting should be permitted where the distance between a curb and the sidewalk is less than two and one-half feet.

5.2.2 DISTANCE FROM WALK

Trees should be centered in the planting strip when the distance between the curb and the sidewalk is less than six feet. Where no sidewalks exist or the sidewalk and curb are attached the tree planting should be no closer than three feet from the curb or sidewalk. The exact placement of the tree will depend on the right-of-way width available.

5.2.3 DISTANCE FROM ALLEY OR DRIVE

Trees should be planted to allow for a minimum of ten feet between the trunk of the tree and any alley or drive.

5.2.4 DISTANCE FROM CROSS-WALKWAY

Trees should be planted no closer than six feet to a cross-walkway, except when the tree is one that has a mature height of less than 35 feet. Such small trees may be planted within four feet of a cross-walkway.

5.2.5 SIGHT TRIANGLE

At the intersection of roadways or vehicular access points, no plant material with a mature height greater than 30 inches shall be planted within a sight triangle measuring 20 feet along the boundary of each of the intersecting roadways, measured from the point of intersecting curb lines. Trees may be permitted on private property provided limbs are kept trimmed to at least eight feet above the ground line.

5.2.6 DISTANCE TO STOP SIGNS AND TRAFFIC SIGNALS

Between 30 and 50 feet should be allotted to allow for a clear view of stop-signs and traffic signals.

5.2.7 SPACING BETWEEN TREES

Spacing between trees shall be at least 1/2 the sum of the mature crown spreads. Generally, large trees should be spaced 40 to 60 feet apart, medium trees 30 to 50 feet apart, and small trees 20 to 30 feet apart.

5.2.8 DISTANCE TO UNDERGROUND UTILITY

The location and type of underground utilities will be determined during the planning and design process. Tree selection will account for space needed for the root system of the tree. The minimum distance from a water meter or sewer service line shall be six feet unless the trees mature height is less than 35 feet, then the minimum distance shall be no less than four feet.

5.2.9 DISTANCE TO OVERHEAD ELECTRICAL UTILITY

No tree should be planted within 25 feet of any overhead electrical utility, except service lines, unless it is a species which attains a mature height of less than 35 feet.

5.2.10 DISTANCE TO BUILDING

Trees should not be planted within five feet of any building.

5.2.11 SIDEWALK CUTOUTS

Tree plantings made in a sidewalk must have a minimum of 16 square feet of area. The tree must be setback from the face of the curb at least two feet.

5.2.12 DISTANCE FROM FIRE HYDRANT

Trees should be planted to allow for a minimum of 15 feet between the trunk of the tree and any fire hydrant.

5.3 SPECIES DIVERSITY

Street tree plantings of any one cultivar, species, or group of species should not comprise more than five, ten and 25 percent of the total tree population respectively. On a single

project, one species should not exceed 50 percent for plantings of less than 80 trees; 30 percent for plantings between 80 and 120 trees; and 25 percent for plantings of more than 160 trees. This will allow a planting design that uses a single species along both sides of a 1000 foot length of street.[8,9]

5.4 SIZE OF TREE TO BE PLANTED

Unless otherwise specified by the City of Sweet Home all trees and their cultivars shall conform to the American Standard for Nursery Stock. A minimum size often specified for use along arterial streets are a caliper of two or greater inches and for collector streets a minimum of 1 and 1/2 inches measured at a point six inches from the ground line. This minimum size specification helps reduce vandalism and theft and increases the planting visibility.

Smaller trees are easy to plant, are less expensive and are more likely to be planted by homeowners. Therefore, it may be desirable for the City of Sweet Home to allow the use of smaller trees in parks and for street tree use.

The use of small caliper stock or seedlings may be especially beneficial when: (1) projects require large numbers of trees for reforestation, riparian, or wildlife purposes; (2) projects involve volunteer or landowner efforts to plant trees in the public rights-of-way; and (3) when the desired species is not available or can not be successfully planted using the size specified. Seedlings can be used to successfully establish street trees for less than one-tenth the cost of two-inch caliper stock. Successful projects utilize a solid walled extruded tree shelter to protect the seedling tree from accidental bumping, increase visibility, and increase the growth of the seedling. Seedlings also have the advantage of being readily available in a wide range of species; and are easy to transport, easy to handle and easy to plant. Appendix G contains information on using tree seedlings for landscape plantings.

5.5 GRADE

Unless otherwise specified by the City, all trees shall have straight trunks, well developed leaders and tops. The root system shall be characteristic of the species and it shall exhibit evidence of proper nursery practices.

At the time of planting, all trees shall be free of mechanical injuries.

5.6 TYPE OF PLANTING STOCK

The type of planting stock, whether bare root, balled and burlapped or boxed or container grown has less effect on the success of the project than the use of healthy nursery stock, proper planting techniques and good care after planting. All nursery stock should at a minimum conform to the American Standard for Nursery Stock.

5.7 PLANTING AND EARLY MAINTENANCE

Pits for the planting of bare-root plants should be at least twelve inches larger in diameter than the diameter of the root system. A larger hole will more readily accommodate the root system without crowding. For container or balled and burlapped material the hole should be a minimum of three times the size of the ball or container.

Plants shall be planted no deeper than previously grown. Allowance should be made for settling.

Guys or supports should not be needed, however, if they are used they should be installed so that they will not girdle or injure the tree or endanger the public.

Newly planted trees, shrubs and other plants require special maintenance during their establishment period, usually the first one to three years.

A thorough watering once every five to ten days during dry periods may be needed to sustain tree growth. A soil probe or small hand shovel should be used to check soil moisture. The soil should form a ball in your hand when squeezed. If it crumbles it is too dry and water is needed. If the soil drips, it is too wet.

A ring of organic mulch should be installed and maintained around the newly planted trees. The mulch ring should be at least three feet in diameter. Mulch helps conserve soil moisture and makes the rooting area of the new tree favorable for new root development. Mulch has been shown to increase the health and growth of trees.

Frequent inspections of the trees should be made to determine the need for insect or disease control.

Pruning newly planted trees should be limited to removing dead, broken, or injured branches. Newly planted trees meeting the American Standard for Nursery Stock should not need pruning to correct structural defects. Lower limbs should only be removed to allow for clearance and visibility. Limbs should not be removed from more than two-thirds of the trees trunk.

5.8 TREE SELECTION

A Preferred Species List for Sweet Home is included in Appendix E. This list is not a complete list of all trees that can grow and thrive in Sweet Home, rather it is a list of species that will help guide the development of a unified and consistent street and park tree planting plan.

Two common themes for tree planting were evident from the public involvement process. The first is that streets with tree names should have those trees planted along them. The second theme is that trees should be used to add both spring and fall color the streetscape. Appendix F contains a list of streets with tree names and the names of trees to match these names. Each of these trees are suited for growth in Sweet Home. The Preferred Species List for also contains a broad selection of trees with spring flowers and fall color. These attributes are noted in the Preferred Species List. Trees that may be difficult to find have been noted.[10,11,12,13]

The list contains few named cultivars even though several may exist for each species. A cultivar is a tree that has been selected for specific characteristics. In almost all cases each tree of a named cultivar is genetically identical. With few exceptions, if a species is listed its cultivars would also be acceptable for planting. However, if a cultivar is listed it does not mean that other cultivars from that species, or the parent species would be suitable for planting. In some cases, cultivars may be more desirable. Often a cultivar will exhibit many of the outstanding characteristics of the parent species without the disadvantages. For example, the thornless cockspur hawthorn is a cultivar of cockspur hawthorn but lacks the dangerous thorns. Many cultivars have been selected that attain smaller stature than the parent specie and often can be planted in locations which require trees that attain a smaller mature size. The number of tree cultivars available from nursery's exceeds 2000 and continues to expand.[14] Information on cultivars can be obtained from the following sources.

> Street Tree Factsheets, available from the School of Forest Resources, The Pennsylvania State University, University Park, PA 16802;
>
> Handbook of Landscape Tree Cultivars, available from East Prairie Publishing Company, PO Box 174, Gladstone, IL 61437, and
>
> Sunset, New Western Garden Book, available at local retail nursery stores.

5.9 TREES POORLY SUITED FOR USE AS STREET TREES

Table 5-2 lists trees or groups of trees that are poorly suited for planting along Sweet Home's streets. The limitations of these trees include, but are not limited to; undesirable growth habits; objectionable fruit; susceptibility to insects or disease; and propensity to storm

damage. Although many of the species listed in Table 5-2 have desirable characteristics there are too many superior trees to warrant the use of these trees along City streets. Please note that these same trees may be desirable in a park setting.

As undesirable species already growing along the City streets die they should be replaced with a species on the preferred species list.

The following describes more specifically why selected species or groups of species are not suited for *street tree use* in Sweet Home and under what circumstances these trees may be used.

- Evergreen conifers attaining heights of more than 30 feet, including douglas-fir, firs, hemlock, junipers, pines, spruce. Evergreen conifers retain low limbs that can block the view of motorists and pedestrians. Removing these low limbs may reduce the aesthetic appeal of these trees and can predispose them to wind-throw.

- Bigleaf maple, (*Acer macrophyllum)* Bigleaf maple was found to be the only tree in Sweet Home which consistently damaged sidewalks. This tree is better suited for large yards or open parks.

- Elms, *(Ulmus*). Many elm species are susceptible to Dutch-elm disease. Although this disease is not widespread in Oregon it has been reported in Portland. The use of elms should be limited to those resistant to Dutch-elm disease and free of other limitations.

TABLE 5-2 TREES POORLY SUITED FOR STREET TREE USE

COMMON NAME	SCIENTIFIC NAME	PROBLEM OR LIMITATIONS
APPLE, COMMON	*Malus sp.*	Large fruit
BLACK LOCUST	*Robinia sp.*	Weak wood, subject to storm damage
BOXELDER	*Acer negundo*	Weak wood, subject to storm damage
CEDAR, ARBOR-VITAE	*Thuja sp.*	Form - visibility hazard
CHERRY, PLUM	*Prunus sp.*	Messy fruit, Over-planted, this group represents 31% of Sweet Home's street trees.
DOUGLAS FIR	*Psuedotsuga sp.*	Form - visibility hazard
ELM, AMERICAN	*Ulmus americana*	Disease susceptibility
ELM, SIBERIAN (CHINESE)	*Ulmus pumila*	Weak wood - subject to storm damage
FIR	*Abies sp.*	Form - visibility hazard
HEMLOCK	*Thuja sp.*	Form - visibility hazard
HICKORY	*Carya sp.*	Large fruit
JUNIPER	*Juniperus sp.*	Form - visibility hazard
MAPLES	*Malus sp.*	Limit use, 25% of Sweet Home's trees are maple
MULBERRY	*Morus sp.*	Messy fruit, aggressive roots
OAK, PIN	*Quercus sp.*	Shallow roots, low branches, high maintenance
PEAR, COMMON	*Pyrus sp.*	Large fruit
PERSIMMON	*Diospyros sp.*	Large messy fruit
PINE	*Pinus sp.*	Form - visibility hazard
POPLAR, COTTONWOOD	*Populus sp.*	Weak wood, invasive roots
SPRUCE	*Picea sp.*	Form - visibility hazard
TREE OF HEAVEN	*Ailanthus altisima*	Weak wood
WALNUT	*Juglans sp.*	Large fruit
WILLOW	*Salix sp.*	Weak wood, Subject to Storm Damage, Invasive roots

SOURCE: ARBOREAL ENTERPRISES, 1992

5.10 APPROVAL OF SPECIES

To allow for the planting of trees not included on the Preferred Species List it is recommended that the City of Sweet Home establish an approval process. As part of the approval process a complete description of the tree with a description of the planting site should be provided to the City. This description should include;

- The common name and scientific name, and cultivar name of the tree;
- The mature size of the tree;
- The mature spread of the tree;
- The range of USDA hardiness zones where the tree is adapted to growth or the climate zone listed in Sunset New Western Garden Book. Sweet Home is in USDA hardiness zone eight and New Western Garden Book climate zone 6;
- Tree shape;
- Insect and disease pests; and
- Outstanding features.

5.11 CONCLUSION

The standards presented in this Chapter and the Preferred Species List in Appendix E have been written to be incorporated into a Street Tree Planting Standards Manual. These standards and the preferred species list should be reviewed every three to five years to allow for changes in Sweet Home's needs, and new planting techniques and products.

5.12 REFERENCES FOR CHAPTER FIVE

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3. Miller, Robert W. 1988. Urban Forestry: Planning and Managing Urban Greenspaces. Prentice-Hall, Englewood Cliffs, NJ. 404 pp.

4. Urbana, City of. Unpublished Report. *Arboricultural Specifications Manual.*

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6. Portland General Electric. 1992. A Guide To Selecting Street Trees: TREES. Portland General Electric Forestry Department, 503-671-1455.

7. Hoefer, Philip J., Dr. E. B. Himelick, and David F. DeVoto. 1990. Municipal Tree Manual. International Society of Arboriculture, PO Box 908, Urbana, IL 61801. 42 pp.

8. International Society of Arboriculture. 1989. Municipal Tree Manual. International Society of Arboriculture, PO Box 908, Urbana, Illinois 61801.

9. Miller, Robert W. 1988. Urban Forestry: Planning and Managing Urban Greenspaces. Prentice-Hall, Englewood Cliffs, NJ. 404 pp.

10. Dirr, Michael A. 1983. Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses. Stipes Publishing Company.

11. Cornell University. 1976. Hortus Third. MacMillan Publishing Company.

12. Sunset, New Western Garden Book. 1979. Lane Publishing Co.

13. Personal Communication, Alex Wynstra, City Forester, Portland.

14. Wandell, Willet N. 1989. Handbook of Landscape Tree Cultivars. East Prairie Publishing Company, PO Box 174, Gladstone, IL 61437. 318 pp.

CHAPTER SIX - PARKS

On March 17, 1993 Aneta Synan and members of the Sweet Home Tree Commission visited the City's parks. Planting and project opportunities that were identified are described for each park.

6.1 PARKS MASTER PLAN

The City should work with the Sweet Home Park's Commission to update the Sweet Home Park System Master Plan adopted by the City Council on September 27, 1983. Tree planting and plans for tree maintenance should be included as one component of the parks master plan. Once the master plan is implemented, site plans can be developed, planting projects can be refined, a budget developed and the project scheduled for implementation.

6.2 PARK TREE INVENTORY

A tree inventory should be used to record information about all trees planted. We recommend, in priority order, inventorying those trees that have been planted in the last 10 years, inventorying those trees that stand out as individuals, and inventorying those trees that are in high use areas. We do not recommend conducting a complete inventory of trees in mass plantings, or forested situations. In these situations it is unlikely that any future maintenance will be scheduled. It is also unlikely that failure of a tree in these situations will result in injury or property damage.

The primary reasons for conducting an inventory is to identify hazard trees, to schedule maintenance to alleviate the hazard, and to schedule maintenance to lengthen the service life of the tree. The inventory program maintains a record of the current condition of the tree, previous maintenance, and scheduled maintenance. In the event of a tree failure this record may be used to show that the tree had been inspected and maintained.

6.3 PROJECT DESCRIPTIONS FOR EACH PARK

6.3.1 STRAWBERRY HILLS PARK (WESTWOOD)

Undeveloped park. The parking lot may have been constructed in part with funds from a Land and Water Conservation Grant. A sign indicates that LAWCON Funds were used for some purpose at this park.

There are many opportunities for planting trees, however, in the absence of a site plan for the development of this park we do not recommend tree planting.

6.3.2 NORTHSIDE PARK

This park offers access to the South Santiam River and has an established pattern of use. Each of the trees in this park should be inspected for hazards. Maintenance needs noted were removal of trees damaged in February's wind and snow storm.

A tree planting project would be compatible with the existing use of the park. Planting 4 or 5 large shade trees would enhance the park by defining the parks boundary and entrance.

6.3.3 SANKEY PARK

Sankey Park is the community's centerpiece. It is 19.68 acres in size. The lower portion includes Ames Creek and a lake created by damming this creek. The lake offers fishing opportunities. Picnic areas with shelters, and playground equipment are situated under a Douglas-fir stand adjacent to the lake. A trail system has been developed that starts at the covered bridge, follows the shore of the lake, traverses a forested area, leads to the upper portion of the park and finally returns through the playground and picnic area.

This park was the site of the first Arbor Day tree plantings and has many new trees. Opportunities for future tree planting are limited to replacing trees that die. A hazard tree survey of the trees along the trail and in the picnic and playground areas is needed. This survey could be combined with a detailed inventory of trees. Each tree could be tagged with an aluminum tag and the information entered into the Tree Keeper program.

6.3.4 12TH AVENUE MINI PARK (NANDINA POCKET PARK)

Nandina Pocket Park is 0.1 acres in size. It has a bus stop style shelter. This park is very visible from the street and could be made more attractive if it were landscaped and maintained. An opportunity exists to involve local residents in designing, installing and maintaining a new landscape for this park. Projects, such as this, that directly involve local residents have been very attractive to agencies and organizations that have funds for tree planting. One of the first steps in implementing this project would be to identify a local resident who can lead a community effort to revitalize and care for this park. Once this group is established, as measured by action to clean up and take care of the park in its current condition, a landscape plan and budget could be developed. With the plan and a budget a very attractive grant proposal could be written.

6.3.5 CLOVER MEMORIAL PARK

Clover Memorial Park is 1.1 acres is size. It is a creek running though it and a new covered footbridge is being constructed. This park is adjacent to Highway 20 (Main Street) and has been used for an entryway sign. The entryway landscape needs to be redone, many of the plants have outgrown their space and some have died. Framing the footpath entry are two large shade trees with diameters in excess of 24". One is a box elder, the other an ash. Each has numerous dead limbs and a beehive is located in the boxelder tree. These trees should be evaluated for their hazard potential. Several red sunset maples have been planted in the park.

6.3.6 ASHBROOK PARK

Ashbrook Park is located in a ten to 15 year old neighborhood. The park is developed for passive recreation and has a well maintained trail, picnic tables, playground equipment and trees.

Planting opportunities are limited to replacing trees that are dead or dying. Two conifers were planted too deeply and should be removed. Many of the trees are young and need training to remove limbs that might cause future defects. All the trees in the park need to be mulched to improve their health and future growth.

Since several different species have been planted there is an opportunity to create a tree trail in this park. The trees could be labeled with weatherproof labels and a booklet developed to describe each of the trees and its use in the landscape. Costs for this project would vary depending on the number of trees, the cost of tree labels, printing costs, labor costs for installing the tree labels, and the cost of writing the

guide. The Chamber of Commerce in Myrtle Point labeled 25 trees and published a 32 page booklet for their tree trail. Much of the project was completed by volunteers and local businesses donated materials and printing costs. The book was written through a contract with a consultant. Myrtle Point's Project was funded through a $1000 grant from the Oregon Department of Forestry. A copy of The Myrtle Point Tree Trail is in Appendix H.

CHAPTER SEVEN -- PROGRAM RECOMMENDATIONS

Planting and maintaining trees is only one component of an effective community forestry program. Other functions of a sound program include maintenance, information and technical assistance, and regulation. In this chapter we summarize recommendations designed to strengthen and improve Sweet Home's Urban Forestry Program.

Recommendations for the City to maintain trees on public property were made in Chapters three and five. From the sample inventory it was estimated that a well trained two man crew working six week per year could maintain all the trees on the right-of-way. Information about the cost of such maintenance can be more accurately estimated from a complete street tree inventory. This inventory will be completed by the Tree Commission.

A good program does more than plant or maintain trees; it foster citizen participation through information and technical assistance programs. Building citizen trust and initiative requires efforts by city staff and volunteers. The city should inform citizens about the benefits of a healthy urban forest and provide incentives for individuals to plant trees.

7.1 TREE PLANTING AND OTHER PROJECTS

Several streets and areas of Sweet Home were identified for consideration for tree planting projects. We grouped these projects into four broad categories: (1) Highway 20/Main Street; (2) Downtown; (3) Parks; and (4) Front yards and the Right-of-way.

7.1.1 HIGHWAY 20/MAIN STREET

Projects along Highway 20/Main Street were ranked as the top priority for tree planting by both survey respondents and individuals that attended the public meeting.

Several options exist with respect to facilitating a consistent planting scheme on private property along Highway 20. We recommend the City of Sweet Home to encourage the planting of trees along Highway 20 by:

- Increasing public awareness through an aggressive information program about tree planting;
- Obtaining planting easements from private property owners;
- Providing incentives such as cost sharing with private property owners who agree to plant and maintain trees on their property; and

- Developing regulations specifying minimum landscape requirements for all new businesses.

An aggressive information program should be started which describes the desired future appearance of the highway, addresses concerns about trees and tree planting, and describes the responsibility of the city and the private landowners for the planting and care of the trees.

In the Highway 20 right-of-way the City should work closely with the Oregon Department of Transportation to plan the location of sidewalks. Planting strips should be encouraged along this major arterial. This will increase the distance between the traffic lane and the pedestrian walkway.

The paved median on Highway 20 between 9th and 18th should be redesigned to include a raised planting bed. We suggest a raised bed to protect the plantings, to provide larger soil volume for plant growth, and to minimize damage to the plantings from snow plowing operations. The planters should accent intersections and pedestrian crossings rather than be continuous along the length of the raised median.

The City of Sweet Home should adopt an ordinance requiring minimum landscape requirements for commercial development and parking lots. Landscaping in parking lots should include a provision requiring a certain percentage of the parking lot be shaded by trees. This requirement is consistent with goal five, "To compensate for the heat released from road surfaces, cool the area adjacent to paved surfaces and to sequester carbon released from the use of fossil fuels." A sample ordinance on energy conservation with landscaping can be found in the USEPA publication, *Cooling Our Communities; A Guidebook on Tree Planting and Light-Colored Surfacing*, January 1992. This document, GPO #055-000-00371-8 is available from the Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15220-7954, Attn: New Orders.

7.1.2 DOWNTOWN

There is little opportunity for planting trees in sidewalk cutouts because of the narrow sidewalk width. Therefore, in general, we do not recommend the use of sidewalk cutouts. The City, however, should thoroughly investigate the use of "bubble planting areas" in the downtown area. A bubble planting area is an area adjacent to the curb that extends out into the street and is used for planting. These areas have been used successfully in Seaside or other Oregon communities. An investigation would start with a review of street widths and traffic patterns. Bubble planting areas do not have to be paired on opposite sides of the street. They can be used effectively

singly. They also would not have to put in at every intersection. Even one or two in the downtown area would add interest. The bubble planting areas can be designed to include park benches or drinking fountains.

7.1.3 PARKS

Several park planting projects were identified during the public involvement process. These include plantings in Northside and Westwood parks and the development of a mini-park at 12th and main. Parks projects are described in more detail in Chapter Six.

7.1.4 FRONT YARDS AND THE RIGHT-OF-WAY

The opportunities for plantings in the public right-of-way along many of Sweet Home's streets are limited. The City and the Tree Commission should focus it's initial efforts on plantings in existing planting strips that are now empty. Such strips exist along South 2nd Avenue, 10th Avenue, and Cedar Street.

To facilitate tree planting in front yards and on the right-of-way the city should initiate a comprehensive public information and incentive program.

Informational brochures on selection, planting and care should be developed and made available to landowners. A brochure on Sweet Home's Urban Forestry Program and it's ordinances and regulations will also help direct plantings that are consistent with the Cities goals. To encourage the planting of trees that match streets named for trees the brochures should include a list and description of appropriate trees. Appendix F includes some of this information.

Incentives should be designed to facilitate voluntary participation in tree planting. While incentives can be either financial or technical, many communities offer financial incentives. The most common are cost share programs. In most of these programs the landowner is given a choice of five or six trees and the city arranges for the purchase and planting. The homeowner then pays for a portion of the cost of the tree, usually 50 percent. The exact planting location is best made by the city in accordance to a set of planting specifications similar to those in Chapter 5. Planting locations are usually, although not always on the public on the right-of-way. Communities that allow planting off the public right-of-way usually require the tree to be planted in full public view.

Cooperative strategies should also be used to encourage tree planting in the right-of-way and in front yards. The City of Colorado Springs Colorado has implemented a

program to encourage tree planting on the right-of-way which, involves the landowner in the planting, creates partnerships with local nurseries. The City of Colorado Springs issues certificates worth $110 toward the purchase of a balled and burlapped tree at participating nurseries. The homeowner must plant the tree within 10 feet of the curb. For more information contact the City of Colorado Springs, Natural Resources Division, Park and Recreation Way, Colorado Springs, CO 80905, (719) 578-6698.

7.2 REGULATORY STRATEGIES

Regulations provide a means to authorize new programs and to set policy and standards for the urban forestry program. The mission statement and policies listed in chapter two should be adopted by City Council. Chapter Four of this report is an extensive review of the many of the ordinances and regulations that might pertain to urban forestry. The recommended changes should be adopted by the city council.

This report also presents planting standards. The standards in Chapter Five should also be adopted by the City Council. Although the ordinance includes some maintenance standards, these standards are not complete, therefore a maintenance standards manual should be developed.

7.3 SUMMARY OF RECOMMENDATIONS

The recommendations in this report are summarized in the following list. A key to the abbreviations follows the list.

OBJECTIVE OR ACTION	PRIORITY	WHO	EST. COST	TIME
PLANTING ALONG HIGHWAY 20				
Obtain Planting Easements	1	C,TC	NK	1-2 yrs
Cost share Incentive Program	1	C,TC	NK	1-2 yrs
Information program	1	C,TC	NK	1-2 yrs
Adopt a Landscape Ordinance	1	C,TC	NK	1-2 yrs
Raised median plantings	2	C,TC,B	NK	1-3 yrs
Plantings with sidewalk reconstruction	2	C,TC,DOT	NK	1-3 yrs

OBJECTIVE OR ACTION	PRIORITY	WHO	EST. COST	TIME
PLANTING DOWNTOWN				
Bubble planters in the downtown area	2	C,TC	NK	2-5 yrs
Adopt a Landscape Ordinance	1	C,TC	NK	1-2 yrs

OBJECTIVE OR ACTION	PRIORITY	WHO	EST. COST	TIME
PLANTING IN PARKS				
Plant 4 or 5 shade trees at Northside Park	1	TC, C	$1000	1-2 yrs
Clover Memorial Park	1	TC,C	NK	1-2 yrs
Nandina Pocket Park, Landscaping	2	TC,C,H	NK	2-4 yrs

OBJECTIVE OR ACTION	PRIORITY	WHO	EST. COST	TIME
PLANTING TREES IN FRONT YARDS AND ALONG R-O-W				
Cost share program for tree planting	1	C, TC,H	NK	1-2 yrs
Brochure on proper tree selection, planting and care	2	C,TC	$2000	2-3 yrs
Cooperative Program with local nurseries	2	C, TC,N	NK	2-3 yrs

OBJECTIVE OR ACTION	PRIORITY	WHO	EST. COST	TIME
POLICIES & ORDINANCES				
Adopt Mission and Goals Statements	1	C	NK	Immediate
Adopt Tree Planting Specifications	1	C	NK	Immediate
Changes to Tree Ordinance	1	C	NK	Immediate
Adopt a Landscape Ordinance	1	C,TC	NK	1-2 yrs
Changes to Zoning Ordinance	2	C	NK	1-3 yrs
Changes to Subdivision Ordinance	2	C	NK	1-3 yrs
Changes to Franchise Agreements	2	C	NK	3-5 yrs
Changes to Comprehensive Plan	3	C	NK	5 yr

OBJECTIVE OR ACTION	PRIORITY	WHO	EST. COST	TIME
OTHER				
Sankey Park, Hazard Tree Inspection	1	TC,C	$2000	Immediate
Develop a maintenance plan for trees in the right-of-way, investigate costs, and train crews in proper tree maintenance	1	C,TC	$4000	1 yrs
Inspect all public trees for hazard	1	C	NK	1 yr
Complete the Street Tree Inventory	1	TC	$2000	1 yr
Brochure on the tree ordinance and the urban forestry program	2	C,TC	$2000	2-3 yrs
Tree Trail	2	C,TC	$2500	2-3 yrs
Memorial or Recognition Tree Program	2	C,TC	$2500	2-3 yrs
Maintain trees on right-of-way	2	C	NK	1-3 yrs
Park Tree Inventory	2	TC	$2500	2-3 yrs

C = City
TC = Tree Commission
DOT = Department of Transportation
B = Businesses
H = Homeowners
NK = Not known

7.4 CONCLUSION

Development of an urban forestry program or planting plan is an ongoing process. Projects will be refined, implemented and completed and new ideas will emerge for new programs. Implementing the polices, and adopting recommended ordinance changes will facilitate tree planting in Sweet Home.

The priority area of the community, the downtown and Highway 20 present unique challenges. In both of these areas there is little opportunity for tree planting on the public right-of-way. As a result, the City and Tree Commission will have to identify landowners willing to plant trees as a part of their landscape. In the downtown area

off of Highway 20 islands for landscape planting can be designed to make space for trees.

Planting in residential areas also presents unique challenges. Little space exists on the right-of-way for planting trees. In addition, the minimum required road right-of-ways for future streets are not adequate for tree planting. As with Highway 20 tree planting opportunities in most residential areas of the community will be on private property.

Due to limited planting opportunities elsewhere, Sweet Home's tree planting program is likely to continue to focus on school and park properties. For the City of Sweet Home to be known for its trees, aggressive programs using incentive and information strategies should be developed to encourage homeowners to plant trees which can be viewed from the street. With the addition of the planting standards proposed in this plan and adoption of the recommended changes to ordinances and polices the existing regulations will guide the planting of appropriate species.

CHAPTER EIGHT -- SOURCES OF ASSISTANCE

8.1 INTRODUCTION

Several projects were identified by the Tree Commission, public, and consultant that are described in the previous chapters. Financial and human resources are necessary to implement the projects. There are several methods and levels of funding and technical assistance available to the City of Sweet Home to finance tree planting, maintenance and related projects. Some of these methods are discussed in this chapter. This discussion is not intended to provide a comprehensive list of all potential sources of assistance, rather we describe several specific programs and provide references where additional information can be sought.

8.2 SOURCES OF FINANCIAL ASSISTANCE

8.2.1 OREGON DEPARTMENT OF FORESTRY URBAN & COMMUNITY FORESTRY ASSISTANCE PROGRAM

The Oregon Department of Forestry administers grant programs for tree planting and community urban forestry projects. In 1992, the department's Urban and Community Forestry Assistance Grants, and the Small Business Administration Tree Planting Grants provided over $200,000 in Federal matching funds to communities. Grant applications vary annually. For more information contact Paul Ries, Oregon Department of Forestry, Urban Forestry Coordinator, 2600 State Street, Salem, OR 97310, 945-7391.

8.2.2 LAND AND WATER CONSERVATION TRUST FUND

Federal Land & Water Conservation Funds are available each year for the acquisition and development of outdoor recreation facilities. The source for this funding is the U.S. Interior Department; in Oregon the fund is administered by the State Parks and Recreation Department. It is a large grant designed for the acquisition of park lands, which provides the community with matching in-kind funding[1]. Grant funds are available for up to 50 percent of the total project cost. Cities, counties, and park and recreation districts are

[1] Matching "in-kind" means that the matching value contributed by the community need not be in dollars. The community may contribute donated land, equipment, and volunteer labor, and these contributions will count toward their equivalent dollar amount.

eligible agencies. The type of facilities that are eligible include ballfields, picnic facilities, boating facilities and playgrounds. Support facilities such as restrooms, parking lots, landscaping, and maintenance of buildings.

Applications must be submitted to the State Parks and Recreation Department by January 1 of each year. The next grant cycle for this program will begin about October 1993. Applications should be sent to Oregon State Parks and Recreation Department, Grant Section, 525 Trade Street SE, Salem OR 97310.

8.2.3 CHARITABLE FOUNDATIONS

Many foundations will fund tree-related projects. Each foundation has specific guidelines and dates for grant applications. Many require a letter of inquiry prior to submission of a grant request. A comprehensive list of foundations providing grants in Oregon can be found in the *Guide to Oregon Foundations*.

One potential foundation that may fund tree projects in Sweet Home is the Meyer Memorial Trust. The Meyer Memorial Trust operates a small grants program that funds projects for amounts up to $8,500. For more information contact the Meyer Memorial Trust at 1313 SW Fifth Avenue, Suite 500, Portland, Oregon 97201. Phone 228-5512.

For additional information on charitable foundations refer to: Guide to Oregon Foundations, United Way of the Columbia Willamette, 718 West Burnside, Portland, Oregon 97209 (226-9131); or The Foundation Center, 312 Sutter Street Rm. 312, San Francisco, California 94108, (415) 397-0902. The Foundation Center also has a Rural Development Information Library which can be contacted at, 1-800-633-7701.

8.2.4 OREGON YOUTH CONSERVATION CORPS (OYCC)

The Oregon Youth Conservation Corps program consists of grants of labor and partial capital financing. OYCC generally provides grants for conservation or environmental projects proposed by non-profit organizations. The OYCC funds are distributed on an equal basis to each county. This summer, for example, each county will be awarded $11,111 of OYCC funds for projects in their county.

To apply, contact Ann Alexander, 225 W. Olive Street, Newport, OR 97365. TEL: 265-6611, FAX: 265-5466. For more detailed information, please refer to the Appendix.

8.2.5 THE INTERMODAL SURFACE TRANSPORATION EFFICIENCY ACT (ISTEA)

The 1991 ISTEA provides matching funds for transportation enhancement projects. This can include landscaping within the public right-of-way. Projects should complement or enhance the Oregon Department of Transportation Visual Resource Management Program. Landscaping projects that are a part of a existing construction project have priority. Reimbursement is 80/20 Federal to Local match. New information about the program will be available in mid-May, 1993. Applications will be reviewed in July. For more information contact Rick Sjolander, ODOT Region 2, Salem OR 97310 378-2626.
This grant may be especially useful for plantings along Highway 20 especially as it related to the Cities and States plans for sidewalk construction.

8.2.6 OREGON STATE MARINE BOARD

The State Marine Board program is a grant program limited to riverside facility improvement only. At this time, the Marine Board already contributes $2,500 a year to the Port of Toledo. Umatilla used Marine Board money for building a boat dock.

To contact the Marine Board, call Dave Obern, Facilities Manager, at 378-8587.

8.2.7 OTHER FUNDING SOURCES

The **American Forests** organization provides funds for tree planting projects through the Global ReLeaf program. These projects can be on public or private properties. For more information, contact: American Forests, Global ReLeaf, 1516 P Street NW, P.O. Box 2000, Washington D.C. 20013, (202) 667-3300.

The **International Society of Arboriculture** funds research projects that have applied use in the field of arboriculture. These have included such projects

that include tree planting as part of the research and projects that involve public information and education. For more information contact: International Society of Arboriculture Research Trust, PO Box GG, Savoy, IL, 61874-9902.

The **State Parks and Recreation Department** has information about the following funding programs:

- County Campground Grant Program;
- Marine Facility Grant Program;
- Maintenance Assistance Program;
- Oregon Community Development Block Grant Program;
- County Fairs and Special Events.

Contact the State Parks and Recreation Department at Oregon State Parks and Recreation Department, Grant Section, 525 Trade Street SE, Salem OR 97310.

The **US Environmental Protection Agency** has a grant program Pollution Prevention Incentive for States. This program was authorized under the Pollution Prevention Act of 1990. Local governments are not eligible but USEPA Region 10 strongly encourages communities to work directly with the State of Oregon in developing a state proposal that includes them as participants. Potential projects might include tree plantings to mitigate pollution. For more information Robin Meeker, Pollution Prevention Program, USEPA Region 10 1200 6th Ave. MD 142, Seattle WA 98141. 206-553-8579. Also contact Paul Ries, Oregon Department of Forestry, Urban Forestry Coordinator, 945-7391.

8.3 SOURCES OF TECHNICAL ASSISTANCE

Many aspects of tree planting and maintenance require technical skills. Activities such as tree selection, pruning, and removal require specialized knowledge, skills, and equipment. Technical assistance may be necessary for both citizens and City staff. To some degree, an active education and awareness program will provide technical assistance to citizens. This can occur through a variety of means including educational brochures, advertisements, and workshops.

Potential sources of technical assistance include the Oregon Department of Forestry, the U.S. Forest Service, utility companies, and private businesses. Below is a list of potential contacts for technical assistance.

Oregon Department of Forestry
Urban and Community Forestry Assistance Program
Paul Ries
945-7391

Pacific Power & Light
David Wall
920 SW 6th Ave
Room 600 PFFC
Portland, OR 97204

National Arbor Day Foundation
211 North 12th, Suite 501
Lincoln, Nebraska 68508
402/474-5655

American Forests
1516 P Street NW
Washington DC 20005
1/800-368-5748

Plant Amnesty
906 NW 87th St
Seattle, WA 98117
206/783-9813

8.4 SUMMARY

Table 8-1 shows sources of assistance and the types of projects they are applicable to.

Table 8-1
Summary of Funding Options

Project Type	Assistance Source			
	Oregon DOF	Charitable Foundations	OYCC	ISTEA
Tree Planting	x			
Tree Maintenance	x			
Public Awareness/Relations	x	x		
Parks & Recreation	x		x	
Trails			x	
Educational Projects with Children	x	x		
Highway 20 and Downtown				x

APPENDIX

A. Analysis of a Public Opinion Survey
B. Summary of Public Meeting
C. Results of the Sample Inventory
D. Ordinances
   1. Tree City USA Bulletin 9, How to Write a Municipal Tree Ordinance
   2. Forest Grove, Oregon: A Significant and Historic Tree Preservation Ordinance
   3. Olympia, Washington: A Tree Preservation Ordinance
E. Preferred Species List
F. Trees for Streets Named After Trees
G. TREESENTIALS Fact Sheets on TUBEX Tree Shelters
H. Myrtle Point, Oregon: Tree Trail

APPENDIX A -- ANALYSIS OF A PUBLIC OPINION SURVEY

ANALYSIS OF A SURVEY
SWEET HOME'S TREES, THE CITY OF SWEET HOME, AND THE SWEET HOME TREE COMMISSION

A survey of 3 groups of Sweet Home residents; Kiwanis Club members, the general public, and persons who attended the Townhall meeting regarding downtown revitalization, was conducted. A total of 54 surveys were completed and analyzed. No significant differences in areas of emphasis were found between the groups.

Question 1 and 2.

1. Are you aware of Sweet Home's urban forestry program?
2. Do you know that Sweet Home is a Tree City USA?

Seventy-one percent of all respondents indicated that they were aware of Sweet Home's Urban Forestry Program. The depth of knowledge that respondents had of the urban forestry program was not determined. However, one person commented that they did not know much about it. Ninety-two percent of all respondents indicated that they knew Sweet Home was a Tree City USA. One person commented that they did not know what Tree City USA meant.

Question 3.

Please indicate your opinion on how much emphasis the City of Sweet Home should place on the following categories of tree-related activity.

This was measured on a scale of one to five. These activities were placed into the following two groups based on analysis of the rankings.

GROUP ONE

- Street Tree Planting
- Street Tree Maintenance
- Park Tree Maintenance
- Tree Planting in Parks
- Arbor Day and Tree City USA

GROUP TWO

- Tree Maintenance Training to Homeowners
- Developing Information Programs
- Tree Planting on School Property

More emphasis should be placed on Street and Park Tree Planting and Care and Arbor Day/Tree City USA, than on developing, information and training programs for homeowners and planting trees on school properties. This is not to say that the City of Sweet Home

should not engage in activities listed in group two just that the respondents felt more emphasis should be placed on Street and park tree planting and care. While there was a significant difference between group one and group two no difference in emphasis was found between the elements in each group.

Comments included, "please stop topping of trees", "plant trees downtown", "plant trees in parking lots", and "plant trees on vacant land".

Question 4
Please indicate how much emphasis the City of Sweet Home should place on tree planting activities in specific areas of the community.

This was also ranked on a scale of one to five. The specific areas were placed into two groups based on the level of emphasis respondents thought should be placed on each item.

GROUP ONE
- Downtown
- Parks
- Commercial areas other than downtown
- Encourage planting on private property

GROUP TWO
- Residential streets
- School property
- Industrial areas

Respondents indicated that planting trees downtown, in commercial areas, in parks and on private property should receive more emphasis than plantings in areas listed in group two. Analysis of responses showed that no difference in emphasis for the items within each group.

Specific comments included; "under powerlines", "clusters of trees in parking lots", and "City entryways".

Discussion and Conclusion:

On the basis of the responses, tree planting and care in the downtown area and along Main Street should be emphasized by the City of Sweet Home and the Sweet Home Tree Commission. The median strip along Main Street was specifically mentioned as were planting at the entryways to town. It was emphasized that, "The entrance to the City can make or break a town." Planting along Long Street was also mentioned as a priority by one respondent.

Tree planting is associated with beauty. Beauty was mentioned in the comments by seven of the 15 respondents. One respondent wrote,

> "When I first drove through Sweet Home 20 years ago I can recall...how plain the city appeared. I have lived here since and ... Main Street still looks plain. Our City would look beautiful with lots of trees, especially along Highway 20.

Two respondents thanked the City and the Tree Commission for the good job they were doing. "Your doing a good job, keep it up.", and "Thanks for good efforts. As a timber ... and outdoor activity related town, ...beautification (tree, flower, shrub) ought to be visible and contribute to the town atmosphere....

Only two respondents voiced concerns about trees, specifically about the mess trees make, potential problems with utilities and about the need to prune, water, and spray trees.

One respondent wrote about the need to have programs in grade schools to teach the proper care of trees and to help kids gain proper understanding and respect at early age.

The need for an organized planting plan or theme was mentioned by three respondents. Two of these mentioned that they liked the idea of matching the species with the street name. Trees with flowers and good fall color were also mentioned.

While none of the tree related activities or specific areas listed for planting should be de-emphasized, it was surprising that tree planting on school property did not rank as high as street and park tree planting and care or as high as encouraging private property owners to plant trees. It was not surprising that the most emphasis on the planting should be in the downtown area, and commercial areas other than downtown.

The efforts of the City and the Tree Commission are appreciated and people believe that these efforts will lead to a more attractive community.

APPENDIX B -- SUMMARY OF PUBLIC MEETING

SUMMARY OF FEBRUARY 11 PUBLIC MEETING ON THE STREET AND PARK TREE PLANTING PLAN

1. INTRODUCTION

On February 11, 1993, Mike Reichenbach of Arboreal Enterprises and Bob Parker of MLP Associates met with members of the Sweet Home Tree Commission and with interested residents. The purpose of this meeting was to: (1) discuss a potential mission statement for the Street and Park Tree Plan; (2) identify goals and objectives; (3) identify specific projects; and (3) set priorities for potential project ideas.

The consulting team used several methods to facilitate discussion and input. First, we provided a draft mission statement with several potential goals. We asked persons attending to review the mission statement followed by a discussion of the statement and goals. This resulted in modifications to the mission statement and a refinement of the goals. Next, we provided individuals with a list of 13 potential policy statements and asked them to indicate their level of agreement (or disagreement) with the statements. We then tabulated the results and discussed of each individual statement. We asked participants to identify tree planting and other tree-related projects they thought should be included in the Street and Park Tree Plan. This was followed by a discussion of each project and prioritization of the projects. We concluded the meeting with a summary of input we received throughout the evening.

Six individuals attended the meeting including representatives of the general public, the Sweet Home Tree Commission, and the City of Sweet Home. Below is a summary of input we received.

2. DISCUSSION OF DRAFT MISSION STATEMENT AND GOALS

To facilitate discussion, we provided participants with a potential mission statement for the Street and Park Tree Plan. Below is the text of the proposed mission statement:

> The City of Sweet Home is undergoing a transition from timber-dependency to a diversified multi-resource economy. Several economic objectives such as recruiting new business, retaining existing business, and attracting retirees depend on an attractive, healthy urban appearance and environment. The economic health and appearance of the urban environment are critical to Sweet Home's health and quality of life. A comprehensive tree planting program will improve the health and appearance of Sweet Home's urban environment on a long term, systematic basis. Special consideration will be made for planting appropriate species and for a long term tree maintenance program.

> It is the goal of this program to facilitate the development of attractive residential, commercial, and industrial areas through the planting of trees. The design of the tree plantings should: (1) link the residential, commercial, and industrial areas with a common theme; and (2) enhance existing landscapes and buildings.

There was general consensus by participants that the mission statement was appropriate and should be included as a part of the Street and Park Tree Plan. The Tree Commission also reviewed the mission statement.

We also identified five potential goals for the plan as a basis for discussion. These goal statements are listed below:

1. To create a consistent pattern of tree planting along all rights-of-ways within the City a tree planting theme will be used.

2. To enhance air, water, and land resource qualities within the community.

3. To improve the visual quality of the city.

4. To fulfill peoples emotional needs for "peace" and "restfulness".

5. To compensate for the heat released from road surfaces, cool the area adjacent to paved surfaces and to sequester carbon released from the use of fossil fuels.

There was considerable discussion concerning the goals among participants. One participant suggested that Goal 3 should be combined with Goal 1. Participants also identified that an additional goal address educational opportunities and resident's needs with respect to the urban forest. Another suggested that the word noise be added to Goal 2 or to develop an additional goal that encourages the use of tree buffers for noise mitigation. Following the discussion, we asked participants to rank the goals. All of the participants ranked the combined Goal 1 and Goal 3 as the top priority. No general consensus existed with respect to the other goals.

Several comments were made with respect to the idea of a tree planting theme. Consensus existed with respect to the idea of themed plantings to street names.

Below is the list of refined goals.

1. To improve the visual quality of the city by creating a consistent pattern of tree planting along all rights-of-ways within the City through the use of a tree planting theme.

2. To enhance air, water, and land resource qualities within the community and to provide noise buffers.

3. To provide tree-related educational opportunities for all citizens of Sweet Home.

4. To fulfill peoples emotional needs for "peace" and "restfulness".

5. To compensate for the heat released from road surfaces, cool the area adjacent to paved surfaces and to sequester carbon released from the use of fossil fuels.

3. POTENTIAL TREE-RELATED POLICIES

Policies are important tools for implementing a plan and achieving the desired results. To further refine the scope of the Plan, we asked participants to indicate their level of agreement with 13 potential policy statements.[1]

There were two policy statements that the group believed were ambiguous. On these their was no clear agreement or disagreement. The first statement dealt with planting trees in *every* available space. The general objection to this statement was the word every. The suggestion was made that the word should every be changed to *desirable* or *planned* spaces. With this change the group could agree with the statement. The second statement addressed the subject of encouraging the planting of trees that attain heights of greater than 35 feet. Trees that attain such heights include medium as well as large shade trees. Considerable discussion focused on shade and general climatic characteristics of the region. From the responses and discussion it can be concluded that respondents are uncomfortable with large trees. This corresponds to other comments from our previous survey indicating that residents favor the use of small ornamental trees as opposed to shade trees. Shade is not always desired, especially during the Pacific Northwest winters. Large trees may also be viewed as threatening since their failure can cause considerable damage. However, medium and large shade trees are more easily seen than small ornamental trees. If Sweet Home is to be regarded as a Tree City, medium and large trees need to be planted. The City and the Tree Commission should address the concerns expressed by Sweet Home's residents about the use of large trees. It is recommended that an informational brochure be developed about the benefits and use of medium and large trees for street and park tree planting. Mike Reichenbach pointed out that there are limited opportunities for planting large trees in Sweet Home and that these opportunities should be capitalized on wherever possible. Participants understood this and generally agreed.

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[1] Participants were asked to rank their level of agreement with the policy statements on a scale of 2 to -2. A score of 2 indicated strong agreement, 0 indicated neutral, and -2 indicated strong disagreement.

TABLE 1. Policy Statements
GENERAL AGREEMENT WITH POLICY STATEMENT
The species of trees planted shall be suited to the climate, soils, and space available for planting.
Work with the utility companies to remove and replace trees growing under powerlines.
The City/Tree Commission will encourage the replanting of at least one tree for every tree that is removed.
The City/Tree Commission will encourage the planting of trees listed on a preferred species list.
The City/Tree Commission will establish an educational program on the proper planting and care of trees.
The City/Tree Commission will develop programs to encourage residents to plant trees in their front yards.
The City/Tree Commission shall develop standards for the maintenance of street trees.
New development and road construction shall incorporate space for planting trees by requiring planting strips.
No tree attaining a mature height of more than 35 feet shall be planted beneath or within 25 feet of overhead electrical utility lines excepting electrical service lines.
Native species and species that do not easily spread will be selected for planting.
GENERAL DISAGREEMENT WITH POLICY STATEMENT
New development and road construction shall incorporate space for planting trees by reducing road widths to accommodate trees.
NO CLEAR AGREEMENT OR DISAGREEMENT
Trees shall be planted along Sweet Home's rights-of-way in every available space.
The City/Tree Commission will encourage the use of tree species that attain heights of greater than 35 feet.

Source: Arboreal Enterprises/MLP Associates, 1993.

4. POTENTIAL TREE PLANTING PROJECTS

The final part of the meeting was devoted to identifying and setting priorities for specific projects. Participants identified a wide range of projects. We grouped these projects into four broad categories: (1) Highway 20/Main Street; (2) Other Streets; (3) Parks; and (4) other tree related projects. See table number 2.

In terms of priorities, participants ranked downtown the city entrances as the top priority. Park projects including the arboretum were also considered a important. Finally, development of a program recognizing persons by planting a tree received considerable comment.

Given the substantial challenge to planting trees in along Highway 20 and in the downtown area, participants identified several innovative projects. These include working with businesses to develop planting strips in parking lots, and encouraging private landowners to plant trees along Highway 20. Mike Reichenbach also pointed out that other opportunities exist to develop planting "islands" that extend out into the parking lane. The reduction in on street parking would be one to two spaces per block, thus enabling the creation of 2 to 4 islands per block.

Other project priorities included developing entryway plantings, and identification of planting opportunities on Long Street. Additional planting opportunities exist in planting strips that do not currently have trees. Such planting strips exist along 2nd Avenue, 10th Avenue, and Cedar Street.

A great deal of support existed for the development of an arboretum. One of the suggested locations for this arboretum was Sankey Park. It was suggested that the arboretum be located close to a school and include an interpretive trail. It was also suggested that the program to recognize persons through a tree planting might be one possible way to help fund the purchase of trees for the arboretum. Through such a program money for trees, tree planting and care, and for a name plate would be sought from donors wishing to recognize or honor someone.

TABLE 2. LIST OF POTENTIAL TREE PLANTING OR RELATED PROJECTS
HIGHWAY 20/MAIN STREET
Plant trees as buffers between the sidewalk and highway east of 18th Avenue on Highway 20
Encourage private owners to plant, especially along Highway 20 east of 18th
Landscaping berm on Highway 20 west of town
Work with downtown businesses to encourage donation of easements or cooperative plantings; Safeway, Speedy, Thriftway, A & W, Santiam Supply, and the Bowling Alley
Plant vacant lots along highway 20
Entryway plantings
Highway 20 TACO TIME to Cascadia
Plant trees on the vacant lot between Figaros and the New Era shop
Park benches along main street
STREETS OTHER THAN MAIN STREET
Plant a tree buffer between the rodeo grounds and adjacent residences
Themed planting to street names
Plant trees on South 2nd Avenue, 10th & Cedar, and other avenues that have empty planting strips
Investigate possible planting opportunities on Long Street and other streets
PARKS
Plant trees in the park off of Westwood Street
Plant trees at Northside Park
Develop a mini-park at 12th and main
OTHER
Develop an arboretum with interpretive trails in Sankey Park
Establish a planting recognition program of someone or some group. Incorporate into arboretum
Develop a landscaping ordinance
Develop a brochure and/or walking tour of unusual trees in Sweet Home
Donate trees; buy trees and donate in someone's name; work with nurseries to donate trees
Walking trail from Foster to the lake off of Poplar at 59th Ave
Developing a historic or heritage tree program

Source: Arboreal Enterprises/MLP Associates, 1993.

5. RANKING OF SEVEN TREE-RELATED PROJECT IDEAS

Seven tree-related project ideas, ideas that do not include tree planting, were ranked by tree commission members and the general public. The seven ideas, in priority order, are listed in Table 3.

TABLE 3. TREE-RELATED PROJECT IDEAS
STRONG SUPPORT
Develop an informational brochure on how to properly plant and prune trees.
Develop an educational brochure describing ordinances pertaining to trees.
Work with the utility company on a tree removal replacement and educational program for landowners.
Develop an ordinance protecting historic trees.
MODERATE SUPPORT
Identify trees that will be removed or damaged by future road construction projects.
Develop an informational bulletin for homeowners on how to hire a tree service.
WEAK SUPPORT
Encourage landowners to plant trees through a cost share program.

Source: Arboreal Enterprises/MLP Associates, 1993.

6. CONCLUSION

Comments made at the public meeting will be used to guide the development of Sweet Home's Street and Park Tree Planting Plan.

A mission statement with goals was identified for further consideration by the Sweet Home Tree Commission. Each of the project ideas will be addressed in the plan and may be incorporated into project blocks for future implementation. Although additional ideas will be considered planting priority is likely to be placed on Highway 20, entryways to the city, and parks.

APPENDIX C -- RESULTS OF THE SAMPLE INVENTORY

Consolidated Tree Data from all Sample Blocks 1

Planting Space Data All Sample Blocks . . . . . 2 & 3

Estimated Number of Trees and Planting Spaces by Block 4

Estimated Percentage of Trees by Size Class and Tree Type 5

CONSOLIDATED TREE DATA FROM ALL SAMPLE BLOCKS

City of Sweet Home, Sample Tree Inventory														
Consolidated data from all blocks														
Total Distance Covered in feet, 62825														
	Species													
		< 4" Caliper			4" Cal to 12" DBH			> 12" DBH			Totals			
		OK	Work	Dead	OK	Work	Dead	OK	Work	Dead	OK	Work	Dead	ALL
True fir	*Abies sp*	5			2	1					7	1	0	8
Maple	*Acer sp*	2			3	5		1	1		6	6	0	12
Alder	*Alnus sp*	2			3	2					5	2	0	7
Birch	*Betula sp*					1					0	1	0	1
White cedar	*Chamaecyparis sp*		1		1	1		3			4	2	0	6
Hawthorne	*Crateagus sp*	1			2	1					3	1	0	4
Chinese fir	*Cunninghamia sp*					1					0	1	0	1
Cypress	*Cupressus sp*	1									1	0	0	1
Ginkgo	*Ginkgo biloba*					1					0	1	0	1
Honey locust	*Gleditsia triacanthos*	1			2	1		2	1		5	2	0	7
Holly	*Ilex sp*	1	1						4		1	5	0	6
Walnut	*Juglans sp*				2	1			6		2	7	0	9
Juniper	*Juniperus sp*					1					0	1	0	1
Incense cedar	*Libocedrus decurrens*					1		7	1		7	2	0	9
Sweet gum	*Liquidambar styraciflua*					1			1		0	2	0	2
Apple	*Malus sp*	1			5	1		1	1		7	2	0	9
Misc	*Misc*	3	1		8	2		1			12	3	0	15
Spruce	*Picea*				1						1	0	0	1
Pine	*Pinus sp*				3	5		2	1		5	6	0	11
Poplar or Cottonwood	*Populus sp*				2	1		10			12	1	0	13
Cherry	*Prunus sp*	5			3	21		10	2		18	23	0	41
Douglas Fir	*Pseudotsuga menziesii*	51	3		48	6		111	4		210	13	0	223
Pear	*Pyrus sp*	2									2	0	0	2
Oak	*Quercus sp*	3			2	1		2	1		7	2	0	9
Buckthorn	*Rhamnus sp*					1					0	1	0	1
Sumac	*Rhus sp*	7									7	0	0	7
Black locust	*Robinia pseudoacacia*				2						2	0	0	2
Willow	*Salix sp*	3				1					3	1	0	4
Big Tree	*Sequoiadendron giganteum*		1					1			1	1	0	2
Red Cedar, Thuja	*Thuja sp*				3						3	0	0	3
											331	87	0	418
	TOTALS	88	7	0	92	57	0	151	23	0				418
# < 4"	95													
4" - 12"	149													
12" >	174													
Total trees	418													

PLANTING SPACE DATA
ALL SAMPLE BLOCKS

City of Sweet Home Sample Inventory							
Planting Spaces							
Block # 1							
half open, half in planting strip					Total		
					Planting		
		Small	Medium	Large	Needs	Topped	Replace
	Private				0		
	Public	11	26	25	62	10	
Distance sampled in feet	5125						
Planting spaces per mile	64						
Trees per mile	68						
Trees and Spaces per mile	132						
Block # 2							
Planting Strip							
		Small	Medium	Large		Topped	Replace
	Private	2	3		5	2	
	Public	33			33		
Distance sampled in feet	2350						
Planting spaces per mile	74						
Trees per mile	4						
Trees and Spaces per mile	79						
Block # 3							
Mainly open or no curb, 1000 feet planting strip							
		Small	Medium	Large		Topped	Replace
	Private	4	1	5	10	11	
	Public	208	25	10	243	8	4
Distance sampled in feet	18600						
Planting spaces per mile	69						
Trees per mile	15						
Trees and Spaces per mile	84						
Block # 4							
No curbs							
		Small	Medium	Large		Topped	Replace
	Private	19	2	5	26	7	
	Public	8	1	4	13	3	
Distance sampled in feet	4650						
Planting spaces per mile	15						
Trees per mile	14						
Trees and Spaces per mile	28						
Block # 6							
one-third planting strip, two-thirdsno curb							
		Small	Medium	Large		Topped	Replace
	Private	7		4	11	3	1
	Public	16	1	2	19	4	6
Distance sampled in feet	3550						
Planting spaces per mile	28						
Trees per mile	42						
Trees and Spaces per mile	70						

PLANTING SPACE DATA
ALL SAMPLE BLOCKS

Block # 7							
Sample area feet less than proposed due to non-existant streets							
		Small	Medium	Large		Topped	Replace
	Private	24		5	29	7	
	Public	22		19	41	4	2
Distance sampled in feet	4600						
Planting spaces per mile	47						
Trees per mile	17						
Trees and Spaces per mile	64						
Block # 8							
No curb or open							
		Small	Medium	Large		Topped	Replace
	Private	7	8	11	26		
	Public	25	19	16	60		2
Distance sampled in feet	8800						
Planting spaces per mile	36						
Trees per mile	53						
Trees and Spaces per mile	89						
Block # 10							
No curb or open							
		Small	Medium	Large		Topped	Replace
	Private	4		27	31		
	Public				0		
Distance sampled in feet	1900						
Planting spaces per mile	0						
Trees per mile	56						
Trees and Spaces per mile	56						
Block # 11							
Area sample is less than proposed due to non existent streets and land use patterns							
no curb							
		Small	Medium	Large		Topped	Replace
	Private	4	1	26	31	1	
	Public	21	2		23		
Distance sampled in feet	5200						
Planting spaces per mile	23						
Trees per mile	1						
Trees and Spaces per mile	24						
Block # 12							
open or no curb							
		Small	Medium	Large		Topped	Replace
	Private	29	13	7	49	1	
	Public	38	5	17	60	2	
Distance sampled in feet	8050						
Planting spaces per mile	39						
Trees per mile	87						
Trees and Spaces per mile	126						

ESTIMATED NUMBER OF TREES AND PLANTING SPACES BY BLOCK

Sweet Home has a total of 209,187 feet of street (excluding the downtown area)

Block	Feet of Street	Feet Sampled	percent of street area Sampled	w = percent of trees in block	Observed number of trees	Estimated number of trees per block	Observed number of S public spaces	Observed number of M public spaces	Observed number of L public spaces	Observed number of S private spaces	Observed number of M private spaces	Observed number of L private spaces	Observed Number of Topped Trees
1	14895	5125	34%	15.35%	66	192	11	21	15	0	0	0	10
2	7303	2350	32%	0.50%	2	6	33	0	0	2	3	0	2
3	40004	18600	46%	9.29%	54	116	208	25	10	4	1	5	23
4	26110	4650	18%	5.39%	12	67	8	1	4	19	2	5	10
6	8630	3550	41%	5.45%	28	68	16	1	2	7	0	4	14
7	36285	4600	13%	9.47%	15	118	22	0	19	24	0	5	13
8	28889	8800	30%	23.12%	88	289	25	19	16	7	8	11	2
10	6230	1900	30%	5.25%	20	66	0	0	0	4	0	27	0
11	21126	5200	25%	0.33%	1	4	21	2	0	4	1	26	1
12	19715	8050	41%	25.87%	132	323	38	5	17	29	13	7	3
	209187	62825	30%										
				100%	418	1250							
							Est tot/blk	Est tot/blk	Est tot/blk	Est tot/blk	Est tot/blk	Est tot/blk	Est tot/blk
							32	61	44	0	0	0	29
							103	0	0	6	9	0	6
							447	54	22	9	2	11	49
		Estimated # of trees		1250			45	6	22	107	11	28	56
							39	2	5	17	0	10	34
Est # of public spaces for small trees				1100			174	0	150	189	0	39	103
Est # of public spaces for medium trees				206			82	62	53	23	26	36	7
Est # of public spaces for large trees				336			0	0	0	13	0	89	0
		Total public spaces		1642			85	8	0	16	4	106	4
		Total trees and spaces		2892			93	12	42	71	32	17	7
Est # of private spaces for small trees				451			1100	206	336	451	85	335	295
Est # of private spaces for medium trees				85									
Est # of private spaces for large trees				335									
	Total space for trees on private			871									
	Est # of easily seen topped trees			295									

ESTIMATED PERCENTAGE OF TREES BY SIZE CLASS AND TREE TYPE

	Mature	Species	Size Classes												
	Tree		Less than 4" Caliper			4" Caliper to 12" DBH			Greater Than 12" DBH			Totals			By tree
	size		OK	Work	sum	OK	Work	sum	OK	Work	sum	OK	Work	ALL	type
broadleaf	large	Acer sp	0.43%	0.00%	0.43%	0.79%	0.99%	1.78%	0.25%	0.17%	0.42%	1.46%	1.16%	2.62%	
broadleaf	large	Alnus sp	0.53%	0.00%	0.53%	0.72%	0.46%	1.18%	0.00%	0.00%	0.00%	1.25%	0.46%	1.70%	
broadleaf	large	Ginkgo biloba	0.00%	0.00%	0.00%	0.00%	0.23%	0.23%	0.00%	0.00%	0.00%	0.00%	0.23%	0.23%	
broadleaf	large	Juglans sp	0.00%	0.00%	0.00%	0.34%	0.17%	0.52%	0.00%	2.41%	2.41%	0.34%	2.58%	2.93%	
broadleaf	large	Liquidambar styraciflua	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.00%	0.17%	0.17%	0.00%	0.34%	0.34%	
broadleaf	large	Misc	0.67%	0.23%	0.90%	2.10%	0.34%	2.45%	0.26%	0.00%	0.26%	3.03%	0.58%	3.61%	
broadleaf	large	Populus sp	0.00%	0.00%	0.00%	0.39%	0.17%	0.56%	2.63%	0.00%	2.63%	3.02%	0.17%	3.19%	
broadleaf	large	Quercus sp	0.87%	0.00%	0.87%	0.39%	0.17%	0.56%	0.46%	0.26%	0.72%	1.72%	0.43%	2.15%	
broadleaf	large	Robinia pseudoacacia	0.00%	0.00%	0.00%	0.53%	0.00%	0.53%	0.00%	0.00%	0.00%	0.53%	0.00%	0.53%	
broadleaf	large	Salix sp	0.79%	0.00%	0.79%	0.00%	0.33%	0.33%	0.00%	0.00%	0.00%	0.79%	0.33%	1.11%	18.42%
broadleaf	medium	Betula sp	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	
broadleaf	medium	Gleditsia triacanthos	0.23%	0.00%	0.23%	0.47%	0.20%	0.66%	0.39%	0.20%	0.59%	1.09%	0.39%	1.48%	
broadleaf	medium	Ilex sp	0.17%	0.23%	0.40%	0.00%	0.00%	0.00%	0.00%	0.69%	0.69%	0.17%	0.92%	1.09%	2.75%
broadleaf	small	Crateagus sp	0.26%	0.00%	0.26%	0.43%	0.17%	0.61%	0.00%	0.00%	0.00%	0.70%	0.17%	0.87%	
broadleaf	small	Malus sp	0.26%	0.00%	0.26%	1.50%	0.20%	1.70%	0.26%	0.45%	0.71%	2.03%	0.65%	2.67%	
broadleaf	small	Prunus sp	1.68%	0.00%	1.68%	0.79%	4.34%	5.13%	2.63%	0.89%	3.52%	5.10%	5.23%	10.33%	
broadleaf	small	Pyrus sp	1.26%	0.00%	1.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.26%	0.00%	1.26%	
broadleaf	small	Rhamnus sp	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	
broadleaf	small	Rhus sp	4.42%	0.00%	4.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.42%	0.00%	4.42%	19.72%
conifer		Abies sp	1.31%	0.00%	1.31%	0.34%	0.17%	0.52%	0.00%	0.00%	0.00%	1.66%	0.17%	1.83%	
conifer		Chamaecyparis sp	0.00%	0.23%	0.23%	0.17%	0.17%	0.34%	0.58%	0.00%	0.58%	0.76%	0.40%	1.16%	
conifer		Cunninghamia sp	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	
conifer		Cupressus sp	0.23%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.23%	
conifer		Juniperus sp	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	
conifer		Libocedrus decurrens	0.00%	0.00%	0.00%	0.00%	0.45%	0.45%	2.96%	0.63%	3.59%	2.96%	1.08%	4.04%	
conifer		Picea	0.00%	0.00%	0.00%	0.20%	0.00%	0.20%	0.00%	0.00%	0.00%	0.20%	0.00%	0.20%	
conifer		Pinus sp	0.00%	0.00%	0.00%	0.59%	0.86%	1.45%	0.46%	0.17%	0.63%	1.05%	1.03%	2.08%	
conifer		Pseudotsuga menziesii	10.98%	0.91%	11.89%	10.51%	1.50%	12.01%	23.58%	0.82%	24.40%	45.07%	3.24%	48.30%	
conifer		Sequoiadendron giganteum	0.00%	0.20%	0.20%	0.00%	0.00%	0.00%	0.20%	0.00%	0.20%	0.20%	0.20%	0.39%	
conifer		Thuja sp	0.00%	0.00%	0.00%	0.54%	0.00%	0.54%	0.00%	0.00%	0.00%	0.54%	0.00%	0.54%	59.11%
		total	24.09%	1.81%	25.90%	20.80%	11.78%	32.58%	34.65%	6.87%	41.52%	79.54%	20.46%	100.00%	100.00%

APPENDIX D -- ORDINANCES
TREE CITY USA, BULLETIN #9

TREE CITY USA
BULLETIN
for the
Friends of Tree City USA

Bulletin No. 9
James R. Fazio, Editor

How To Write a Municipal Tree Ordinance

Tree City USA is a powerful force for the promotion of tree care and urban forestry. It is a program that has caught the imagination of citizens, elected officials and urban tree professionals. Over 1,000 communities now fly the flag of membership, a composite area that is home to some 60 million Americans.

At the heart of the Tree City USA program are four basic requirements: The community must have (1) a tree board or department, (2) an annual community forestry program backed by the expenditure of at least $2 per capita for trees and tree care, (3) an annual Arbor Day proclamation and observance, and (4) a tree ordinance.

In this special issue of *Tree City USA Bulletin*, sections of a model ordinance are presented, explained and illustrated with actual examples. Not every section will be appropriate to all communities, and there are others in use that are not included in this general coverage of the topic.

The purpose of this issue is to provide a starting point for the thousands of communities that do not have an adequate tree ordinance. Although an ordinance is only as good as the administrative program that backs it up — including support for education and, when necessary, enforcement — a municipal tree ordinance and involvement in the Tree City USA program are giant strides in the direction of healthier urban trees and a quality environment.

John Rosenow

John Rosenow, Executive Director
National Arbor Day Foundation

Why a Tree Ordinance?

Ordinances reflect the values of a community, the values its residents believe are worth protecting to maintain their quality of life and an environment that is both safe and pleasant. A community's trees, often called the "urban forest," are very much the kind of community asset that deserves to be protected and managed for the common good.

A tree ordinance encourages beautification, air cooling and purification, noise abatement, property value enhancement and the other attributes of trees within a city. It also enables citizens to prevent and control the spread of diseases, to preserve trees in the path of development, and to avoid unnecessary costs associated with sewer clogging, sidewalk replacement and tree-related accidents. An ordinance may also give force and direction to professional tree care within the municipality's work force and helps control unscrupulous or careless operators.

Ordinances vary in length and complexity, but the key to effectiveness is to write the ordinance simply, clearly and tailored to the needs of *your* community. In the end, a tree ordinance is just another tool for proper tree care. Like any tool, it needs to be of high quality, matched properly to the job, and used with skill and care.

Behind the Model Ordinance

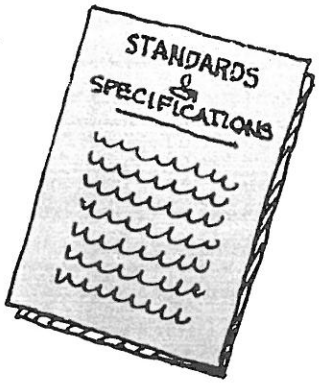
The ordinance sections and their descriptions that follow are based largely on the work of Philip J. Hoefer of the Colorado State Forest Service. His compilation resulted in a new publication, *Municipal Tree Ordinance Manual,* that was developed by the Municipal Arborists and Urban Foresters Society, a special interest group of the International Society of Arboriculture (ISA). The manual has been published by ISA and supersedes its earlier publication, *A Standard Municipal Tree Ordinance,* that has been widely used since 1972. We gratefully acknowledge permission by the author and the societies to use excerpts from their publication, and we encourage you to obtain a copy of the manual as referenced on page 8.

In its entirety, the manual consists of an introduction, sections for possible inclusion in an ordinance, three sample ordinances (one quite short, the other more comprehensive, and the 1972 standard ordinance), and a "standards and specifications" section. The latter consists of detailed guidelines to arboricultural practices such as planting and pruning, maintenance, removal, landscaping, contracting, and similar activities that are important in any community forestry program.

A standards and specifications section is recommended as a separate but companion part of a municipal ordinance. This is because including such a large amount of detail directly in the ordinance itself is cumbersome and difficult to change. For greater flexibility it is better to keep the ordinance brief, but to authorize the designated forestry body (board, commission or department) to promulgate rules, regulations, standards and specifications. These can be published separately and revised as necessary, but still be subject to final approval by the city council or other elected officials.

Importantly, each community has different circumstances that need to be addressed in an ordinance and its accompanying standards and specifications. Use the model ordinance sections and the ordinances of other communities as starting points for developing your own ordinance or to revise one that is not working well, but add or delete sections to match the unique needs and circumstances of *your* community. Be sure to use the services of an attorney to review or help write all drafts to assure that your final product is legally sound as well as beneficial to the future of your community's trees.

A workable ordinance should be short.



Detailed performance standards and specifications are best placed in a separate document.

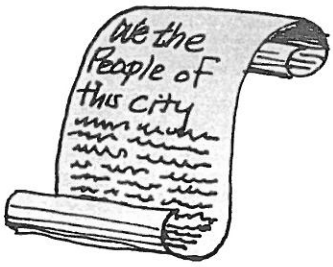
Suggested Sections for a Tree Ordinance

Although no two tree ordinances will be exactly alike, there are some basic elements that will help assure that the document is workable and effective. These elements are called *sections,* and they are presented here with examples and principles that illustrate *why* each one is necessary.

I. PURPOSE

PRINCIPLE: An opening statement that clearly sets forth the purpose of the ordinance will help avoid ambiguity in interpretation. This initial section is usually capitalized and in bold print.

Example: **IT IS THE PURPOSE OF THIS ORDINANCE TO PROMOTE AND PROTECT THE PUBLIC HEALTH, SAFETY, AND GENERAL WELFARE BY PROVIDING FOR THE REGULATION OF THE PLANTING, MAINTENANCE, AND REMOVAL OF TREES, SHRUBS, AND OTHER PLANTS WITHIN THE CITY OF _____ .**



A clearly stated purpose prevents misinterpretation.

II. AUTHORITY AND POWER

PRINCIPLE: Someone within city government must have the clearly designated authority to administer the provisions of the ordinance. This section defines, designates, or creates a department, board, commission, or person responsible for the planting, care, and protection of the city's trees.

Example: There is hereby created and established a City Tree Board for the City of _____, which shall consist of five members, citizens and residents of this city, who shall be appointed by the mayor with the approval of the city council. Members of the board shall serve without compensation.

[HOME RULE AUTHORITY: In order to avoid conflicts with state laws governing trees, a statement transferring regulations to the city may be necessary. State, county and city laws will explain this process. If needed, the statement should be added as a section.]

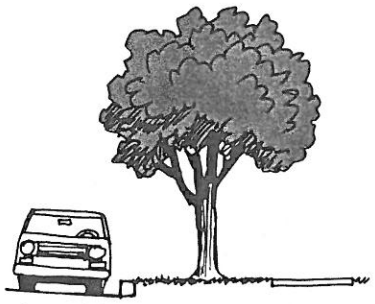
A tree ordinance and tree board or commission usually go hand in hand. Limited and staggered terms of office lend vitality and continuity to a board.

III. TERM OF OFFICE

PRINCIPLE: Reasonable and clearly stated terms of office for volunteer boards or commissions will help infuse the program with new ideas on a periodic basis and will help avoid the problems created by obstructionists with life or long-term tenure. This section defines length of service, a method for filling vacancies, and the number of consecutive terms (if any) that can be served. Staggering terms can help assure continuity and stability.

Example: The term of the five persons to be appointed by the mayor shall be three years, except that the term of two of the members appointed to the first board shall be for only one year and the term of two members of the first board shall be for two years. In the event that a vacancy shall occur during the term of any member, his or her successor shall be appointed for the unexpired portion of the term.

An ordinance must specify what property it covers, such as...

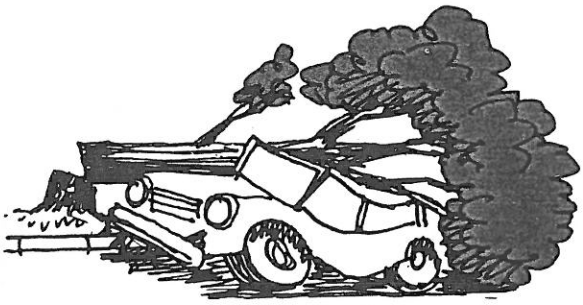


...along rights-of-way

...in public parks

...in cemeteries.

A license requirement protects both trees *and* property owners.



An insurance provision helps protect city government and unwary home or business owners who hire someone to do tree work.

IV. APPLICABILITY

PRINCIPLE: This section is needed to make it clear what property is covered by the ordinance. This usually includes trees on rights-of-way, public parks, cemeteries, and other public grounds, and sometimes even on private property.

Example: This ordinance provides full power and authority over all trees, plants and shrubs located within street rights-of-way, parks and public places of the city; and to trees, plants and shrubs located on private property that constitute a hazard or threat as described herein.

V. DEFINITIONS

PRINCIPLE: To prevent misunderstanding, words that may be unfamiliar to lay citizens should be defined. If a standards and specifications appendix accompanies the ordinance, many arboricultural terms can be placed there instead of in this section.

Examples of words or terms to define: arborist, contractor, city forester or city arborist, tree, public tree, private tree, tree lawn, parkway, right-of-way, easement, etc.

VI. LICENSING

PRINCIPLE: One way to protect trees *and* citizens from irresponsible companies or individuals who pose as arborists is to require practitioners to have a license. Conditions for obtaining the license may even require that the person be a *certified* arborist. (See Bulletin No. 6.) This section provides licensing authority and includes details such as fees, frequency of renewal, testing procedures, types of licenses, suspensions and appeals, surety bonds, showing identification on equipment, etc.

Example: It shall be unlawful for any person to engage in the business of planting, cutting, trimming, pruning, removing, spraying, or otherwise treating trees, shrubs or vines within the City without first producing evidence of certification/license before the City. (An explanation of requirements and fees is then presented.)

VII. INSURANCE

PRINCIPLE: Arborists work under dangerous circumstances and around high value property. Since it is often difficult for homeowners to ascertain whether property and tree workers are adequately covered, or to insist on such coverage, a provision in the tree ordinance can easily correct the situation.

Example: Before any license shall be issued, each applicant shall first file evidence of possession of liability insurance in the minimum amounts of $300,000 for bodily injury or death and $100,000 property damage indemnifying the City or any person injured or damaged resulting from the pursuit of such endeavor as herein described.

VIII. LANDSCAPING

PRINCIPLE: This section can assure that trees will be a part of new developments. But planted vegetation can be an asset or a liability — depending on what is planted and how it is done. This part of the ordinance can define a process for having new landscape plans reviewed and approved by the city forester or tree board, with the issuance of building permits only after such a review.

Example: In new subdivisions or when the development of commercial property occurs, the city forester will review landscaping plans and may require street trees to be planted in any of the streets, parking lots, parks and other public places abutting lands henceforth developed and/or subdivided.

IX. TREE PLANTING, MAINTENANCE, AND REMOVAL

PRINCIPLE: Good tree care and management is possible only if people have specific information about practices that result in safe, healthy trees that contribute to a quality environment rather than create problems. The purpose of this section is to provide that information in the form of requirements. In many ways, it is the heart of a good ordinance. Actually, the material in this section is best included in a separate standards and specifications chapter, but placing it directly in the ordinance is an option. Either way, all specifications should be reviewed at least every five years, and should include such specifics as desirable and undesirable tree species, spacing, pruning techniques, hazardous trees, sight obstruction, and vandalism.

Examples:

Tree Species — The Town Tree Board develops and maintains a list of desirable trees for planting along streets in three size classes: small, medium and large. A list of trees not suitable for planting will also be created and enforced by the Tree Board.

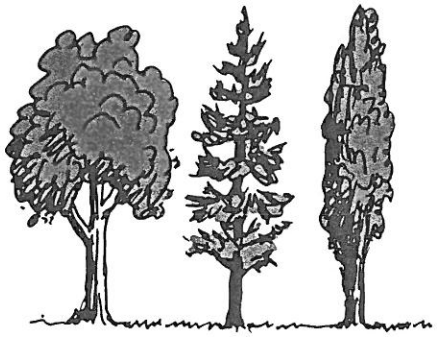
Spacing — The spacing of street trees will be in accordance with the three species size classes listed in this ordinance, and no trees may be planted closer together than the following: small trees, 30 feet; medium trees, 40 feet; and large trees, 50 feet; except in special plantings designed or approved by a landscape architect.

Utilities — No street trees other than those species listed herein as small trees may be planted under or within 10 lateral feet of any overhead utility wire, or over or within 5 lateral feet of any underground water line, sewer line, transmission line or other utility.

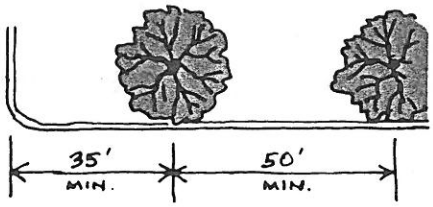
Distance from Curb and Sidewalk — The distance trees may be planted from curbs or curblines and sidewalks will be in accordance with the three species size classes listed in Section ___ of this ordinance, and no trees may be planted closer to any curb or sidewalk than the following: small trees, 2 feet; medium trees, 3 feet; and large trees, 4 feet.

Topping — It shall be unlawful as a normal practice for any person, firm, or city department to top any street tree, park tree, or other tree on public property. Topping is defined as the severe cutting back of limbs to stubs within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree. Trees severely damaged by storms or other causes, or certain trees under utility wires or other obstructions where other pruning practices are impractical may be exempted from this ordinance at the determination of the City Tree Board.

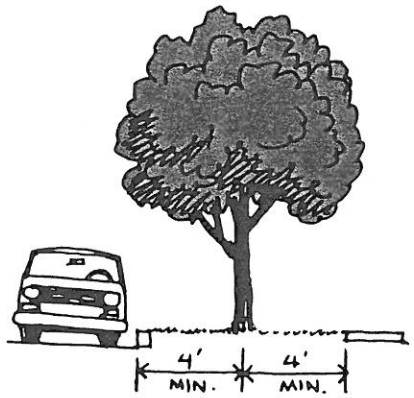
Important details of planting and tree care can be placed in the ordinance or in an appendix, or, better, in a separate standards document. Specification examples include...



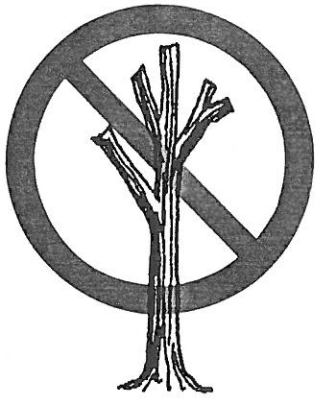
...suitable species



...spacing



...a distance from curb and sidewalk

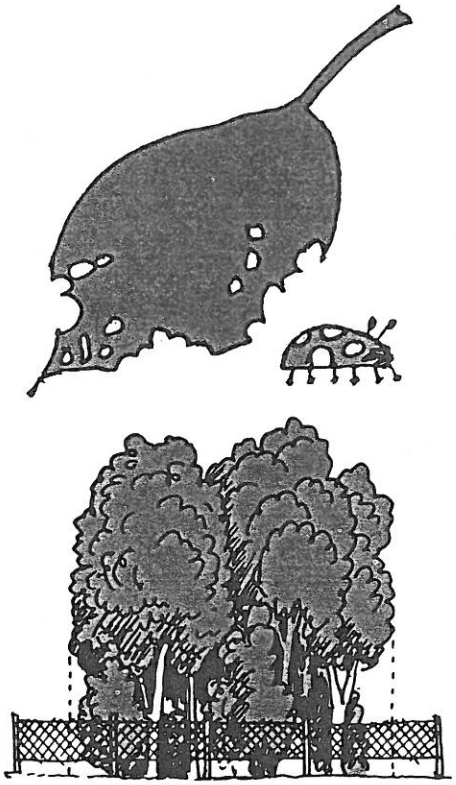


...and acceptable pruning practices.

X. ADJACENT LANDOWNER RESPONSIBILITY

PRINCIPLE: Quite naturally, homeowners often want to plant trees or do work on trees that abut their property but are on a public right-of-way. This section describes a process by which the homeowner can do the work, but only in accordance with the sound principles of urban forest management and arboriculture.

Example: No person shall plant, remove, cut above the ground, or disturb any tree on any street, park, or other public place without first filing an application and procuring a permit from the city forester. The person receiving the permit shall abide by the standards set forth in this ordinance.



A protection provision is important for safeguarding mature trees and other existing vegetation from insects, construction damage or, in some cases, removal.

XI. TREE PROTECTION

PRINCIPLE: Protecting existing trees is a major challenge. Therefore, more and more progressive communities are using this section not only to prevent insect and disease epidemics, but also to protect trees on both public and private property from damage during construction. Increasingly, another use of this section is to identify and protect trees of historic value or unusual qualities (called *landmark trees).* Requiring permits for *all* tree removals is one way to achieve these goals.

Example 1:

Upon the discovery of any destructive or communicable disease or other pestilence which endangers the growth or health of trees, or threatens to spread disease or insect infestations, the city forester shall at once cause written notice to be served upon the owner of the property upon which such diseased or infested tree is situated, and the notice shall require such property owner to eradicate, remove or otherwise control such condition within reasonable time to be specified in such notice.

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The following guidelines and standards shall apply to trees proposed (in a developer's "tree protection plan") to be retained... (Rules are then specified such as not grading or locating utilities within the tree's dripline, placing protective barriers around trees, preventing siltation, etc. Or, developers may be required to preserve a percent of forested tracts, plant trees in open space, or pay into a county tree planting fund so that there is no net loss of tree cover.)

Example 3:

The city forester shall have as one of his/her duties the location, selection and identification of any trees which qualify as "Landmark Trees." A tree may qualify as a Landmark Tree if it meets one or more of the following criteria: (Criteria may include species rarity, old age, association with a historical event or person, abnormality, scenic enhancement, etc.)

Action by officials is sometimes needed on private property for purposes of public safety.

XII. PRIVATE TREES

PRINCIPLE: Since trees on private property often affect the safety and welfare of other trees and people other than the owner, a provision is needed to allow community action in such cases. This section provides authority to inspect private trees and designate them as public nuisances when necessary.

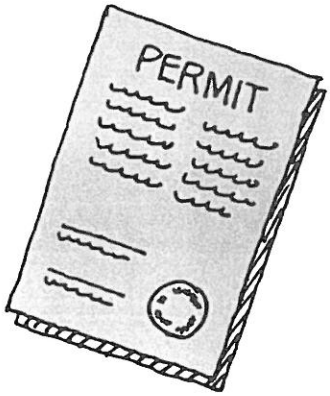
Example: The city forester or his/her official designee has the authority to enter onto private property whereon there is located a tree, shrub, plant or plant part that is suspected to be a public nuisance. (Note: An appropriate legal definition of a public nuisance is needed here, such as *any tree with an infectious disease or insect problem; dead or dying trees; a tree or limb(s) that obstruct street lights, traffic signs, the free passage of pedestrians or vehicles; a tree that poses a threat to safety, etc.* Also needed is a description of the legal process for notifying property owners and causing abatement of the nuisance.)

XIII. PERMITS

PRINCIPLE: Permits provide a way to make certain that anyone who plants, does work on or removes a public tree (and sometimes private trees) is knowledgeable and capable of doing the job right. Permits also are a means to assure compliance with standards and specifications, allow for follow-up inspections, and generally serve as a tool for enabling a community to control the future of its urban forest.

Example: No person except the City Arborist, his/her agent, or a contractor hired by the City Arborist may perform any of the following acts without first obtaining from the City Arborist a permit for which no fee shall be charged: (treatments and actions are listed, each one specifying whether it applies to trees on public land or to any tree, public or private).

Note: An example of a permit form is included in the MAUFS/ISA "Municipal Tree Ordinance Manual."

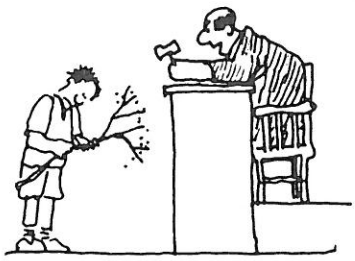


Permits help make sure everyone knows the rules and best practices before doing tree work.

XIV. ENFORCEMENT

PRINCIPLE: For an ordinance to be more than a piece of paper, authority must be given to the city forester or other official to enforce the provisions. This includes the right to issue notices of violations, notices to perform work and to stop work.

Example: The city forester shall have the power to promulgate and enforce rules, regulations and specifications concerning the trimming, spraying, removal, planting, pruning and protection of trees, shrubs, vines, hedges and other plants upon the right-of-way of any street, alley, sidewalk, or other public place in the city. (Details about the process of rule-making, review and approval by the governing body, and enforcement need to be included.)



The legal process to be used against violators must be clearly spelled out.

XV. PENALTIES, CLAIMS AND APPEALS

PRINCIPLE: Enforceable, meaningful ordinances must contain provisions for penalties and violations. Most cities have standard statements that will work in a tree ordinance, or one may be written specifically related to trees. There needs to be a process for the city to do needed work if a landowner fails to comply with an order, and an appeal route.

Examples: *Violations* — Any person who violates any provision of this ordinance or who fails to comply with any notice issued pursuant to provisions of the ordinance, upon being found guilty of violation, shall be subject to a fine not to exceed $500 for each separate offense. Each day during which any violation of the provisions of this ordinance shall occur or continue shall be a separate offense. If, as the result of the violation of any provision of this ordinance, the injury, mutilation, or death of a tree, shrub, or other plant located on city-owned property is caused, the cost of repair or replacement of such tree, shrub, or other plant shall be borne by the party in violation. The replacement value of trees and shrubs shall be determined in accordance with the latest revision of *A Guide to the Professional Evaluation of Landscape Trees, Specimen Shrubs, and Evergreens,* as published by the International Society of Arboriculture.

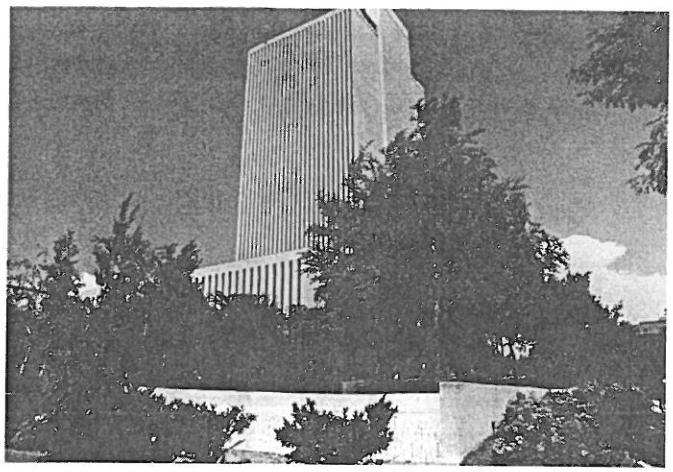
Assessment of Claim — In the event that a nuisance is not abated by the date specified in the notice, the City Arborist is authorized to cause the abatement of said nuisance. The reasonable cost of such abatement shall be filed as a lien against the property on which the nuisance was located. In addition, the owner of the property upon which the nuisance was located shall be subject to prosecution.

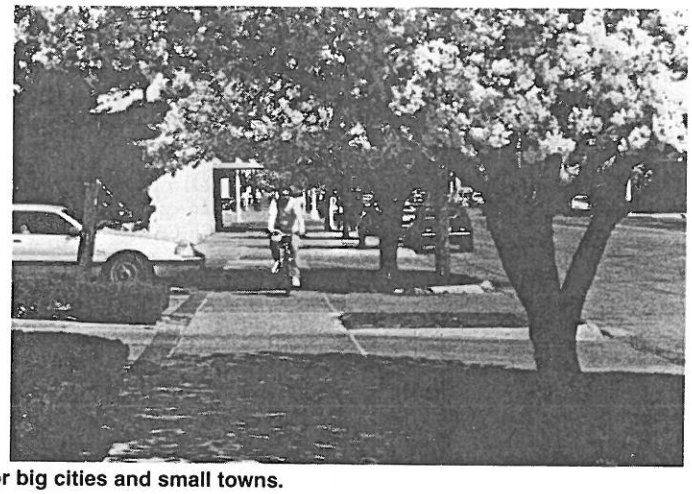
Appeals — (Include your municipality's standard appeals process.)

Each community's ordinance must be written to serve that community's unique needs and circumstances.

XVI. OTHER

Because circumstances vary so widely between municipalities, there may be other sections necessary to fashion an ordinance to the needs of your community. These range from sections that local government may require in all its ordinances (such as a severability clause that states that if any section of the ordinance is found to be invalid or unconstitutional, it does not affect the validity of remaining sections) to how the urban forestry program is to be financed. The ordinance must fit your town's needs.





Tree ordinances are important for big cities and small towns.

Other Sources of Information

Tree City USA Bulletin will inform readers of helpful, up-to-date publications which provide more depth or that are readily available for community distribution. The editor welcomes sample copies to consider for inclusion in future editions.

It is recommended that anyone developing a new tree ordinance or revising an existing one first obtain a copy of the following manual. Sale price is $25.00.

Municipal Tree Ordinance Manual
International Society of Arboriculture
P.O. Box 908
Urbana, IL 61801

Copies of tree ordinances from other cities will be invaluable in deciding what to include and how to fashion the language in your ordinance. Below is an excellent example of a tree ordinance that has been attractively reproduced for public distribution. Fort Collins' urban forester, Tim Buchanan, has also written a model standards and specifications document as a companion to the tree ordinance.

Contact:
Office of the City Forester
Parks & Recreation Department
413 S. Bryan
Fort Collins, CO 80521

For copies of other exemplary tree ordinances, including those with strong provisions for protecting existing trees (See Section XI), contact The National Arbor Day Foundation.

American Forestry Association and the National Urban Forest Council are offering assistance to communities facing the ordinance dilemma through an urban-forestry information system called TreeNet. Information on TreeNet can be obtained by writing TreeNet, P.O. Box 52105, Durham, NC 27717, or calling (919) 493-1087.

For a historical and national overview of tree ordinances, articles in professional journals may be reviewed. These include:

Journal of Forestry (5400 Grosvenor Lane, Bethesda, MD 20814)
"Protecting Privately Owned Urban Woodlands: Trends in Municipal Tree Ordinances." 1976, pp. 622-624.

Journal of Arboriculture (P.O. Box 908, Urbana, IL 61801)
"Ordinance Control of Street Trees." 1975, pp. 212-216.
"Challenges of Municipal Arboriculture." 1976, pp. 217-220.
"An Analysis of Tree Ordinances: The Example of New Jersey." 1977, pp. 191-197,
"Street Tree Policies in Ohio Towns." 1980, pp. 185-191.
"A Tree Management Ordinance for Huntsville, Alabama." 1982, pp. 81-82.
"Municipal Ordinances' Relation to Trees." 1982, pp. 128-136.
"Municipal Tree Management in New Jersey." 1984, pp. 229-235.

To order additional Bulletin copies... Friends of Tree City USA members may obtain a single copy of any Tree City USA Bulletin free of cost. Quantities of any issue are available at 25 for $6.25 or 500 for $100. To order, specify the issue number and quantity, and make your check payable to: The National Arbor Day Foundation, 100 Arbor Avenue, Nebraska City, NE 68410.

The Bulletins available are:

- No. 1 *How to Prune Young Shade Trees*
- No. 2 *When a Storm Strikes*
- No. 3 *Resolving Tree-Sidewalk Conflicts*
- No. 4 *The Right Tree for the Right Place*
- No. 5 *Living with Urban Soils*
- No. 6 *How to Hire an Arborist*
- No. 7 *How to Save Trees During Construction*
- No. 8 *Don't Top Trees!*
- No. 9 *How to Write a Municipal Tree Ordinance*

To Join the Friends of Tree City USA... to receive a subscription to the Tree City USA Bulletin...and to become more involved in the urban forestry movement in your town and throughout America, send a $10 dues-donation to Friends of Tree City USA, National Arbor Day Foundation, 100 Arbor Avenue, Nebraska City, NE 68410. Make your check payable to National Arbor Day Foundation.

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TREE CITY USA

The Tree City USA program is sponsored by The National Arbor Day Foundation in cooperation with the U.S. Forest Service and National Association of State Foresters. To achieve the national recognition of being named as a Tree City USA, a town or city must meet four standards:

Standard 1: A Tree Board or Department
Standard 2: A City Tree Ordinance
Standard 3: An Annual Community Forestry Program
Standard 4: An Arbor Day Observance and Proclamation

Each winning community receives a Tree City USA flag, plaque, and community entrance signs. Towns and cities of every size can qualify. Tree City USA application forms are available from your state forester or The National Arbor Day Foundation.

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TREE CITY USA
BULLETIN
for the
Friends of Tree City USA

Bulletin No. 9
James R. Fazio, Editor

How To Write a Municipal Tree Ordinance

Tree City USA is a powerful force for the promotion of tree care and urban forestry. It is a program that has caught the imagination of citizens, elected officials and urban tree professionals. Over 1,000 communities now fly the flag of membership, a composite area that is home to some 60 million Americans.

At the heart of the Tree City USA program are four basic requirements: The community must have (1) a tree board or department, (2) an annual community forestry program backed by the expenditure of at least $2 per capita for trees and tree care, (3) an annual Arbor Day proclamation and observance, and (4) a tree ordinance.

In this special issue of *Tree City USA Bulletin*, sections of a model ordinance are presented, explained and illustrated with actual examples. Not every section will be appropriate to all communities, and there are others in use that are not included in this general coverage of the topic.

The purpose of this issue is to provide a starting point for the thousands of communities that do not have an adequate tree ordinance. Although an ordinance is only as good as the administrative program that backs it up — including support for education and, when necessary, enforcement — a municipal tree ordinance and involvement in the Tree City USA program are giant strides in the direction of healthier urban trees and a quality environment.

John Rosenow

John Rosenow, Executive Director
National Arbor Day Foundation

Why a Tree Ordinance?

Ordinances reflect the values of a community, the values its residents believe are worth protecting to maintain their quality of life and an environment that is both safe and pleasant. A community's trees, often called the "urban forest," are very much the kind of community asset that deserves to be protected and managed for the common good.

A tree ordinance encourages beautification, air cooling and purification, noise abatement, property value enhancement and the other attributes of trees within a city. It also enables citizens to prevent and control the spread of diseases, to preserve trees in the path of development, and to avoid unnecessary costs associated with sewer clogging, sidewalk replacement and tree-related accidents. An ordinance may also give force and direction to professional tree care within the municipality's work force and helps control unscrupulous or careless operators.

Ordinances vary in length and complexity, but the key to effectiveness is to write the ordinance simply, clearly and tailored to the needs of *your* community. In the end, a tree ordinance is just another tool for proper tree care. Like any tool, it needs to be of high quality, matched properly to the job, and used with skill and care.

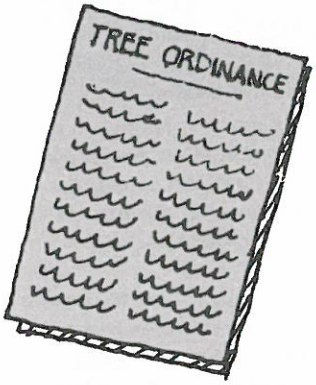
Behind the Model Ordinance

The ordinance sections and their descriptions that follow are based largely on the work of Philip J. Hoefer of the Colorado State Forest Service. His compilation resulted in a new publication, *Municipal Tree Ordinance Manual,* that was developed by the Municipal Arborists and Urban Foresters Society, a special interest group of the International Society of Arboriculture (ISA). The manual has been published by ISA and supersedes its earlier publication, *A Standard Municipal Tree Ordinance,* that has been widely used since 1972. We gratefully acknowledge permission by the author and the societies to use excerpts from their publication, and we encourage you to obtain a copy of the manual as referenced on page 8.

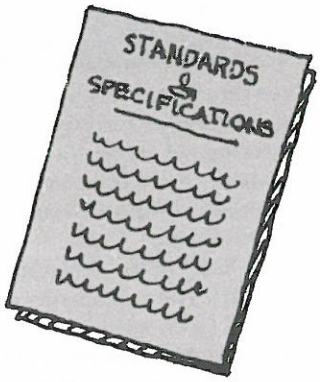
In its entirety, the manual consists of an introduction, sections for possible inclusion in an ordinance, three sample ordinances (one quite short, the other more comprehensive, and the 1972 standard ordinance), and a "standards and specifications" section. The latter consists of detailed guidelines to arboricultural practices such as planting and pruning, maintenance, removal, landscaping, contracting, and similar activities that are important in any community forestry program.

A standards and specifications section is recommended as a separate but companion part of a municipal ordinance. This is because including such a large amount of detail directly in the ordinance itself is cumbersome and difficult to change. For greater flexibility it is better to keep the ordinance brief, but to authorize the designated forestry body (board, commission or department) to promulgate rules, regulations, standards and specifications. These can be published separately and revised as necessary, but still be subject to final approval by the city council or other elected officials.

Importantly, each community has different circumstances that need to be addressed in an ordinance and its accompanying standards and specifications. Use the model ordinance sections and the ordinances of other communities as starting points for developing your own ordinance or to revise one that is not working well, but add or delete sections to match the unique needs and circumstances of *your* community. Be sure to use the services of an attorney to review or help write all drafts to assure that your final product is legally sound as well as beneficial to the future of your community's trees.



A workable ordinance should be short.



Detailed performance standards and specifications are best placed in a separate document.

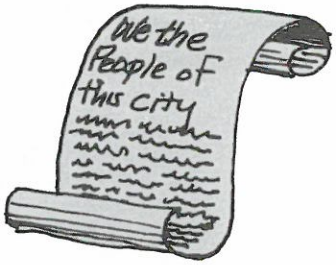
Suggested Sections for a Tree Ordinance

Although no two tree ordinances will be exactly alike, there are some basic elements that will help assure that the document is workable and effective. These elements are called *sections,* and they are presented here with examples and principles that illustrate *why* each one is necessary.

I. PURPOSE

PRINCIPLE: An opening statement that clearly sets forth the purpose of the ordinance will help avoid ambiguity in interpretation. This initial section is usually capitalized and in bold print.

Example: **IT IS THE PURPOSE OF THIS ORDINANCE TO PROMOTE AND PROTECT THE PUBLIC HEALTH, SAFETY, AND GENERAL WELFARE BY PROVIDING FOR THE REGULATION OF THE PLANTING, MAINTENANCE, AND REMOVAL OF TREES, SHRUBS, AND OTHER PLANTS WITHIN THE CITY OF _____ .**



A clearly stated purpose prevents misinterpretation.

II. AUTHORITY AND POWER

PRINCIPLE: Someone within city government must have the clearly designated authority to administer the provisions of the ordinance. This section defines, designates, or creates a department, board, commission, or person responsible for the planting, care, and protection of the city's trees.

Example: There is hereby created and established a City Tree Board for the City of _____, which shall consist of five members, citizens and residents of this city, who shall be appointed by the mayor with the approval of the city council. Members of the board shall serve without compensation.

[HOME RULE AUTHORITY: In order to avoid conflicts with state laws governing trees, a statement transferring regulations to the city may be necessary. State, county and city laws will explain this process. If needed, the statement should be added as a section.]

A tree ordinance and tree board or commission usually go hand in hand. Limited and staggered terms of office lend vitality and continuity to a board.

III. TERM OF OFFICE

PRINCIPLE: Reasonable and clearly stated terms of office for volunteer boards or commissions will help infuse the program with new ideas on a periodic basis and will help avoid the problems created by obstructionists with life or long-term tenure. This section defines length of service, a method for filling vacancies, and the number of consecutive terms (if any) that can be served. Staggering terms can help assure continuity and stability.

Example: The term of the five persons to be appointed by the mayor shall be three years, except that the term of two of the members appointed to the first board shall be for only one year and the term of two members of the first board shall be for two years. In the event that a vacancy shall occur during the term of any member, his or her successor shall be appointed for the unexpired portion of the term.

An ordinance must specify what property it covers, such as...

...along rights-of-way

...in public parks

...in cemeteries.

A license requirement protects both trees *and* property owners.

An insurance provision helps protect city government and unwary home or business owners who hire someone to do tree work.

IV. APPLICABILITY

PRINCIPLE: This section is needed to make it clear what property is covered by the ordinance. This usually includes trees on rights-of-way, public parks, cemeteries, and other public grounds, and sometimes even on private property.

Example: This ordinance provides full power and authority over all trees, plants and shrubs located within street rights-of-way, parks and public places of the city; and to trees, plants and shrubs located on private property that constitute a hazard or threat as described herein.

V. DEFINITIONS

PRINCIPLE: To prevent misunderstanding, words that may be unfamiliar to lay citizens should be defined. If a standards and specifications appendix accompanies the ordinance, many arboricultural terms can be placed there instead of in this section.

Examples of words or terms to define: arborist, contractor, city forester or city arborist, tree, public tree, private tree, tree lawn, parkway, right-of-way, easement, etc.

VI. LICENSING

PRINCIPLE: One way to protect trees *and* citizens from irresponsible companies or individuals who pose as arborists is to require practitioners to have a license. Conditions for obtaining the license may even require that the person be a *certified* arborist. (See Bulletin No. 6.) This section provides licensing authority and includes details such as fees, frequency of renewal, testing procedures, types of licenses, suspensions and appeals, surety bonds, showing identification on equipment, etc.

Example: It shall be unlawful for any person to engage in the business of planting, cutting, trimming, pruning, removing, spraying, or otherwise treating trees, shrubs or vines within the City without first producing evidence of certification/license before the City. (An explanation of requirements and fees is then presented.)

VII. INSURANCE

PRINCIPLE: Arborists work under dangerous circumstances and around high value property. Since it is often difficult for homeowners to ascertain whether property and tree workers are adequately covered, or to insist on such coverage, a provision in the tree ordinance can easily correct the situation.

Example: Before any license shall be issued, each applicant shall first file evidence of possession of liability insurance in the minimum amounts of $300,000 for bodily injury or death and $100,000 property damage indemnifying the City or any person injured or damaged resulting from the pursuit of such endeavor as herein described.

VIII. LANDSCAPING

PRINCIPLE: This section can assure that trees will be a part of new developments. But planted vegetation can be an asset or a liability — depending on what is planted and how it is done. This part of the ordinance can define a process for having new landscape plans reviewed and approved by the city forester or tree board, with the issuance of building permits only after such a review.

Example: In new subdivisions or when the development of commercial property occurs, the city forester will review landscaping plans and may require street trees to be planted in any of the streets, parking lots, parks and other public places abutting lands henceforth developed and/or subdivided.

IX. TREE PLANTING, MAINTENANCE, AND REMOVAL

PRINCIPLE: Good tree care and management is possible only if people have specific information about practices that result in safe, healthy trees that contribute to a quality environment rather than create problems. The purpose of this section is to provide that information in the form of requirements. In many ways, it is the heart of a good ordinance. Actually, the material in this section is best included in a separate standards and specifications chapter, but placing it directly in the ordinance is an option. Either way, all specifications should be reviewed at least every five years, and should include such specifics as desirable and undesirable tree species, spacing, pruning techniques, hazardous trees, sight obstruction, and vandalism.

Examples:

Tree Species — The Town Tree Board develops and maintains a list of desirable trees for planting along streets in three size classes: small, medium and large. A list of trees not suitable for planting will also be created and enforced by the Tree Board.

Spacing — The spacing of street trees will be in accordance with the three species size classes listed in this ordinance, and no trees may be planted closer together than the following: small trees, 30 feet; medium trees, 40 feet; and large trees, 50 feet; except in special plantings designed or approved by a landscape architect.

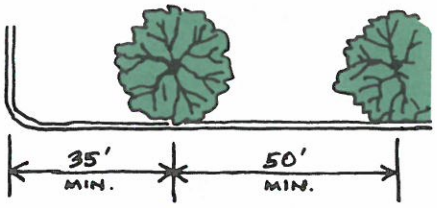
Utilities — No street trees other than those species listed herein as small trees may be planted under or within 10 lateral feet of any overhead utility wire, or over or within 5 lateral feet of any underground water line, sewer line, transmission line or other utility.

Distance from Curb and Sidewalk — The distance trees may be planted from curbs or curblines and sidewalks will be in accordance with the three species size classes listed in Section ___ of this ordinance, and no trees may be planted closer to any curb or sidewalk than the following: small trees, 2 feet; medium trees, 3 feet; and large trees, 4 feet.

Topping — It shall be unlawful as a normal practice for any person, firm, or city department to top any street tree, park tree, or other tree on public property. Topping is defined as the severe cutting back of limbs to stubs within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree. Trees severely damaged by storms or other causes, or certain trees under utility wires or other obstructions where other pruning practices are impractical may be exempted from this ordinance at the determination of the City Tree Board.

Important details of planting and tree care can be placed in the ordinance or in an appendix, or, better, in a separate standards document. Specification examples include...

...suitable species



...spacing

...a distance from curb and sidewalk

...and acceptable pruning practices.

X. ADJACENT LANDOWNER RESPONSIBILITY

PRINCIPLE: Quite naturally, homeowners often want to plant trees or do work on trees that abut their property but are on a public right-of-way. This section describes a process by which the homeowner can do the work, but only in accordance with the sound principles of urban forest management and arboriculture.

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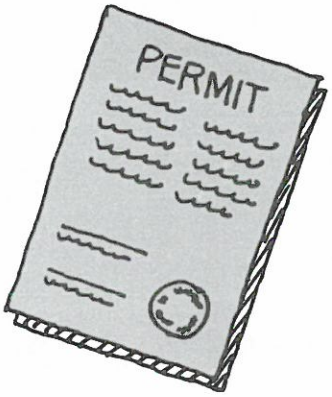
Example: No person except the City Arborist, his/her agent, or a contractor hired by the City Arborist may perform any of the following acts without first obtaining from the City Arborist a permit for which no fee shall be charged: (treatments and actions are listed, each one specifying whether it applies to trees on public land or to any tree, public or private).

Note: An example of a permit form is included in the MAUFS/ISA "Municipal Tree Ordinance Manual."



Permits help make sure everyone knows the rules and best practices before doing tree work.

XIV. ENFORCEMENT

PRINCIPLE: For an ordinance to be more than a piece of paper, authority must be given to the city forester or other official to enforce the provisions. This includes the right to issue notices of violations, notices to perform work and to stop work.

Example: The city forester shall have the power to promulgate and enforce rules, regulations and specifications concerning the trimming, spraying, removal, planting, pruning and protection of trees, shrubs, vines, hedges and other plants upon the right-of-way of any street, alley, sidewalk, or other public place in the city. (Details about the process of rule-making, review and approval by the governing body, and enforcement need to be included.)

The legal process to be used against violators must be clearly spelled out.

XV. PENALTIES, CLAIMS AND APPEALS

PRINCIPLE: Enforceable, meaningful ordinances must contain provisions for penalties and violations. Most cities have standard statements that will work in a tree ordinance, or one may be written specifically related to trees. There needs to be a process for the city to do needed work if a landowner fails to comply with an order, and an appeal route.

Examples: *Violations* — Any person who violates any provision of this ordinance or who fails to comply with any notice issued pursuant to provisions of the ordinance, upon being found guilty of violation, shall be subject to a fine not to exceed $500 for each separate offense. Each day during which any violation of the provisions of this ordinance shall occur or continue shall be a separate offense. If, as the result of the violation of any provision of this ordinance, the injury, mutilation, or death of a tree, shrub, or other plant located on city-owned property is caused, the cost of repair or replacement of such tree, shrub, or other plant shall be borne by the party in violation. The replacement value of trees and shrubs shall be determined in accordance with the latest revision of *A Guide to the Professional Evaluation of Landscape Trees, Specimen Shrubs, and Evergreens,* as published by the International Society of Arboriculture.

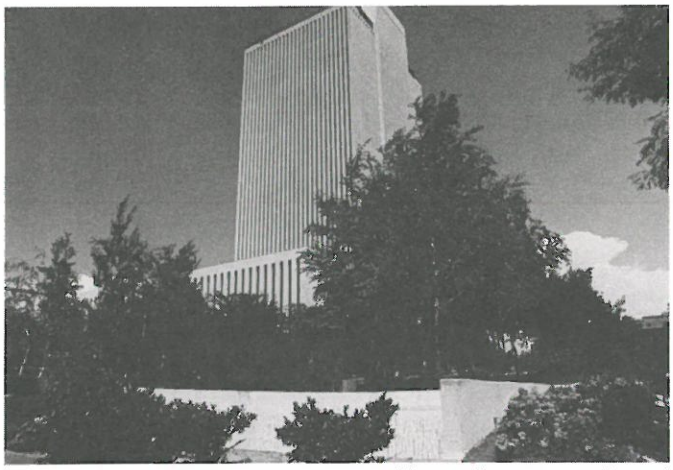
Assessment of Claim — In the event that a nuisance is not abated by the date specified in the notice, the City Arborist is authorized to cause the abatement of said nuisance. The reasonable cost of such abatement shall be filed as a lien against the property on which the nuisance was located. In addition, the owner of the property upon which the nuisance was located shall be subject to prosecution.

Appeals — (Include your municipality's standard appeals process.)

Each community's ordinance must be written to serve that community's unique needs and circumstances.

XVI. OTHER

Because circumstances vary so widely between municipalities, there may be other sections necessary to fashion an ordinance to the needs of your community. These range from sections that local government may require in all its ordinances (such as a severability clause that states that if any section of the ordinance is found to be invalid or unconstitutional, it does not affect the validity of remaining sections) to how the urban forestry program is to be financed. The ordinance must fit your town's needs.



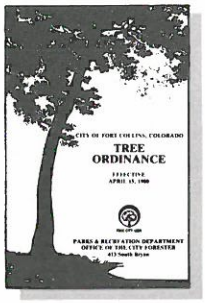
Tree ordinances are important for big cities and small towns.

Other Sources of Information

Tree City USA Bulletin will inform readers of helpful, up-to-date publications which provide more depth or that are readily available for community distribution. The editor welcomes sample copies to consider for inclusion in future editions.

It is recommended that anyone developing a new tree ordinance or revising an existing one first obtain a copy of the following manual. Sale price is $25.00.

Municipal Tree Ordinance Manual
International Society of Arboriculture
P.O. Box 908
Urbana, IL 61801



Copies of tree ordinances from other cities will be invaluable in deciding what to include and how to fashion the language in your ordinance. Below is an excellent example of a tree ordinance that has been attractively reproduced for public distribution. Fort Collins' urban forester, Tim Buchanan, has also written a model standards and specifications document as a companion to the tree ordinance.

Contact:
Office of the City Forester
Parks & Recreation Department
413 S. Bryan
Fort Collins, CO 80521

For copies of other exemplary tree ordinances, including those with strong provisions for protecting existing trees (See Section XI), contact The National Arbor Day Foundation.

American Forestry Association and the National Urban Forest Council are offering assistance to communities facing the ordinance dilemma through an urban-forestry information system called TreeNet. Information on TreeNet can be obtained by writing TreeNet, P.O. Box 52105, Durham, NC 27717, or calling (919) 493-1087.

For a historical and national overview of tree ordinances, articles in professional journals may be reviewed. These include:

Journal of Forestry (5400 Grosvenor Lane, Bethesda, MD 20814)
"Protecting Privately Owned Urban Woodlands: Trends in Municipal Tree Ordinances." 1976, pp. 622-624.

Journal of Arboriculture (P.O. Box 908, Urbana, IL 61801)
"Ordinance Control of Street Trees." 1975, pp. 212-216.
"Challenges of Municipal Arboriculture." 1976, pp. 217-220.
"An Analysis of Tree Ordinances: The Example of New Jersey." 1977, pp. 191-197.
"Street Tree Policies in Ohio Towns." 1980, pp. 185-191.
"A Tree Management Ordinance for Huntsville, Alabama." 1982, pp. 81-82.
"Municipal Ordinances' Relation to Trees." 1982, pp. 128-136.
"Municipal Tree Management in New Jersey." 1984, pp. 229-235.

To order additional Bulletin copies... Friends of Tree City USA members may obtain a single copy of any Tree City USA Bulletin free of cost. Quantities of any issue are available at 25 for $6.25 or 500 for $100. To order, specify the issue number and quantity, and make your check payable to: The National Arbor Day Foundation, 100 Arbor Avenue, Nebraska City, NE 68410.

The Bulletins available are:

- No. 1 *How to Prune Young Shade Trees*
- No. 2 *When a Storm Strikes*
- No. 3 *Resolving Tree-Sidewalk Conflicts*
- No. 4 *The Right Tree for the Right Place*
- No. 5 *Living with Urban Soils*
- No. 6 *How to Hire an Arborist*
- No. 7 *How to Save Trees During Construction*
- No. 8 *Don't Top Trees!*
- No. 9 *How to Write a Municipal Tree Ordinance*

To Join the Friends of Tree City USA...to receive a subscription to the Tree City USA Bulletin...and to become more involved in the urban forestry movement in your town and throughout America, send a $10 dues-donation to Friends of Tree City USA, National Arbor Day Foundation, 100 Arbor Avenue, Nebraska City, NE 68410. Make your check payable to National Arbor Day Foundation.

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TREE CITY USA

The Tree City USA program is sponsored by The National Arbor Day Foundation in cooperation with the U.S. Forest Service and National Association of State Foresters. To achieve the national recognition of being named as a Tree City USA, a town or city must meet four standards:

Standard 1: A Tree Board or Department
Standard 2: A City Tree Ordinance
Standard 3: An Annual Community Forestry Program
Standard 4: An Arbor Day Observance and Proclamation

Each winning community receives a Tree City USA flag, plaque, and community entrance signs. Towns and cities of every size can qualify. Tree City USA application forms are available from your state forester or The National Arbor Day Foundation.

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100 Arbor Avenue · Nebraska City, NE 68410

APPENDIX D -- ORDINANCES
FOREST GROVE, OREGON
SIGNIFICANT AND HISTORIC TREE PRESERVATION ORDINANCE

Pop 13,557 Forest Grove

HISTORIC AND SIGNIFICANT TREES
(Ord. 92-03; 1/27/92)

9.940 INTENT. The trees of Forest Grove, a reminder of the City's namesake, offer historic, aesthetic, spiritual, social, environmental, and monetary values to the community. To ensure the success of the urban forestry program, the tree management ordinance establishes governing guidelines, a legal framework, and authority for the community forestry program. This ordinance seeks to enhance the quality of life in Forest Grove by promoting good stewardship that will ensure the continued health and well-being of the community forest. This ordinance creates a protected status for trees as listed below:

(1) Trees within public street rights-of-way.
(2) Trees within natural areas. Trees and vegetation within wetlands or wetland buffer areas, floodplains, within 30 feet of center line of mapped drainage ways, and open space areas as designated on the Comprehensive Plan.
(3) Trees on land subject to or undergoing development review. Trees over 6 inches in diameter on land subject to development or over 6 inches in diameter on land undergoing development review such as site review, subdivision review, partition review, building permit, etc.
(4) Trees identified as part of development review. These trees were existing and/or shown on site plans, and are part of an approved development.
(5) Significant/Historic trees as defined in this ordinance.

Where any tree falls into more than one category, the most restrictive criteria apply.

9.941 DEFINITIONS. The following definitions shall be used within this ordinance:

1. Applicant. Owner or designated agent.
2. Canopy. Space of the tree above ground including the trunk and branches measured in volume.
3. Cap Size. A shortened version of Caliper Size, the narrowest diameter of the tree trunk (or the sum of multiple trunks) measured 5 inches above the base of the tree.
4. Drip line. The outermost edge of the tree's original canopy. When depicted on a plan, the drip line will appear as an irregular-shaped circle that follows the canopy edge of the tree branches as seen from overhead.
5. Grove. A stand of three or more trees (of the same species or a mixture), which form a visual and biological unit.
6. Major Pruning. Removal of over 20 percent of the tree's canopy, any tree topping, or disturbance of over 10 percent to the root system.

7. Public Right-of-Way. The space between the street edge and the property line, often the inside of the sidewalk. This area includes the park strip or tree lawn area between the curb and sidewalk.
8. Required Front Yard. Area within a front yard setback as required by the Forest Grove Zoning Ordinance.
9. Root Zone. Area of the ground around the base of the tree measured from the trunk to 5 feet beyond the drip line.
10. Tree. Any woody, perennial plant, deciduous, evergreen or coniferous, characterized by having a main stem or trunk of six inches or more in diameter 4.5 feet above natural grade. (Diameter equals the circumference divided by 3.142). In cases of multi-stemmed or multi-trunk trees, the diameter shall be the sum of diameters of all individual stems or trunks. Trees of less than 6 inches in diameter may be considered under this ordinance section if they are designated as historic or significant trees.
11. Vegetation. Any woody, perennial plant, deciduous, evergreen or coniferous which is not defined as a tree.

9.942 CITY APPROVAL REQUIRED. Unless specifically exempted under Permit Exemption below, protected trees require City approval prior to removal or major pruning. It shall be unlawful within any one year period to remove or prune so as to remove over 20% of a tree's canopy, top a tree, or disturb over 10% of the root zone of any protected tree or vegetation except in accordance with the provisions of this ordinance.

(A) Permit Requirements.

(1) The applicant shall file an application for protected tree removal or pruning with the Community Development Department. The owner or authorized agent must submit information on the location and size of the parcel, the location, type, and size of the tree or trees in question, and the reasons for the desired action. The information and reasons shall address any appropriate criteria based on the type of area and tree designation. The City may require the verification of any stated tree illness, safety problem, etc. by an arborist certified by the International Society of Arboriculture, paid for at the applicant's expense.

(2) The Department shall ascertain whether the request is valid under the terms of this ordinance within four working days of submission. If valid, the permit shall be processed within seven working days unless referred or appealed to the Tree Task Force (TTF) or Historic Landmarks Board (HLB). All permits for removal and pruning shall be issued with the following conditions attached:

(a) Trees subject to this ordinance shall be removed or pruned following pruning standards of the International Society of

Aboriculture, those standards provided to all applicants by the City at the time the permit is issued.

(b) It is the responsibility of the applicant to assure that all protected trees are removed or pruned in a manner which ensures safety to individuals and public and private property.

(c) Other conditions as the Community Development Department (or other body upon referral or appeal) shall attach in keeping with the purpose of this ordinance.

(B) Permit Exemption.

(1) Imminent Danger. If an imminent danger exists to the public or any property owner or occupant, the Community Development Director may issue an emergency removal permit. The removal shall be in accordance with accepted arboricultural standards and be the minimum necessary to eliminate the danger.

(Penalty for Incorrect Danger Assessment. If it is determined that imminent danger did not exist or that the hazardous condition had existed for over 60 days and the owner delayed in applying for a permit, mitigation shall be required as established in Section 9.949 of this ordinance.)

(2) Maintenance. Regular maintenance which does not require removal of over 20% of the tree's canopy, tree topping, or disturbance of over 10% to the root system.

(C) <u>REVIEW PROCESS</u>. Requests for tree removal or major pruning are reviewed, approved, approved with conditions, or denied by the Community Development Director or designee. Conditions shall be related to impact of the requested action. Staff decisions may be appealed before the TTF, and TTF decisions may be appealed before the City Council. In reviewing such appeals, the TTF or City Council may approve, approve with conditions, or deny. Appeal periods and procedures are as set forth in Section 9.911 of this ordinance.

9.943 <u>DESIGNATION OF SIGNIFICANT AND HISTORIC TREES</u>.

(A) Inventory Requirements. An inventory shall be conducted of significant/historic trees and groves which may qualify as significant. Criteria are as follows:

(1) Tree Criteria. An individual tree shall be considered significant if the TTF finds:

(a) The tree has a distinctive size, shape or location which warrants a significant status; or
(b) The tree has special botanical significance as a specimen in the Forest Grove area; or
(c) The tree possesses exceptional beauty which warrants a significant status; or
(d) The tree is significant due to a functional or aesthetic relationship to a natural resource; or
(e) The tree is significant based upon its association with historic figures, properties or general growth and development of the city.

(2) Grove Criteria.

(a) The grove is relatively mature and evenly aged; and
(b) The grove has a purity of species composition, is of a rare or unusual nature, or is an exceptional example of a type of forest such as riparian or woodland; and
(c) The grove is in a healthy growing condition; and
(d) The grove has a crucial functional and/or aesthetic relationship to a natural resource; or
(e) The grove has a historic significance based upon its association with historic figures, properties or general growth and development of the city.

(3) Inventory Updates. Provisions shall be made for periodic updates of the tree inventory as required by changes in the number and condition of significant and historical trees.

(B) Pre-Inventory Tree List. Prior to the completion of an inventory, the initial significant/historic tree list shall consist of:

(1) Trees designated as Historic on the 1990 Historic Tree Inventory; and
(2) Any tree over 24 inches in diameter (measured 4.5 feet above the base) within any required front yard or public right-of-way; and
(3) Any White Oak over 24 inches in diameter (measured 4.5 feet above the base).

These trees shall be considered Significant/Historic until July 1, 1993 or the adoption by the TTF of a Significant/Historic Inventory, whichever occurs first.

(C) Creation and Modification of Significant/Historic Tree List. The TTF shall review the Inventory and draw up a proposed list of significant/historic trees and

groves of trees. The TTF shall hold at least one public hearing on this proposed list.

(D) Notification Requirements. Each property owner of the tree or trees under consideration in the Inventory shall be notified by mail 20 days prior to any public hearing, or 10 days prior to the first of two public hearings. In addition, the owners of Significant and Historic trees so designated in the Inventory shall be notified annually, excluding City-owned property.

9.944 PROTECTION OF SIGNIFICANT AND HISTORIC TREES.

(A) Designated Trees. Significant and Historic Trees are those selected in the inventory identified in Section 9.943(A) above. Prior to adoption of the inventory, Significant and Historic trees are those defined in section 9.943(B).

(B) Pruning.

(1) The City shall adopt standards for acceptable pruning methods (based on standards of the International Society of Aboriculture), and shall evaluate the proposed pruning against these standards. If the plan meets these standards, it shall be approved. If the plan does not meet these standards, it shall be denied or modified to meet those standards.

(2) When development is proposed within a significant grove or when Significant/Historic trees are located within a site proposed for development, a tree preservation plan demonstrating preservation methods shall be submitted for approval. If justification for removal is based upon the health of the tree, and a visual inspection by the Community Development Department cannot establish that the tree is dead or diseased, the applicant shall hire an arborist certified by the International Society of Arboriculture, or pay a fee established by the City so that such arborist can be hired to inspect and evaluate the health of the tree.

(C) Criteria. The permit for major pruning or removal shall be granted if any of the following criteria have been met:

(1) The tree is dead or diseased. If the tree is determined to be alive and/or curable of disease, the permit shall be denied if the cost of curing the disease is less than one-fourth of the value of the tree.

(2) The tree has lost its significance in terms of its original designation due to damage from natural or accidental causes, or if some other

reason can be established that it is no longer of historic significance.

(3) The tree has become a nuisance by virtue of damage to personal property or improvements, either public or private, on the subject site or adjacent sites, or that extraordinary maintenance is required to prevent damage to such improvements or property.

(4) The tree is unsafe to the occupants of the property, an adjacent property or the general public.

(5) The proposed removal is part of a development project and:

(a) The removal is for a public purpose, and there is no alternative without significant cost or safety problems as determined by the TTF; or

(b) Protecting Significant/Historic trees results in a density reduction of over 15%, or an increase in costs of 15%. If this is so, the allowed tree removal shall be the minimum required to reduce the impact on density and costs of less than 15%.

(D) Construction Around Significant and Historic Trees. In the absence of specific restrictions or allowances, the following construction practices shall be followed.

(1) Excavations and driveways shall not be placed within six feet of any tree or within 80% of the distance between the drip line and the tree trunk, whichever is the greater distance. During such excavation or construction, this distance shall be protected and no temporary building, building material, vehicle, or debris kept within this area. Exceptions to this distance may be approved upon a favorable report by a qualified arborist.

(2) During the erection, repair, alteration or removal of any building or structure in the drip line or designated distance of a Significant or Historic tree, there shall be a sufficient fence to prevent injury to such tree before starting and during construction (directly or as a result of soil compaction in the root area) as a result of such construction.

(E) Issuance of Permit. All permits for removal and pruning shall be issued with the following conditions attached:

(1) Any Significant or Historic tree shall be removed or pruned following standards of the International Society of Arboriculture, which standards shall be provided to all applicants by the City at the time the permit is issued.

(2) It is the responsibility of the applicant to assure that all protected trees are removed or pruned in a manner which ensures safety to individuals and public and private property.

(3) Other conditions (such as one or more replacement trees) shall be attached in keeping with the purpose of this ordinance.

(F) Relative Value. The relative significance and historic value of the tree (based on the Manual of Tree and Landscape Appraisers), as determined in the inventory or other study, shall be considered in evaluating the need for removal or mitigation requirement.

(G) Referral and Appeals. The Community Development Director may refer the review to the TTF. The Director may also request a recommendation from the Historic Landmarks Board if the permit request involves trees with historic significance. A decision of the Director may be appealed to the TTF. Appeals of the TTF decision shall go directly to the City Council with time periods and procedures as per Section 9.911 of this ordinance.

9.945 <u>TREES IN PUBLIC RIGHTS-OF-WAY (STREET TREES)</u>.

(A) Criteria. The permit for major pruning or removal shall be granted if any of the following criteria have been met:

(1) The tree is dead or diseased. If the tree is determined to be alive and/or curable of disease, the permit shall be denied if the cost of curing the disease is less than one-fourth of the value of the tree.

(2) The tree has become a nuisance by virtue of damage to personal property or improvements, either public or private, on the subject site or adjacent sites, or that extraordinary maintenance is required to prevent damage to such improvements or property.

(3) The tree is unsafe to the occupants of the property, an adjacent property or the general public.

(4) The proposed removal is part of a development project.

(2) Planting specifications such as depth and width of tree well, fertilization, and watering requirements shall be determined by the City.

(D) Maintenance.

(1) Responsibility of property owner adjacent to public rights-of-way.

(a) Appropriate watering of the tree is required by the adjacent property owner for two years following planting, unless a City irrigation system or a separate maintenance contract is developed.

(b) Pruning requirements. Trees or shrubs standing in or upon any public right-of-way, or on public or private grounds, and having branches projecting into the public street or sidewalk, shall be kept trimmed by the owner or owners of the property adjacent to or in front of which such trees, shrubs or plants are growing so that:

(i) The lowest branches shall not project lower than 12 feet above the surface of the street, and shall not project lower than 14 feet above the surface of streets designated as state highways.

(ii) The lowest branches shall not project lower than eight feet above the surface of any sidewalk or footpath.

(iii) The branches of any tree, shrub, or other vegetation shall be pruned so as to maintain the vision clearance area set forth in Section 9.850 of this ordinance.

(iv) Newly planted trees may remain untrimmed, provided they do not interfere with street traffic or persons using the sidewalk.

(v) If pruning results in removal of over 20% of crown, tree topping, or disturbance of over 10% of the root system then a permit is required.

(vi) Where tree roots create hazardous sidewalk conditions, the owner is responsible for pruning the roots or modifying the sidewalk to alleviate the hazardous condition.

(2) City Maintenance.

(a) The City may perform pruning on any street tree within the rights-of-way without any permit if total pruning results in removal of less than 20% of the crown or disturbance of less than 10 % of the root system. Major pruning of a series of street trees may be combined in one permit.

(b) If the owner or owners, lessees, occupants or person in charge of the property shall fail and neglect to trim such trees, shrubs or plants within 10 to 45 days after notice, the City shall trim such trees, shrubs or plants. Such trimming by the City shall not act to relieve such owner, lessee, occupant or person in charge of responsibility for violation of the Ordinance.

9.946 TREES IN NATURAL RESOURCE AREAS.

(A) Additional Information Requirements. An applicant who wishes to remove vegetation or do work within a Natural Resource Area shall submit:

(1) Information indicating the area being affected; and
(2) The nature of the work proposed, and/or the reasons for removal of vegetation; and
(3) A plan for mitigation or re-vegetation; and
(4) Evidence of submittal of appropriate applications to state and federal agencies as required.

(B) Criteria. The request for vegetation removal shall be approved based on the criteria below:

(1) The permanent impact will be negligible or minor.

(2) The removal is necessary to prevent the spread of disease or insects declared to be a nuisance by a government agency or qualified arborist, or to correct or eliminate a natural hazard (as identified by the City or qualified arborist) to the property owner, surrounding properties, or community at large.

(3) The loss of value will be of temporary duration until new vegetation can be established, or the mitigation plan provides satisfactory replacement of the lost vegetation and establishment of a new resource area of equal value to be completed within two planting seasons. Mitigation for lost vegetation is preferred on-site, or within the immediate vicinity of the subject site. Off-site mitigation may be approved if there is no reasonable alternative and a method

of guaranteeing permanent use of the area off-site is found, such as dedication of the area to a public entity, easement or deed restriction.

(4) Timetables for the work shall be established which minimize the impact on wildlife.

9.947 TREES ON DEVELOPABLE LAND, PRIOR TO AND DURING DEVELOPMENT.

(A) Protected Trees Prior to Development. A permit shall be required for the removal or major pruning for trees over 6 inches in diameter or other Protected Trees as defined in this ordinance. A permit may cover a tree management plan which specifies cutting, pruning, and thinning on a 6 month to 2 year basis.

(B) Trees shall be protected in the following instances:

(1) Groves or wooded areas associated with natural drainages and wetland areas shall be retained to preserve riparian habitat and to minimize erosion.

(2) Groves or wooded areas along property lines shall be retained to serve as buffers from adjacent properties.

(3) Trees shall be retained in sufficiently large areas and dense stands so as to ensure against a narrow row of trees which are prone to wind damage.

(C) Tree Removal Criteria. The permit for removal shall be granted if any of the following criteria have been met:

(1) The trees requested for removal are dead or diseased. The Community Development Director may request the verification of a qualified arborist, at the applicant's expense, to make such a verification of the health of the trees.

(2) Removal of the trees is necessary to accomplish a public purpose, such as the installation of public utilities or provision of public streets by a public agency. The applicant shall show evidence of consideration of alternative designs.

(3) Removal of trees is for thinning purposes following accepted aboricultural practices.

(D) Review Standards During Development Review.

(1) Types of Review Covered: The following types of review are subject to a tree permit as required in this ordinance:

(a)	Conditional Use	(d)	Site Review
(b)	Land Partition	(e)	Subdivision
(c)	Planned Development	(f)	Variance

For those structures and sites already receiving an appropriate development permit, no additional permit is required as part of building permit issuance.

(2) Permit Requirements. In conjunction with the development permit requested, the applicant shall include the location, size, and species of all trees subject to this ordinance. Groves of trees which are to be protected do not have to be individually delineated, however the number of trees in each grove shall be included.

(3) Protection Plan. For all such trees proposed to be preserved, the applicant shall submit a protection plan which indicates how those trees or groves will be protected from soil compaction, construction activities, grade changes, and soil erosion. This protection plan shall be part of the landscape plan incorporating other landscaping requirements.

(4) Review Criteria. Trees of 6-inch diameter or larger shall be preserved unless the applicant proves to the satisfaction of the reviewing body that removal is necessary as a result of:

(a) Necessity to remove trees which pose a safety hazard to pedestrians, property or vehicular traffic or threaten to cause disruption of public service; or which pose a safety hazard to persons or buildings.

(b) Necessity to remove diseased trees or trees weakened by age, storm, fire or other injury.

(c) Necessity to observe good arboricultural practices.

(d) Need for access immediately around the proposed structure for construction equipment.

(e) Need for access to the building site for construction equipment.

(f) Essential grade changes. Essential grade changes are those grade changes needed to implement safety standards common to standard engineering or architectural practices.

(g) Surface water drainage and utility installations.

(h) Location of driveways, buildings or other permanent improvements so as to avoid unreasonable economic hardship.

(i) Compliance with other ordinances or codes.

(j) Necessity to install solar energy equipment.

For criteria (d) through (h) above the applicant shall show evidence of exploring alternate designs which would increase tree protection. Removal of Significant/Historic trees shall also comply with the criteria under Section 9.947, Significant/Historic trees.

(5) Yard Setback Adjustment.

(a) The Community Development Director may authorize adjustments from the requirements of this ordinance where it can be shown that, owing to special and unusual circumstance related to a specific property, a proposed development would result in the removal of trees designated Significant/Historic. An adjustment to the side, front, and/or rear yard setback requirements by up to 50 percent may be authorized if necessary to retain designated Significant/Historic trees. Adjustments may be made for subdivision and partition lots, provided the average lot size for the request meets required densities. The Community Development Director may grant only the minimum adjustment necessary to retain the designated Significant/Historic trees. In granting the adjustment, the Community Development Director may attach conditions necessary to protect the best interests of the surrounding property or neighborhood and to otherwise achieve the purposes of this ordinance.

(b) Notice of the granting of an adjustment shall contain the address of the property and the specific adjustment granted with such conditions as may have been applied, the effective date of the adjustment, and when, where, how and by whom an appeal to the decision may be filed. Notice shall be provided by mail to each abutting property owner.

(c) Any affected party may file a written appeal to the TTF of such an adjustment granted by the Community Development Director, prior to

the effective date of such order. The appeal shall set forth wherein the Community Development Director failed to adhere to the provisions of this ordinance. An appeal stays all action and suspends the adjustment until the appeal is resolved. Decision of the TTF may be appealed to the City Council.

9.948 TREES IN APPROVED DEVELOPMENTS. Trees which were existing and retained as part of a development review procedure.

(A) Criteria: The permit for major pruning or removal shall be granted if any of the following criteria have been met.

(1) The tree is dead or diseased. If the tree is determined to be alive and/or curable of disease, the permit shall be denied if the cost of curing the disease is less than one-fourth of the value of the tree.

(2) The tree has lost its significance in terms of its original designation due to damage from natural or accidental causes, or if some other reason can be established that it is no longer of historic significance.

(3) The tree has become a nuisance by virtue of damage to personal property or improvements, either public or private, on the subject site or adjacent sites, or that extraordinary maintenance is required to prevent damage to such improvements or property.

(4) The tree is unsafe to the occupants of the property, an adjacent property or the general public.

(5) The pruning, removal or replacement of the tree results in an improved development as measured by the original review criteria. Decisions under this provision may be transferred by staff or the applicant to the original reviewing body.

9.949 MITIGATION AND PENALTIES.

(A) Tree Replacement. For all tree removal and if an appropriate space is available, Significant/Historic trees shall be replaced with new trees, 2 inches in caliper size or larger, meeting City recommendations for tree type, placement, installation, and watering provisions. The owner shall be responsible for the continued health of the new tree including regular watering. Replacement shall be completed within one year of removal.

(B) Improper Removal Mitigation:

(1) If tree removal (or Major Pruning resulting in permanent harm to the tree) is completed without receiving a permit, or tree removal performed under the imminent danger provision and after an investigation it is determined that the danger did not exist or that a hazardous condition had existed for over 60 days and the owner knowingly delayed applying for a permit, or other situation where tree removal was performed illegally, then replacement is based on replacement value of the tree as based on the Manual of Tree and Landscape Appraisers. Mitigation shall be based on the following alternatives, singularly or in combination:

(a) One or more trees resulting in the same or higher value of the removed tree, except that the value can be no less than the cost of tree replacement as specified in Section 9.949(A).

(b) The replacement value of the removed tree to be paid to the City. Such funds shall be used by the City to plant new trees on public rights-of-way.

(c) One or more trees of a species acceptable to the City in which the caliper size cumulative square inches of the replacement trees equal the caliper size cumulative square inches of the removed trees.

(d) Mitigation shall be completed within one year.

(2) Mitigation Completion. Where it is determined that tree removal was performed illegally, all permit processing in work for that parcel shall be suspended until mitigation is complete.

(C) Partial Compliance With Criteria. If the required criteria have only been partially met, then the reviewing body can require mitigation greater than Section 9.949(A), Tree Replacement but less than Section 9.949(B), Improper Removal.

(D) Other Penalties: Violations of this ordinance are subject to the mitigation requirements described above plus any penalties set forth in the Municipal Code.

(5) The removal is for a public purpose, and there is no alternative without significant cost or safety problems.

(6) The removal is part of a street tree improvement program, such as improving the streetscape, or improving the age and species diversity of the City.

(B) Additional Requirements.

(1) It shall be unlawful to attach anything to a tree, or to the support or protection devices of a tree, except that which is used for support or protection or approved by the City.

(2) It shall be illegal to remove protective devices from around a tree, or in any way damage a street tree.

(3) The applicant shall state when products of pruning or tree removal will be used for a financial return. The commercial harvesting of tree products (e.g. harvesting and selling of spring foliage) shall not be the primary purpose for pruning or cutting trees in the public rights-of-way.

(4) If removal is allowed, the stump shall be removed to a depth of six inches below the surface of the ground or finish grade of the street, whichever is of greater depth.

(5) Mitigation requirements shall be according to Section 9.949(A) requiring a tree of at least 2 inch or larger caliper size to be planted within one year of removal.

(C) Planting Requirements.

(1) Approved Species.

(a) New street trees shall conform to an existing tree plan unless a specific exception is granted. When a tree plan does not exist, tree species shall be determined by the City. In selection of tree species, the City shall consider the list of prohibited trees, the available planting area, above or below ground restrictions, the need for tree diversity, and the requests of adjacent property owners.

(b) The specific location and distance between street trees shall be determined by the City.

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TREE PRESERVATION ORDINANCE

period of two years. Failure to maintain the trees according to the director's instructions shall constitute a new and separate violation of this chapter. At the director's discretion, the cost of replacement trees may be deducted from the amount of any civil fee assessed.

2. Revocation of Permits. In addition to other actions, the director may issue a stop-work order or withhold issuance of a certificate of occupancy, permits or inspections until the provisions of this chapter have been fully met. (Ord. 5181 §1(7), 1991).

16.56.080 City tree account. There is created a city tree account into which all penalties and revenues received under this chapter shall be placed. (Ord. 5181 §1(8), 1991).

Chapter 16.60

TREE PROTECTION AND REPLACEMENT

Sections:

16.60.010 Purpose.
16.60.020 Definitions.
16.60.030 Applicability.
16.60.040 Exemptions.
16.60.050 Tree protection and replacement plan required.
16.60.060 Tree protection and replacement plan review procedure.
16.60.070 Review standards for tree protection.
16.60.080 Tree protection and replacement requirement--Transition to urban forestry.
16.60.090 Tree protection during construction.
16.60.100 Maintenance requirements.
16.60.110 Variance for hardship.
16.60.120 Appeal--Modification.
16.60.130 Enforcement--Penalties.
16.60.140 Liability on the city.
16.60.150 Review of chapter by city council.

16.60.010 Purpose. Whereas rapid growth, the spread of development, and increasing demands upon natural resources have the effect of encroaching upon, despoiling or eliminating many of the trees and other forms of vegetation and natural resources and processes associated therewith which, if preserved and maintained in an undisturbed and natural condition, constitute important physical, aesthetic, recreation and economic assets to existing and future

residents of the city; and whereas the city council finds (1) that trees and woodland growth protect public health through the absorption of air pollutants and contamination, through the reduction of excessive noise and mental and physical damage related to noise pollution, through their cooling effect in the summer months and insulating effects in winter, through their positive impact on global climate change; (2) that trees and woodlands provide for public safety through the prevention of soil erosion, siltation and flooding; (3) that trees and woodlands are essential to the general welfare of the city by maintaining the natural beauty and the irreplaceable heritage for existing and future city residents; and (4) that Olympia can promote urban forestry practices which will preserve or enhance trees on public and private lands as they transition from natural areas into an urban environment. Therefore, the purposes of this chapter are:

A. To provide for the protection, preservation, replacement, proper maintenance and use of trees and woodlands located in this city in order to preserve and enhance the city's physical and aesthetic character by preventing untimely and indiscriminate removal or destruction of trees;

B. To protect trees and woodlands of this city for their economic support of local property values and to preserve and enhance the Pacific Northwest's natural beauty;

C. To minimize the adverse impacts of land disturbing activities on surface drainage, soil erosion, air quality, sedimentation and pollution of natural waterways, in order to minimize the public and private costs for stormwater control and treatment, utility maintenance and removal of pollution from our natural waterways;

D. To promote site planning, construction practices and horticultural practices that are consistent with the reasonable use of property;

E. To provide for the paramount public concern for these natural resources in the interest of a healthier and safer place in which to live and to promote the general welfare of the residents of this city;

F. To implement the goals and objectives of the Washington State Environmental Policy Act; and

G. To implement the goals and objectives of the city's comprehensive plan. (Ord. 5248 §11(part), 1991).

<u>16.60.020 Definitions</u>. All words in this chapter shall have their customary dictionary definition except as specifically defined herein.

1. "Agriculture" means the use of land for the primary purpose of deriving income from growing plants or trees on land including, but not limited to, land used principally for fruit or timber production, but not including land

used principally for another use and only incidentally for growing trees or plants for income.

2. "Buildable area" is that portion of a parcel of land wherein a building, parking and other improvements may be located and where construction activity may take place. Buildable areas shall not include streams, flood hazard areas, geologically hazard areas or wetlands as defined in Section 18.76.030.

3. "Caliper" means the American Association of Nurseryman standard for trunk measurement of nursery stock. Caliper of the trunk shall be the trunk diameter measured six inches above the ground for up to and including four inch caliper size and twelve inches above the ground for larger sizes.

4. "City" means the city of Olympia, Washington.

5. "Clearing" means the destruction or removal of vegetation from a site by physical, mechanical, chemical or other means. This does not mean landscape maintenance or pruning consistent with accepted horticultural practices which does not impair the health or survival of the trees.

6. "Commercial nursery or tree farm" means a licensed plant or tree nursery or farm in relation to those trees planted and growing on the premises of the licensee, which are planted and grown for sale through retail or wholesale channels in the ordinary course of the licensee's business.

7. "Critical root zone" is the area where the tree's roots are located. This root zone is generally the area surrounding a tree at a distance which is equal to one foot for every caliper inch of tree.

8. "Crown" means the area of a tree containing leaf or needle-bearing branches.

9. "Diameter at breast height (d.b.h.)" means a tree's diameter in inches at four and one-half feet above the ground. On multistemmed or trunked trees, the diameter shall be the sum of diameters of all individual stems or trunks.

10. "Director" means the director of the public works department or the director's designee.

11. "Grading" means any excavation, filling or combination thereof.

12. "Ground cover" means trees less than six inches d.b.h. and other vegetation.

13. "Hazard tree" means any tree with any structural defect, disease, extreme size or combinations of these which make it subject to a high probability of failure which might cause damage to persons or property.

14. "Land development" refers to any human induced change to real estate, including but not limited to land division, construction, installation or expansion of a building or other structure; drilling; and site alterations such as those due to land surface mining, dredging, grad-

ing, construction of earthen berm, paving, improvements for use as parking or storage, excavation or clearing. Land development shall include improvements or remodeling only if a permit is required and the footprint of the building is expanded.

15. "Landmark tree" means a tree or group of trees designated as such by the city because of its exceptional value to the residents of the city (see Chapter 16.56).

16. "Limits of construction line" means a line separating the buildable areas from the protected areas.

17. "Person" means any individual, organization, society, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, governmental agency, public or private utility, cooperative, interstate body or other legal entity.

18. "Protected area" means all land where no construction activity is allowed and includes the critical root zone of those trees to be preserved.

19. "Qualified professional forester" means a professional with academic and field experience that makes him or her a recognized expert in urban forestry. This may include arborists certified by the International Society of Arboriculture.

20. "Remove or removal" means the act of removing a tree by digging up, cutting down or any act which causes a tree to die within a period of three years; including but not limited to, damage inflicted on the root system by machinery, storage of materials or soil compaction; changing the ground level in the area of the tree's root system; damage inflicted on the tree permitting infections or infestation; excessive pruning; paving with concrete, asphalt or other impervious material within the drip-line, or any other action which is deemed harmful to the tree.

21. "Street tree" means trees located within the street right-of-way, adjacent to public or private streets, including undeveloped areas.

22. "Transplant" means the relocation of a tree from one place to another on the same property.

23. "Tree" means any self-supporting perennial woody plant characterized by one main stem or trunk of at least six inches d.b.h., or a multistemmed trunk system with a definite crown, maturing at a height of at least six feet above ground level.

24. "Tree survey" means a drawing at a scale of at least one inch equals one hundred feet scale drawing which provides the following information: location of all trees having six inches or greater d.b.h., or groves of trees, plotted by accurate techniques and the common or botanical name of those trees and their d.b.h.

25. "Tree unit" means a unit of measurement based upon the size of the tree as set forth in Tables 16.60.080A and B of Section 16.60.080.

26. "Undeveloped" means a parcel of land on which no buildings or other facilities are located.

27. "Urban forestry" means the use of state of the art techniques to preserve or enhance trees on public and private lands as they transition from natural areas into an urban environment. This will include site design strategies and construction and planting techniques which incorporate best management practices.

28. "Windfirm" means a tree which is capable of withstanding windstorms.

29. "Worksite" means any contiguous area owned and operated as one development unit upon which earth disturbing activities are planned or underway. (Ord. 5248 §11(part), 1991).

16.60.030 Applicability. A. No person or representative, directly or indirectly, shall engage in any land clearing or otherwise remove, relocate to another site, or destroy any tree, within the city, without first obtaining approval of a tree protection and replacement plan and obtaining a tree removal permit as provided in this chapter, unless the activity is exempted in Section 16.60.040.

B. This chapter prohibits tree removal on undeveloped property unless allowed in a building or new development permit and requires tree planting when a site to be developed does not meet the minimum tree density herein created.

C. A tree protection and replacement plan and tree removal permit for removal of one or more trees is required for any development which requires permit approval (building, grading, planned residential development, planned unit development, subdivision, short plat, townhouse, site plan review, conditional use permits, variance, shoreline conditional use, shoreline substantial development, shoreline variance and environmental determinations). (Ord. 5248 §11(part), 1991).

16.60.040 Exemptions. The following activities are exempt from the tree removal permit requirements. However, these exempt activities shall comply with all other applicable regulations. In no case shall any landmark tree be removed without first obtaining a tree removal permit pursuant to Chapter 16.56.

A. Agriculture. Lands from which the removal of trees is shown to be necessary for bona fide agricultural use.

B. Commercial Nurseries or Tree Farms. Only those trees which are planted and growing on the premises of a

licensed retailer or wholesaler for sale to the general public.

C. Emergencies. Necessary measures may be taken to protect public safety or private or public property from imminent danger and to respond to emergencies declared by the city, county, state or federal governments. Such emergencies may include a windstorm, mud slide, flood, freeze, dangerous and infectious insect infestation or disease, or other disaster.

D. Firewood Cutting. Firewood cutting is allowed if the site will remain at or above the minimum site density standard herein established.

E. Forest Practices Permit. Tree harvesting allowed under a forest practices permit issued by the Washington State Department of Natural Resources, which under state law preempts regulation by the city.

F. Hazard Trees. Tree trimming, removal or transplanting performed by, or on behalf of, the city, other governmental agencies or public utilities in order to protect public safety or private or public property from imminent damage. This may include trees that are dying, dead, structurally unsound, or diseased to the point that restoration to sound condition is not practical, or that the disease can be expected to be transmitted to other trees and to endanger their health, as determined by a qualified professional forester.

G. Nominal Activity. For developed single-family and duplex residential properties, a tree protection and replacement plan and tree removal permit is not required if the site will remain at or above the minimum site density standard herein established or if no tree removal is proposed.

H. Subdivisions. Individual lots within a subdivision are exempt when the requirements of this have been complied with by the subdivider as follows: (i) the subdivision includes an open space tract or common area which contains the required tree density for the entire subdivision; (ii) the trees within these tracts are protected with conditions, covenants or restrictions; and, (iii) the protecting covenants, conditions and restrictions are identified on the recorded plat map.

I. Minimal Removal. Removal of up to six trees from an undeveloped parcel within any twelve consecutive month period unless said trees are covered by an existing tree plan issued pursuant to this chapter or unless such removal places the parcel below the minimum density required herein. (Ord. 5248 §11(part), 1991).

<u>16.60.050 Tree protection and replacement plan required</u>. A. Requirement Established. Except for the exceptions enumerated in Section 16.60.040 above, no person

shall remove, transplant or destroy, or cause to be removed, transplanted or destroyed, on any land in the city, any tree six inches or greater d.b.h., without first obtaining the director's approval of a tree protection and replacement plan and receiving a tree removal permit from the city. For sites proposed for land development having trees below the minimum density, even though no trees are proposed to be removed, a tree protection and replacement plan is required to bring the site up to the minimum site density standard herein established.

B. Application and Fee. A person seeking a tree removal permit must submit a tree protection and replacement plan to the department of public works and pay a nonrefundable permit fee. Tree applications shall be made on forms to be prescribed and furnished by the city. The permit review fee is to based upon the actual costs of reviewing the tree protection and replacement plan as set forth in the city permit fee schedule.

C. Submittal of a Tree Protection and Replacement Plan. Applicants may discuss development alternatives with a qualified professional forester or city staff in advance of preparing initial site plans. The director may review development concepts and provide appropriate tree preservation educational materials to the applicant. Approval of the tree protection and replacement plan and tree removal permit shall occur before removing or transplanting any tree. Where the site proposed for development requires site plan or plat review, the tree protection and replacement plan and the application for a tree removal permit shall be submitted concurrent with a site plan or plat application. In designing a project, the applicant must retain trees which are healthy and vigorous, wind-firm, not harmful to utilities and which at maturity are a size appropriate to the location. (See Section 16.60.070 of this chapter for retention priorities.)

D. Tree Protection and Replacement Plan Requirements. Attached to the applicant information and site plan information required for the development proposal, the applicant shall include the following tree protection and replacement plan information when applying for a tree removal permit issued under this chapter:

1. A Tree Survey. For all development proposals a tree survey, drawn to scale, identifying the location of existing trees and containing the following information, as applicable:

a. Common or botanical name of each tree;

b. Trees proposed to remain, to be transplanted and to be removed;

c. Landmark trees;

d. Groves (trees standing in close proximity, which form a continuous canopy) with indication of predominant species, estimated number and average size;

e. Any off-site tree which could be adversely affected by the proposed activity;

f. The location and dimensions of established and proposed buffers, natural vegetation easements and open space areas for public, private or community use;

g. Buildable areas;

h. Protected areas; and

i. Limits of construction line.

2. A Grading Plan. When the proposed development requires a grading plan as specified in Chapter 16.48, the following information shall be included on the grading plan:

a. A statement in the detailed plans describing how trees intended to remain will be protected during development;

b. The location and dimensions of areas to be cleared, grubbed, graded, filled, excavated or otherwise disturbed;

c. A general grading plan with proposed grade changes adjoining or within the critical root zone;

d. Trees to be retained;

e. The protected areas, the buildable areas and the limits of construction line; and

f. A statement that all trees being retained will be identified by some method, such as painting, flagging, etc., and, where protective barriers are necessary, that they will be erected before work starts (see Section 16.60.090).

3. Proposed Tree Plan. A survey, drawn to scale, identifying the proposed tree plan for the property including trees to be retained and the trees that are to be planted. The applicant is also required to calculate the site tree density with a detailed explanation including the number, size and species.

4. Additional Information. Any additional or more detailed information required by the director to ensure compliance with the provisions of this chapter.

E. Residential Development Containing Five or More Units. Commercial and Industrial Zoning Districts. For single-family development, subdivisions and multifamily residential developments containing five or more units, commercial, industrial zoning districts, the permit applicant shall have a qualified professional forester:

1. Prepare the tree survey and the tree protection and replacement plan enumerated in subdivisions 1, 2 and 3 of subsection D of this section;

2. Propose steps to protect trees during the course of construction pursuant to Section 16.60.090;

3. Calculate the proposed tree density factor indicating the total existing trees to be preserved and the replacement trees to be planted;

4. Prepare a cost estimate for the proposed replacement trees, the installation costs and the annual maintenance costs;

5. Submit four copies of a topographical survey, if such survey is required by local or state law, other than this chapter, sealed by a registered engineer or registered surveyor, containing all the information required in subdivision 2 of subsection of this section;

6. Provide one aerial photograph of the site and any other additional information required by the director.

F. The director may waive the requirements for a scaled drawing and other submission data if she/he finds that the information presented is sufficient to determine the project's compliance with the provisions of this chapter. (Ord. 5248 §11(part), 1991).

16.60.060 Tree protection and replacement plan review procedure. A. Departmental Review. The director shall review the tree protection and replacement plan and tree removal permit application to determine whether the applicant has provided all required information. Completed applications shall be referred to appropriate city departments for review.

1. Notice of the tree removal permit application shall be posted by the city on the subject site for a period of not less than ten days for single-family development, subdivisions and multifamily residential developments containing five or more units, and commercial and industrial zoning districts.

2. Upon request of either the applicant or the city, the city may conduct field inspections or review meetings. City departments involved in the review shall submit their reports and recommendations to the director, who shall forward them to the appropriate approval authority.

B. Approval Authority. A qualified professional forester shall review the proposed tree protection and replacement plan and the application for the tree removal permit to determine whether the standards required within this chapter have been met by the applicant. The qualified professional forester shall forward a recommendation to the city official who is responsible for approving the proposed development and granting or denying the application for a tree removal permit as follows:

1. Where site plan review or plat approval by the hearing examiner is not required by city ordinance, the approval of the tree protection and replacement plan and the granting or denial of the tree removal permit shall be

the responsibility of the director. Decisions of the director may be appealed to the hearing examiner.

2. Where the site is proposed for development necessitating site plan review and plat approval by the hearing examiner, the hearing examiner shall be responsible for approving the tree protection and replacement plan and granting or denying approval of the application for a tree removal permit (subject to affirmation, reversal or modification by the city council on a appeal with respect to plat approvals).

3. In granting or denying a permit the responsible city official shall consider the recommendation of the qualified professional forester and the standards enumerated in Section 16.60.070.

C. Permit Issuance.

1. Within ten working days of the receipt of a tree protection and replacement plan, a complete tree removal permit application and a copy of any associated development applications for projects requiring only staff review, and within fifteen working days for projects requiring evaluation by consulting specialists, the director shall make every effort to review the proposed activity for conformance with the provisions of this chapter, confer with other affected departments and needed specialists, and take one of the following actions:

a. Approve the tree protection and replacement plan and issue a tree removal permit;

b. Inform the applicant that the permit will be issued concurrently with the associated development permit or approval;

c. Return the application if the submission is incomplete and inform the applicant of the deficiencies;

d. Approve the tree protection and replacement plan and tree removal permit with conditions as necessary to fulfill the provisions of this chapter; or

e. Deny the permit, indicating in writing the deficiencies or reasons for denial and the procedure for submitting a revised tree protection and replacement plan and tree removal permit application.

2. The director may require an evaluation by a qualified professional forester, engineer, soils engineer, testing lab, or other specialist, at the applicant's expense, at any time during the tree protection and replacement plan review process or tree removal permit inspection as necessary to ensure compliance with the provisions of this chapter and/or the terms of the tree removal permit.

D. Approval of Tree Protection and Replacement Plan and Granting of a Tree Removal Permit. Whenever a tree protection and replacement plan is approved and application for a tree removal permit is granted, the reviewing authority shall:

1. Conditions. Attach conditions considered necessary by the reviewing authority to ensure the intent of this chapter will be fulfilled. This includes adjustment of the limits of construction to insure survival of trees designated to be retained; and,

2. Completion of Operations. Fix a reasonable time to complete tree removal operations. All tree protection and replacement plan activities regulated by this chapter shall proceed continuously or in approved phases in an expeditious manner unless halted by unfavorable weather or a stop work order. In no case shall more than one hundred eighty days lapse between inspections.

E. Public Notice. If the approval authority approves the tree protection and replacement plan or grants a tree removal permit, notice of the decision shall be mailed to the applicant and be posted by the city on the subject site for a period of ten working days, during which there shall be no tree removal work done. No tree removal work shall be done during the notice periods or when appeals are pending disposition. Residential projects containing one to four units shall be exempt from the public notice requirements herein.

F. Permit Duration. A permit issued under this chapter shall be valid for one hundred eighty days or the duration of the associated development permit or approval, whichever is greater. The director may authorize a one hundred eighty day extension or permit extensions consistent with those extensions allowed under the associated development permit or approval. The director may require additional conditions in conjunction with a permit extension if necessary to ensure compliance with the provisions of this chapter.

G. Permit Amendments. The permittee may request and the director may approve a minor amendment to an approved permit at any time. In addition, the director may require reasonable project modifications to protect drainageways, environmentally sensitive areas, and adjoining property and structures from damage or to alleviate hazardous conditions.

H. Display of Permits and Inspection.

1. Posting Property/Obligation of Person(s) Performing Work. Work regulated by this chapter shall not commence until the appropriate permits have been posted on the worksite in a conspicuous location. The notice shall remain posted until the director accepts the work as complete. Every contractor or other person performing or directing the performance of any work requiring a permit under this chapter shall have a duty to be familiar with and comply with the relevant terms and conditions of the permit and any associated plans and specifications.

2. Inspections.

a. The director shall have right of entry to the work site for the purposes of performing the inspections authorized in this chapter and taking action as required to enforce the provisions of this chapter and to protect public safety, adjoining properties and environmentally sensitive areas.

b. The director shall conduct inspections as necessary to ensure compliance with this chapter, approved plans and the terms of permits. The director shall, as applicable, conduct inspections at the following project stages unless s/he determines that fewer or more inspections are necessary considering the scale and nature of the project, site conditions or the proximity to an environmentally sensitive area:

i. After the submission of a tree protection and replacement plan and before the issuance of a permit;

ii. Upon installation of tree protection barriers in accordance with Section 16.60.100;

iii. Upon completion of the permitted activity and installation of any required restorative or replacement landscaping;

iv. Prior to release of a maintenance surety for required replacement landscaping; and

v. In no case shall more than one hundred eighty days lapse between inspections.

3. Upon completion of the inspection, the director shall either approve the work or notify the permittee in writing as to the nature of the violation or deficiency and specify the compliance time.

4. The permit grantee shall allow city representatives to enter and inspect the premises at any reasonable time. Failure to allow inspection shall constitute a violation of this chapter.

I. Surety. For residential developments containing five or more units, and projects within commercial and industrial zoning districts the following surety will be required.

1. Performance Surety. To insure completion of the tree protection and replacement plan and compliance with the conditions of a tree removal permit granted pursuant to this section, the approval authority shall require that the applicant post a bond, cash escrow, irrevocable letter of credit, or other financial instrument approved by the city attorney in a face amount equal to one hundred twenty-five percent of the estimated cost to obtain and plant the trees required by said plan if the total value of said trees exceeds one thousand dollars. The estimated value of trees shall be subject to approval of the director. The director may also require such a surety in an amount s/he deems reasonable and necessary to ensure completion of other permitted work in accordance with the

terms of the tree removal permit. The city will draw upon these funds as necessary to do the following if the applicant/permittee fails to do so within the time period specified by the director, to remedy violations to the plan or the permit:

a. To complete the project in compliance with the terms of the plan or permit;

b. To remedy any damage to public streets, utilities and property caused by the applicant/permittee in meeting the terms and conditions of the tree protection and replacement plan and tree removal permit; and

c. To alleviate hazardous conditions resulting from the applicant/permittee's performance of work pursuant to the tree protection and replacement plan and tree removal permit.

2. Any surety required under this chapter shall be in addition to any other surety required by the city for the project. The surety required through this chapter may not be released without the director's authorization.

3. If the city deems it necessary to expend all or part of the surety, the director may issue a stop work order on the project until the applicant/permittee reestablishes sufficient surety, as determined by the director, to ensure completion of the project in accordance with the terms of the plan or the permit. This authority does not limit the general authority provided in Section 16.60.140 of this chapter to impose stop work orders.

4. If the cost of remedial work exceeds the surety amount, the city may place a lien upon the property for the amount of the additional costs.

5. The surety shall be released upon the director's acceptance of the completed work. (Ord. 5248 §11(part), 1991).

16.60.070 Review standards for tree protection. The following standards shall govern the approval of a tree protection and replacement plan and the granting or denial of an application for a tree removal permit:

A. Developmental Alternatives. Preservation and conservation of wooded areas, trees, similar woody vegetation and related natural resources and processes shall have priority over development when there are feasible and prudent location alternatives on site for proposed building structures or other site improvements.

B. Tree Removal. Tree removal and clearing shall be limited to designated street rights-of-way, drainage and utility areas and areas necessary for the construction of buildings, structures or other site improvements. Clearing for roads and utilities shall be the minimum necessary to accomplish the engineering designs and shall be restricted to designated rights-of-way unless otherwise approved by

the director based upon a demonstrated need and permission of the affected landowner.

C. Design. Development shall be designed, located and conducted so as to minimize the loss of healthy stands of trees as identified by a qualified professional forester, degradation of wildlife habitat as identified through environmental review, and the potential for erosion and slope failure.

D. Phasing. Tree removal operations shall be conducted so as to expose the smallest practicable area of earth to erosion for the least possible time. If the project is phased, tree removal shall be phased accordingly (i. e., for tracts which require preliminary plat approval, the tree protection and replacement plan will limit tree removal to only those areas which will allow the construction of streets, utilities, stormwater drainage facilities and other such community facilities.)

E. Retention Priority. In designing a project, the applicant shall retain the following, in the following order of priority, unless it would make reasonable use of the property allowed under the zoning impractical or impossible:

1. Landmark trees;

2. Trees along or upon slopes greater than fifteen percent, and in areas with highly erodible soils, and along drainageways and water bodies where they serve to stabilize soils and retard erosion and sedimentation;

3. Stands of healthy trees which form a continuous canopy and/or are mutually dependent, as identified by a qualified professional forester;

4. Trees which provide wildlife habitat as identified through environmental review;

5. Trees which are unusual due to their size, age or rarity;

6. Healthy, windfirm trees bordering public rights-of-way;

7. Trees sheltering interior trees or trees on adjacent property from strong winds that could otherwise cause them to blow down;

8. Trees which separate incompatible uses or reduce sound and wind levels.

F. Compliance With Statutes and Ordinances. Implementation of this chapter may be coordinated with other city, state or federal statutes and ordinances.

1. To ensure that tree removal or land clearing activity regulated by this chapter is carefully coordinated with the development or use of a parcel, the applications for tree removal and development permits and/or approvals shall be submitted and processed concurrently. A permit required under this chapter may be issued concurrently with approval of one or more of the following:

a. Engineering permit;
b. Building permit;
c. Preliminary or final plat or short plat;
d. Binding site plan;
e. Conditional use permit or variance;
f. Shoreline substantial development permit;
g. Planned residential development or planned unit development;
h. Design review; or
i. Project within the public right-of-way or an approved utility extension.

2. The director shall coordinate the review of the project with affected departments and agencies. Conditions or requirements recommended or required by other departments and agencies shall be reflected, as appropriate, in the terms of the permit.

3. Tree removal authorized under this chapter shall be consistent with all other applicable programs, regulations and ordinances, including, but not limited to, the shoreline master program, the stormwater control manual, and the Uniform Building Code. Whenever conflicts exist between this chapter and federal, state, or local laws, ordinances or rules, the more restrictive provisions shall apply.

4. Issuance of a permit under this chapter does not exempt the permittee from procuring and complying with other required permits or approvals.

G. Limitation. Tree removal shall be limited to instances where:

1. Necessary for a building, structure or other site improvement, and the permit applicant has shown there is no location alternative on-site for a proposed building, structure or other site improvement; or

2. The tree is diseased, damaged or in danger of falling, is located too close to existing or proposed buildings or structures, interferes with existing or proposed utility service or drainage, creates unsafe vision clearance or does not conform to other city ordinances or regulations;

3. Upon demonstration by the applicant, consistent with sound site planning, forestry and landscape practices, that all or part of the existing trees considered for preservation are impractical or unsuitable, the approval authority may approve a binding proposed tree plan, which in the approval authority's judgment will provide tree cover that will serve the purposes of this chapter as well as or better than the existing trees.

H. Thinning. Stands of trees may be thinned, based upon the recommendation of a qualified professional forester, to remove dead or diseased trees, or to accommodate outdoor recreational activities or essential site facili-

ties, provided that the integrity and safety of the stand is not diminished.

I. Replacement Evaluation. The approval authority shall evaluate the applicant's proposed tree protection and replacement plan, including grading plan and landscape plan, confirm or identify trees to be retained, and specify any special precautions that must be taken to ensure the survival of the trees. In making this evaluation, the approval authority shall consider, as appropriate, the site's soil conditions, topography and drainage; each tree's condition, stability, size and location; each tree's function in retarding erosion and sedimentation, reducing runoff and stabilizing slopes; and each tree's importance to the character of the surrounding area and habitat value. The approval authority shall also consider the ability of the tree to survive the construction phase and coexist with the proposed development considering potential public safety risks, proximity to existing and proposed structures and other improvements, and potential interference with utility lines, septic tanks, drainfields, sidewalks, streets, traffic, solar access, gardens and other development.

J. Environmentally Sensitive Areas. The approval authority shall restrict activities and/or impose conditions as warranted, to protect environmentally sensitive areas and their associated buffers, water quality, property or public safety. This may include the prohibition or restriction of land clearing and tree removal operations up-slope from streams, wetlands, water bodies, and other environmentally sensitive areas where such activities would result in damage to the sensitive area.

K. Alternative Compliance. All tree removal permit activities regulated by this chapter shall be performed in compliance with the applicable standards contained in this chapter, unless the applicant demonstrates that alternate measures or procedures will be equal or superior to the provisions of this chapter in accomplishing the purposes of this chapter.

L. Modifications to the Site Plan. The approval authority may require modifications to the site plan or subdivision to accommodate stands of trees or individual trees consistent with the provisions of this chapter and the reasonable use of the property. The approval authority may require that all or part of the trees required for retention or replacement be located along public rights-of-way and/or site boundaries to help minimize potential land use conflicts, or to serve other purposes of this chapter. The approval authority shall only require retention of trees near structures and along rights-of-way based upon the recommendation of a qualified professional forester indicating that the trees are healthy and not prone to wind

throw, or pose a negligible risk to property and public safety.

M. Timeline. The approval authority shall set a deadline for the installation of replacement trees and will require a financial surety as provided in Section 16.60.100. (Ord. 5248 §11(part), 1991).

16.60.080 Tree protection and replacement requirement --Transition to urban forestry. A. Minimum Tree Density Requirement Established. A minimum tree density is required in the buildable area of each site. The tree density may consist of existing trees, replacement trees or a combination of existing and replacement trees. The site density of trees to be protected on each site shall be determined prior to approval of a tree protection and replacement plan or tree removal permit, by the approval authority.

B. Tree Density Calculation. The minimum tree density factor required for each site is fifteen tree units per acre. To calculate the density of trees to be protected:

1. Measure the stem diameter of each protected tree 4.5 feet above the ground line. This is called diameter at breast height (DBH) and is measured in inches.

2. Go to Table 16.60.080A and select the tree unit value that corresponds to the DBH for each protected tree.

Example: A twenty-inch DBH tree has a tree unit value of 2.2.

3. Add up the tree unit values for all protected trees and divide by the total acreage of the buildable area. This value must be greater than fifteen tree units per acre. If the total is less than fifteen tree units per acre, more trees must be protected or replacement trees will be required.

C. Replacement Tree Requirement. If existing trees are inappropriate or inadequate to meet the minimum of fifteen tree units per acre, a sufficient number of replacement trees shall be planted to meet the minimum requirement. To determine the total number of replacement trees required, refer to Table 16.60.080B.

1. Replacement trees are measured differently than protected trees. Instead of measuring DBH as in protected trees, replacement trees are measured by caliper in inches. Caliper on replacement trees is measured six inches above the ground line for four inches and smaller trees, and twelve inches above the ground for larger replacement trees.

2. Go to Table 16.60.080B and select the tree unit value that corresponds to the caliper for each replacement tree.

Example: A two-inch caliper tree has a tree unit value of 0.5.

3. Add up the tree unit values for all replacement trees to determine how many of that size tree will be required to achieve the minimum site density.

Example: If there are no trees or the trees are not appropriate for protection on a one acre site and the selected replacement trees were two-inch caliper, then thirty replacement trees must be planted.

D. Replacement Tree Quality. Replacement trees shall be State Department of Agriculture Nursery Grade No. 1 or better and must be approved by the city prior to planting. Replacement trees must be staked, fertilized and mulched.

E. Replacement Tree Location.

1. City Approval Required. The applicant's proposed location of transplanted or replacement trees shall be subject to city approval as part of the tree protection and replacement plan.

2. Location on Site. To the extent feasible and desirable, trees shall be relocated or replaced on-site.

3. Relocation or Replacement Off-site. Where it is not feasible to relocate or replace trees on-site, relocation or replacement may be made at another approved location in the city.

4. City Tree Fund. Where it is not feasible to relocate or replace trees on site or at another approved location in the city, the tree removal permit permittee shall pay into the city tree account an amount of money approximating the current market value of the replacement trees that would otherwise be required. The city shall use the city tree account for the purpose of acquiring, maintaining and preserving wooded areas and for planting and maintaining trees within the city.

TABLE 16.60.080A

EXISTING TREES TO REMAIN

(Conversion from diameter (DBH) to tree units for trees protected on site)

DBH"	Tree Units	DBH"	Tree Units	DBH"	Tree Units
1-4	.1	22	2.6	37	7.5
5-7	.3	23	2.9	38	7.9
8-9	.5	24	3.1	39	8.3
10	.6	25	3.4	40	8.7
11	.7	26	3.7	41	9.2
12	.8	27	4.0	42	9.6
13	.9	28	4.3	43	10.1
14	1.1	29	4.6	44	10.6
15	1.2	30	4.9	45	11.0
16	1.4	31	5.2	46	11.5
17	1.6	32	5.6	47	12.0
18	1.8	33	5.9	48	12.6
19	2.0	34	6.3	49	13.1
20	2.2	35	6.7	50	13.6
21	2.4	36	7.1		

TABLE 16.60.080B

REPLACEMENT TREES

(Conversion from caliper inches to tree units for replacement trees)

Caliper	Units	Caliper	Units
1	.4	8	1.3
2	.5	9	1.5
3	.6	10	1.7
4	.7	11	1.9
5	.9	12	2.1
6	1.0	13	2.3
7	1.2	14	2.5

(Ord. 5248 §11(part), 1991).

16.60.090 Tree protection during construction. Prior to initiating tree removal on the site, trees to be preserved shall be protected from potentially damaging activities as follows unless otherwise approved by the approval authority consistent with accepted urban forestry, landscape and horticultural practices.

A. Placing Materials Near Tree. No person may conduct any activity within the protected area of any tree designated to remain, including, but not limited to, parking equipment, placing solvents, storing building material and soil deposits, dumping concrete washout and locating burnholes.

B. Attachments to Trees. During construction, no person shall attach any object to any tree designated for protection.

C. Protective Barrier. Before development, land clearing, filling or any land alteration for which a tree removal permit is required, the applicant:

1. Shall erect and maintain readily visible protective tree fencing along the outer edge and completely surrounding the protected area of all protected trees or groups of trees. Where possible, an area twice the circumference of the critical root zone of large conifers to be retained should be protected to minimize the potential for wind throw. Fences shall be at least four feet high;

2. May be required to cover with mulch to a depth of at least four inches or with plywood or similar material

the areas adjoining the critical root zone of a tree in order to protect roots from damage caused by heavy equipment;

3. Shall prohibit excavation or compaction of earth or other potentially damaging activities within the barriers;

4. May be required to minimize root damage by excavating a two foot deep trench to cleanly sever the roots of trees to be retained;

5. Shall keep the protective fencing in place until the city authorizes the removal or issues a final certificate of occupancy, whichever occurs first. Protective tree fencing shall be constructed of wood, metal or other substantial material; and

6. Shall ensure that any landscaping done in the protected zone subsequent to the removal of the barriers shall be accomplished with light machinery or hand labor.

D. Grade.

1. The grade shall not be elevated or reduced within the critical root zone of trees to be preserved without the director's authorization. The director may allow coverage of up to one half of the area of the tree's critical root zone with light soils (no clay) to the minimum depth necessary to carry out grading or proposed tree plan, if it will not imperil the survival of the tree. Aeration devices may be required to ensure the tree's survival. If required, the cost of the aeration devices shall not exceed the cost of removing the tree and replacing it with a tree(s) of comparable unit value as determined pursuant to Tables 16.60.080A and B.

2. If the grade adjacent to a preserved tree is raised such that it could slough or erode into the tree's critical root zone, it shall be permanently stabilized to prevent suffocation of the roots.

3. The applicant shall not install an impervious surface within the critical root zone of any tree to be retained without the authorization of the director. The director may require specific construction methods and/or use of aeration devices to ensure the tree's survival and to minimize the potential for root induced damage to the impervious surface.

4. To the greatest extent practical, utility trenches shall be located outside of the critical root zone of trees to be retained. The director may require that utilities be tunnelled under the roots of trees to be retained if s/he determines that trenching would significantly reduce the chances of the trees survival. If required, the cost of the trenching or the tunnelling shall not exceed the cost of removing the tree and replacing it with a tree(s) of comparable unit value as determined pursuant to Tables 16.60.080 A and B.

5. Trees and other vegetation to be retained shall be protected from erosion and sedimentation.

E. Directional Felling. Directional felling of trees shall be used to avoid damage to trees designated for retention.

F. Additional Requirements. The approval authority may require additional tree protection measures which are consistent with accepted urban forestry practices. (Ord. 5248 §11(part), 1991).

16.60.100 Maintenance requirements. A. Maintenance Requirement. The term "maintenance requirement" as used in this chapter shall be defined as follows: The property owner shall be responsible for the regular care and maintenance of all trees in the approved tree protection and replacement plan. Trees are to be maintained in a vigorous and healthy condition, free from diseases, pests and weeds. This maintenance shall include feeding, watering, fertilization, pruning or other needed maintenance, in accordance with generally accepted arboricultural practices. Trees which become diseased, severely damaged or which die shall be removed by the owner as soon as possible but no later than sixty days after notification by the city. All trees removed under this section shall be replaced with a healthy tree of the same size and species as required by the approved tree protection and replacement plan for the property.

B. Applicability of Maintenance Requirement. The maintenance requirement shall apply as follows:

1. Residential Property Owners--Single-family and Multifamily Developments--One to Four Units. The maintenance requirement shall not apply to owners of residential property that is classified as single-family or multifamily and located in a development of one to four units or to open space or common areas within such developments.

2. Areas Dedicated as Open Space or Common Areas in Single-family Residential Developments that Exceed Four Units.

a. For areas dedicated as open space or common area in a single-family residential development that exceeds four units, the tree protection and replacement plan and the maintenance requirement of this section shall be in effect for three years from the date the final plat approval is issued for the project. The tree plan shall be a condition of approval identified on the face of the plat. The applicant shall also execute a covenant in a form agreeable to the city which shall require the applicant and his successors to comply with the maintenance requirement of this section. The covenant shall obligate both the property owner and the homeowner's association, if one is

formed. The covenant shall be recorded by the county auditor. The recording fee shall be paid by the applicant.

b. In any single-family residential development in excess of nine units, the covenant specified in paragraph a of this subdivision shall include a requirement that the property owners form a homeowner's association for the purpose of carrying out the provisions of the tree protection and replacement plan and the maintenance requirement of this section.

3. Multifamily Residential, Commercial, Industrial Developments. For all trees covered by the tree protection and replacement plan, the maintenance requirement shall apply in perpetuity to developments that are multifamily residential developments in excess of four units, commercial and industrial. The applicant shall execute a covenant in a form agreeable to the city which shall require that the applicant and his successors comply with the maintenance requirement imposed by this section. The covenant shall be binding on successor property owners and owners' associations. The covenant shall be recorded by the county auditor. The recording fee shall be paid by the applicant.

C. Maintenance Agreement.

1. Each development listed in subsection B of this section to which the maintenance requirement of this chapter applies shall also be subject to a maintenance agreement. The director shall require the applicant to execute a maintenance agreement with the city, in a form acceptable to the city attorney, which shall include the provisions of the maintenance requirement in this chapter, to ensure the survival of trees located in each development and to ensure compliance with the tree protection and replacement plan.

2. The maintenance agreement for developments that are multifamily residential in excess of four units, commercial and industrial developments shall be accompanied by a surety document (bond, cash, letter of credit or similar document) approved by the city attorney. The surety document shall have a face amount equal to one hundred twenty-five percent of the estimated amount necessary to guarantee the maintenance and replacement of trees in conformance with the maintenance requirement and authorized tree protection and replacement plan for a period of three years from the date the certificate of occupancy is issued by the city for the project or from the date of final plat approval as the director determines is appropriate.

3. Any surety required under this section shall be in addition to any other surety required by the city for the project. The surety required through this section may not be released without the director's authorization. If the cost of remedial work exceeds the surety amount, the city may place a lien upon the property for the amount of the additional costs. If the city expends all or part of

the surety, the director may require that the applicant/permittee reestablish sufficient surety, as determined by the director, to ensure that the conditions of the tree protection and replacement plan and the maintenance requirements are met. The surety shall be released upon the passage of a maintenance inspection by the director three years from the date a certificate of occupancy is issued by the city.

4. Table 16.60.100 sets forth a summary of the projects that require a maintenance agreement and a surety document pursuant to this section.

Table 16.60.100

Type of Development	Maintenance Agreement	Bonding
Residential 1 to 4 units	No	No
Short plats 5 to 9 units - Single-family homes	Yes - 3 years Common areas only	No
Long plats 10 units or more - single-family homes	Yes - 3 years - Common areas only Home owners associations	No
Multifamily - 5 units or more	Yes - Perpetuity	Yes
Industrial	Yes - Perpetuity	Yes
Commercial	Yes - Perpetuity	Yes

D. Failure to maintain. Failure to regularly maintain the trees as required in this section shall constitute a violation of this chapter and, if applicable, the plat covenant. (Ord. 5248 §11(part), 1991).

16.60.110 Variance for hardship. A. Authority Established. The approval authority may grant variances from these detailed regulations when undue hardship may result from strict compliance.

B. Conditions to be Prescribed. In granting any variance, the approval authority shall prescribe conditions deemed necessary or desirable for the public interest.

C. Findings. No variance shall be granted unless the approval authority finds that all of the following circumstances exist:

1. The there are special circumstances or conditions affecting the property such that the strict applica-

tion of the provisions of this chapter would deprive the applicant of the reasonable use of her/his land;

2. That the variance is necessary for the preservation and enjoyment of a substantial property right of the petitioner;

3. That the variance will further the objectives and policies of this chapter. Innovative tree protection management practices designed to address the requirements of this chapter which enhance the quality and character of the trees and maintain the desired tree density on the site are encouraged. Innovative practice proposals shall be judged on technical merit, the degree to which they meet the intent of this chapter, the advantages over standard practices, and the anticipated maintenance requirements. Innovative practice proposals may be reviewed and approved by the approval authority. (Ord. 5248 §11(part), 1991).

16.60.120 Appeal--Modification. A. Any condition required herein by any provision of this chapter may be appealed to the hearing examiner, if it is a decision of the director, or to the city council, if it is a decision of the hearing examiner. An appeal must be filed in writing, within the ten day period following the granting or denial of the permit. The appeal shall be accompanied by a statement setting forth in detail the reasons for the appeal and proposed modifications to the tree protection and replacement plan. Appeals shall be processed according to the procedures specified in Chapter 18.71 of this code. The timely filing of an appeal shall have the effect of suspending the issuance of a permit pending the outcome of the appeal.

B. On appeal, no modification to the tree protection and replacement plan or tree removal permit shall be granted which would have the effect of granting a special privilege not shared by other property in the same vicinity. To grant a modification, the appeal authority must find that all of the following conditions apply:

1. There are exceptional or extraordinary circumstances or conditions which apply to the land referred to in the tree protection and replacement plan which do not apply generally to all lands in the vicinity. These include, but are not limited to, size, shape, topography, location or surroundings;

2. The granting of the modification to the tree protection and replacement plan is necessary for the preservation and enjoyment of substantial property rights of the appellant;

3. The granting of the modification to the tree protection and replacement plan will not, under circumstances of the particular case, affect adversely the health or safety of persons residing or working in the neighbor-

hood of the property referred to in the tree plan and will not be detrimental to the public welfare or injurious to property or improvements in the neighborhood or adversely affect the comprehensive plan. (Ord. 5248 §11(part), 1991).

16.60.130 Enforcement--Penalties. A. Authority. It shall be the duty of the director of public works to administer the provisions of this chapter. The director shall have authority to issue permits, impose conditions, enforce the provisions and requirements of this chapter and permits issued thereunder, and establish administrative procedures and guidelines, conduct inspections, and prepare the forms necessary to carry out the purposes of this chapter.

B. Authorized Actions. In addition to other remedies, the city may bring injunctive, declaratory or other actions to enforce this chapter.

C. Stop Work Orders/Permit Revocation.

1. The director shall suspend work or revoke a permit, as appropriate, if s/he finds that:

a. The work is not authorized by a valid permit;

b. Inaccurate information was used to obtain the permit;

c. The permittee is not complying with the terms of the permit or approved plans;

d. The work is, in the director's judgment, a hazard to property or public safety, is adversely affecting or about to adversely affect adjacent property or rights-of-way, a drainageway, watercourse, environmentally sensitive area or stormwater facility, or is otherwise adversely affecting the public health, safety, or welfare;

e. Adverse weather is causing significant problems on or off site; or

f. The required project surety has been expended ~~to the~~ point that it no longer provides assurance of the completion of the project in compliance with the terms of the permit.

2. The director shall issue the permittee/violator a written notice specifying the nature of the violation or problem which must be remedied prior to resuming other work on the project. If the permittee does not comply with the order within the time specified, the director, as an alternative to other remedies, may enter the project site and perform the required work. All costs incurred by the city in performing such work shall be drawn against the surety posted by the permittee to insure the enforcement of the provisions of the tree protection and replacement plan or the tree removal permit. In the absence of sufficient surety, the city may place a lien against the property in

the amount of the funds expended to perform the required work.

D. Restoration. Violators of this chapter or of a permit issued thereunder shall be responsible for restoring unlawfully damaged areas in conformance with a plan, approved by the director, which provides for repair of any environmental and property damage, and restoration of the site; and which results in a site condition that, to the greatest extent practical, equals the site condition that would have existed in the absence of the violation(s).

E. Prohibition of Further Approvals. The city shall not accept, process, or approve any application for a subdivision or any other development permit or approval, or issue a certificate of occupancy for property on which a violation of this chapter has occurred until the violation is cured by restoration or other means accepted by the director and by payment of any penalty imposed for the violation.

F. Civil Penalty.

1. A person who fails to comply with the requirements of this chapter or the terms of a permit issued hereunder, who undertakes an activity regulated by this chapter without obtaining a permit, or fails to comply with a stop work order issued under this chapter shall also be subject to a civil penalty not to exceed five hundred dollars. Each day that a permit violation continues shall constitute a separate violation. In addition, each unlawfully destroyed tree shall constitute a separate violation.

2. Any person who aids or abets in the violation shall be considered to have committed a violation for purposes of the civil penalty.

3. The amount of the penalty shall reflect:

a. The cost to remedy environmental and property damage resulting from the violation;

b. All costs incurred by the city to enforce this chapter against the violator; and

c. The number and extent of past violations of this chapter.

4. Notice of penalty. A civil penalty shall be imposed by a notice in writing, by certified mail with return receipt requested, or by personal service. The notice shall describe the nature and date of the violation, and order the acts constituting the violation to cease and desist, and, when appropriate, require necessary corrective action within a specified time.

5. Appeal. Any person incurring a penalty may, within ten days of the receipt of the notice of the penalty, apply to the hearings examiner in accordance with the procedure specified in Section 16.60.100. The hearings examiner may affirm, modify or reverse the penalty based on the provisions of this chapter.

6. The provisions of this subsection shall apply to violations of this chapter in lieu of the provisions set forth in Chapter 16.52 of this code.

G. Public Nuisance. Any violation of the provisions of this chapter or a violation of a permit issued hereunder is declared to be a public nuisance and may be abated through proceeding for injunctive or similar relief in Superior Court or other court of competent jurisdiction.

H. Violation--Misdemeanor. Any person who violates any provision of this chapter is guilty of a misdemeanor and is subject to a fine not exceeding five thousand dollars or jail time not exceeding ninety days or both such fine and jail time. (Ord. 5248 §11(part), 1991).

16.60.140 Liability on the city. Nothing in this chapter shall be deemed to impose any liability upon the city or upon any of its officers or employees, or to relieve the owner or occupant of any private property from the duty to keep in safe and healthy condition the trees upon their property or upon a public right-of-way over their property. (Ord. 5248 §11(part), 1991).

16.60.150 Review of chapter by city council. This chapter will be reviewed by the city council no later than twelve months subsequent to its effective date to determine what, if any, modifications, additions or deletions are appropriate to carry out the purpose of the chapter. (Ord. 5248 §11(part), 1991).

APPENDIX E -- PREFERRED SPECIES LISTS

CITY OF SWEET HOME – PREFERRED SPECIES LIST

This following list of trees is for *right-of-way* plantings. Trees not recommended for planting in the right-of-way may be suited for planting in park areas or yards. This list is not exhaustive, rather it includes a number of trees that will grow well in Sweet Home. An asterisk at the left of the common name indicates that the tree is only available at a limited number of nurseries. The Oregon Association of Nurseryman sells a directory of member nurseries. Contact OAN, 2780 SE Harrison St. Suite 102, Milwaukee, OR 97222, 1-800-342-6401.

SMALL – Trees that reach heights of less than 35 feet

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
*	ASH, GLOBE HEADED EUROPEAN	*Fraxinus excelsior globosum*	20	15	Formal appearance
*	ASH, GOLDEN DESERT	*Fraxinus oxycarpa `aureoplia'*	20	18	Golden bark
*	ASH, FLOWERING	*Fraxinus ornus*	30	30	Showy white flowers in May, June
*	BUCKEYE, RED	*Aesculus pavia*	30	25	Large showy red flowers
	CALLERY PEAR	*Pyrus calleryana*	30	20	Avoid cultivar selections w/ poor branch habit
	CRABAPPLE, DAVID	*Malus `David'*	12	12	Compact rounded form
	CRABAPPLE, RED BARON	*Malus `Red Baron'*	18	8	Narrow columnar form
	CRABAPPLE, ADIRONDACK	*Malus `Adirondack'*	18	10	Dense upright form, Disease resistant
	CRABAPPLE, CENTURION	*Malus `Centurion'*	20	15	Narrow-upright form
	CRABAPPLE, ADAMS	*Malus `Adams'*	20	20	Rounded form, Disease resistant
	CRABAPPLE, BEVERLY	*Malus `Beverly'*	20	20	Upright-spreading form
	DOGWOOD, FLOWERING	*Cornus florida*	20	25	Upright horizontal branching, more disease prone than Japanese dogwood
	DOGWOOD, JAPANESE	*Cornus kousa*	25	25	Vase shaped, White flowers in June
	HAWTHORN, THORNLESS COCKSPUR	*Crataegus crus-galli `inermis'*	25	25	Glossy foliage, Adaptable, Spring flowers may attract bees
*	LILAC, JAPANESE TREE	*Syringa reticulata*	30	20	Good bark character
	MAGNOLIA, STAR	*Magnolia stellata*	20	15	Heat tolerant, Many cultivars
	MAPLE, VINE	*Acer circinatum*	20	20	Native, Red fall color & fruit
	MAPLE, AMUR	*Acer ginnala*	20	20	Red fall color and fruit

CITY OF SWEET HOME – PREFERRED SPECIES LIST

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
*	MAPLE, ROCKY MTN SUGAR	*Acer grandidentatum*	25	15	Similar to sugar maple
	MAPLE, PAPERBARK	*Acer griseum*	25	20	All year interest, Brown/red flaky bark
*	MAPLE, ROCKY MOUNTAIN	*Acer glabrum*	30	20	Red fall color and fruit
	MAPLE, HEDGE	*Acer campestre*	30	30	Compact rounded form
	MOUNTAINASH, TURKESTAN	*Sorbus tianshanica*	16	8	Good for small places, All year interest
*	MOUNTAINASH, SITKA	*Sorbus sitchensis*	25	---	Oregon native
*	MOUNTAINASH, OAK-LEAVED	*Sorbus hybrida*	30	20	Leaves similar to an oak, Upright form
*	REDBUD, WESTERN	*Cercis occidentalis*	20	20	Oregon native, All year interest
	REDBUD, EASTERN	*Cercis canadensis*	25	30	Flowers before leaves, Good bark
	SERVICEBERRY	*Amelanchier x grandiflora*	20	15	White flowers
	SERVICEBERRY, ALLEGHENY	*Amelanchier laevis*	25	15	Non-aggressive roots
	SERVICEBERRY, SHADBLOW	*Amelanchier canadensis*	30	20	Showy flowers, Dark blue fruit
	SOURWOOD	*Oxydendrum arboreum*	30	20	Pyramidal form, Fragrant flowers

MEDIUM –Trees that reach heights of at least 35 feet but less than 60 feet

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	ASH, RAYWOOD	*Fraxinus oxycarpa `raywood'*	35	25	Purple red fall color
	BIRCH, RIVER	*Betula nigra*	40	35	Pyramidal, Flaky cinnamon bark
	BLACK GUM	*Nyssa sylvatica*	50	30	Pyramidal form, Good residential tree
	CORK TREE	*Phellodendron amurense*	50	35	Broadly vase shaped, cultivars are available
*	DOGWOOD, PACIFIC	*Cornus nuttalii*	50	30	Oregon native, Needs special care, more disease prone than Japanese dogwood
	ELM, PIONEER	*Ulmus `Pioneer'*	50	50	Dutch-elm disease resistant

CITY OF SWEET HOME – PREFERRED SPECIES LIST

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	HOPHORNBEAM, AMERICAN	*Ostrya virginiana*	35	25	Good for confined spaces, Adaptable
	HORNBEAM, EUROPEAN	*Carpinus betulus*	35	25	Dense pyramidal form
*	HORNBEAM, AMERICAN	*Carpinus caroliniana*	40	25	Shade tolerant, Good fall color
	HORSECHESTNUT, RED	*Aesculus carnea*	40	30	Large showy red flowers
	KATSURA TREE	*Cercidiphyllum japonicum*	40	40	All year interest
	LINDEN, LITTLE LEAF	*Tilia cordata*	50	30	Many cultivars
	LINDEN, SILVER	*Tilia tomentosa*	50	30	Attractive leaves
	MOUNTAINASH, EUROPEAN	*Sorbus aucuparia*	35	25	Bright fruit display, Many cultivars
	MOUNTAINASH, KOREAN	*Sorbus alnifolia*	40	30	All year interest
*	OAK, ITALIAN	*Quercus frainetto*	50	30	Strong central leader, Drought resistant
	OAK, SHINGLE	*Quercus imbricaria*	50	35	Adaptable to calcareous soil, Low hanging limbs
	OAK, SAWTOOTH	*Quercus acutissima*	50	40	Fast growing, Heat tolerant
	SILVERBELL, CAROLINA	*Halesia carolina*	40	35	Showy flowers
	SNOWBELL, JAPANESE	*Styrax japonica*	50	25	Beautiful flowers, Formal appearance
*	YELLOWWOOD	*Cladrastis lutea*	50	55	Good flowers and foliage, Smooth bark
	ZELKOVA	*Zelkova serrata*	50	40	Vase shaped, Many cultivars

LARGE – Trees that reach heights of 60 or more feet

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
*	ASH, OREGON	*Fraxinus latifolia*	60	40	Oregon native, Tolerant of wet soil
	ASH, GREEN	*Fraxinus pennsylvanica*	65	55	Good cultivar selection
	ASH, WHITE	*Fraxinus americana*	80	70	Good cultivar selection
	BALD CYPRESS	*Taxodium distichum*	80	45	Deciduous conifer

CITY OF SWEET HOME – PREFERRED SPECIES LIST

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	BEECH, EUROPEAN	*Fagus sylvatica*	60	45	Many, many cultivars
*	CUCUMBERTREE	*Magnolia acuminata*	80	50	Cultivars are available
	DAWN REDWOOD	*Metasequoia glyptostroboides*	60	25	Deciduous conifer, Similar to redwood
	ELM, HOMESTEAD	*Ulmus `Homestead'*	55	35	Fast growing, Disease resistant
*	ELM, LACEBARK	*Ulmus parvifolia*	75	75	Vase shaped, Many cultivars
	GINGKO	*Gingko biloba*	80	40	Use male cultivars
	HACKBERRY	*Celtis occidentalis*	60	45	Urban tolerant
	HAZEL, TURKISH	*Corylus colurna*	60	35	Scorch resistant, Formal character
	HONEY LOCUST	*Gleditsea triacanthos* inermis	60	40	Casts light shade, leaves mulch into the grass and raking is minimized, many cultivars
	KENTUCKY COFFEE TREE	*Gymnocladus dioicus*	75	50	Bold winter habit, Large fruit pods on female trees can be rather messy
	MAPLE, SUGAR	*Acer saccharum*	70	50	Good fall color
	MAPLE, NORWAY	*Acer platanoides*	70	50	Many cultivars
	MAPLE, RED	*Acer rubrum*	70	40	Many cultivars
	TULIP POPLAR	*Lireodendron tulipifera*	80	40	Flowers are like tulips, large fast growing tree
	LINDEN, AMERICAN	*Tilia americana*	60	40	Many cultivars
	LONDON PLANETREE	*Platanus acerifolia*	60	50	Broadly pyramidal form
*	OAK, LAUREL	*Quercus laurifolia*	60	40	Semi-evergreen, Formal appearance
	OAK, SWAMP WHITE	*Quercus bicolor*	60	50	Adapted to wet, poor soil
*	OAK, YELLOW CHESTNUT	*Quercus muehlenbergii*	60	50	Rounded form
	OAK, ENGLISH	*Quercus robur*	60	50	Adaptable, Cultivars available
*	OAK, CHESTNUT	*Quercus prinus*	70	60	Tolerates poor dry soils
	OAK, WILLOW	*Quercus phellos*	70	70	Delicate foliage pattern
*	OAK, SCARLET	*Quercus coccinea*	75	50	Deep and brilliant red fall color
	OAK, NORTHERN RED	*Quercus rubra*	75	50	Moderate to fast growth, Many cultivars

CITY OF SWEET HOME – PREFERRED SPECIES LIST

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	OAK, SHUMARD	*Quercus shumardii*	75	50	Tolerates poor drainage
*	OAK, WHITE	*Quercus alba*	80	50	Moderate growth rate
*	OAK, OREGON WHITE	*Quercus garryana*	80	60	Oregon native
	OAK, BUR	*Quercus macrocarpa*	80	70	Moderate to fast growth, Stout branches
*	OAK, LIVE	*Quercus virginiana*	80	100	Widely used in the Southeast
*	SASSAFRAS	*Sassafras albidum*	60	40	Red fall color, Good bark patterns
	TULIP POPLAR	*Lireodendron tulipifera*	80	40	Flowers are like tulips, large fast growing tree

APPENDIX F -- TREES FOR STREETS NAMED AFTER TREES

TREES FOR STREETS NAMED AFTER TREES

Many communities have streets named for trees. Sweet Home by encouraging the planting of the trees on this list will also have the trees for which the streets were named.

Unless noted, the trees listed are also listed on the preferred species list. Where trees that are not recommended would match the street name an alternate species or list of species has been suggested. The ginkgo tree was selected as an alternate for pines, juniper and firs. An asterisks at the left of the tree name indicates that the tree may be difficult to find at local nurseries.

BIRCH STREET

COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
BIRCH, RIVER	*Betula nigra*	40	35	Pyramidal, Flaky cinnamon bark, many cultivars

CEDAR STREET

The following trees should not be planted in the street right-of-way and are not listed on the preferred species list.

ATLAS CEDAR	*Cedrus atlantica.*	80	40	True cedar, needles in tufted clusters, many cultivars
DEODAR CEDAR	*Cedrus deodora*	80	40	True cedar, needles in tufted clusters, many cultivars
LEBANON CEDAR	*Cedrus libani*	80	40	True cedar, needles in tufted clusters, many cultivars

TREES FOR STREETS NAMED AFTER TREES

DOGWOOD STREET

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	DOGWOOD, FLOWERING	*Cornus florida*	20	25	Upright horizontal branching, more disease prone than Japanese dogwood
	DOGWOOD, JAPANESE	*Cornus kousa*	25	25	Vase shaped, White flowers in June
*	DOGWOOD, PACIFIC	*Cornus nuttalii*	50	30	Oregon native, Needs special care, more disease prone than Japanese dogwood

ELM STREET

	ELM, HOMESTEAD	*Ulmus `Homestead'*	55	35	Fast growing, Disease resistant
	ELM, PIONEER	*Ulmus `Pioneer'*	50	50	Dutch-elm disease resistant
*	ELM, LACEBARK	*Ulmus parvifolia*	75	75	Vase shaped, Many cultivars
	ZELKOVA	*Zelkova serrata*	50	40	Vase shaped, Many cultivars

TREES FOR STREETS NAMED AFTER TREES

FIR COURT AND FIR STREET

True firs become too large for most home landscapes and are susceptible to decay organisms which can make them hazardous. Douglas-fir has already been widely planted throughout the community and its use should not be promoted. One Chinese fir was found in Sweet Home. This tree is not widely used and may be difficult to find.

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	CHINESE FIR	*Cunninghamia lanceolata*	30	20	The foliage on this tree is much coarser than on Douglas-fir, it needs protection from hot dry winds and cold. This tree is not on the preferred species list.
	GINGKO	*Gingko biloba*	80	40	Use male cultivars

IRONWOOD STREET

	HOPHORNBEAM, AMERICAN	*Ostrya virginiana*	35	25	Good for confined spaces, Adaptable, Also known as ironwood
	HORNBEAM, EUROPEAN	*Carpinus betulus*	35	25	Dense pyramidal form, also known as ironwood
*	HORNBEAM, AMERICAN	*Carpinus caroliniana*	40	25	Shade tolerant, Good fall color, also known as ironwood

JUNIPER STREET AND JUNIPER COURT

*	SAWARA CEDAR	*Chamaecyparis pisifera*	60	20	Similar to juniper, not on the preferred species list
	GINKGO	*Ginkgo biloba*	80	40	Use male cultivars

TREES FOR STREETS NAMED AFTER TREES

LARCH COURT, LARCH STREET, AND TAMARACK STREET

COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
EUROPEAN LARCH	*Larix decidua*	100	40	Looses it needles in the winter, good spring and fall character, not on the preferred species list
JAPANESE LARCH	*Larix kaempferi*	100	40	Looses it needles in the winter, good spring and fall character, not on the preferred species list
WESTERN LARCH	*Larix occidentalis*	100	40	Oregon native, Looses it needles in the winter, good spring and fall character, not on the preferred species list

LOCUST COURT AND LOCUST STREET

	HONEY LOCUST	*Gleditsea triacanthos* inermis	60	40	Casts light shade, leaves mulch into the grass and raking is minimized
*	YELLOWWOOD	*Cladrastis lutea*	50	55	Good flowers and foliage, Smooth bark
	KENTUCKY COFFEE TREE	*Gymnocladus dioicus*	75	50	Bold winter habit, Large fruit pods on *female* trees can be messy

TREES FOR STREETS NAMED AFTER TREES

MAPLE DRIVE AND MAPLE STREET

	COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
	MAPLE, SUGAR	*Acer saccharum*	70	50	Good fall color
	MAPLE, NORWAY	*Acer platanoides*	70	50	Many cultivars
	MAPLE, RED	*Acer rubrum*	70	40	Many cultivars
	MAPLE, HEDGE	*Acer campestre*	30	30	Compact rounded form
	MAPLE, VINE	*Acer circinatum*	20	20	Native, Red fall color & fruit
	MAPLE, AMUR	*Acer ginnala*	20	20	Red fall color and fruit
*	MAPLE, ROCKY MOUNTAIN	*Acer glabrum*	30	20	Red fall color and fruit
*	MAPLE, ROCKY MTN SUGAR	*Acer grandidentatum*	25	15	Similar to sugar maple
	MAPLE, PAPERBARK	*Acer griseum*	25	20	All year interest, Brown/red flaky bark

OAK TERRACE

	OAK, SAWTOOTH	*Quercus acutissima*	50	40	Fast growing, Heat tolerant
*	OAK, WHITE	*Quercus alba*	80	50	Moderate growth rate
	OAK, SWAMP WHITE	*Quercus bicolor*	60	50	Adapted to wet, poor soil
*	OAK, SCARLET	*Quercus coccinea*	75	50	Deep and brilliant red fall color
*	OAK, ITALIAN	*Quercus frainetto*	50	30	Drought resistant
*	OAK, OREGON WHITE	*Quercus garryana*	80	60	Oregon native
	OAK, SHINGLE	*Quercus imbricaria*	50	35	Adapts to calcareous soil
*	OAK, LAUREL	*Quercus laurifolia*	60	40	Semi-evergreen, Formal
	OAK, BUR	*Quercus macrocarpa*	80	70	Moderate to fast growth
*	OAK, YELLOW CHESTNUT	*Quercus muehlenbergii*	60	50	Rounded form
	OAK, WILLOW	*Quercus phellos*	70	70	Delicate foliage pattern
*	OAK, CHESTNUT	*Quercus prinus*	70	60	Tolerates poor dry soils
	OAK, ENGLISH	*Quercus robur*	60	50	Adaptable, Cultivars available
	OAK, NORTHERN RED	*Quercus rubra*	75	50	Moderate to fast growth, Many cultivars
	OAK, SHUMARD	*Quercus shumardii*	75	50	Tolerates poor drainage
*	OAK, LIVE	*Quercus virginiana*	80	100	Widely used in the Southeast

TREES FOR STREETS NAMED AFTER TREES

OSAGE STREET

* OSAGE ORANGE	*Maclura pomifera*	60	40	Glossy leaves, the species has thorns and large fruit, cultivars are being developed which lack these bad characteristics, This tree is not on the preferred species list.

PINE STREET

Many pines are available in the nursery trade. As an alternative to the use of pines the gingko is suggested. Only male trees should be used because the fruit, borne by female trees, has a bad odor.

COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
GINKGO	*GINKGO biloba*	80	40	Use male cultivars

POPLAR STREET

Planting poplar trees is not recommended because of their short life span, weak wood, and invasive roots. The following trees either have leaves similar to poplars, or have a common name of poplar.

TULIP POPLAR	*Lireodendron tulipifera*	80	40	Flowers are like tulips, large fast growing tree
KATSURA TREE	*Cercidiphyllum japonicum*	40	40	All year interest

TREES FOR STREETS NAMED AFTER TREES

REDWOOD STREET

COMMON NAME	SCIENTIFIC NAME	HEIGHT IN FEET	SPREAD IN FEET	NOTES
BALD CYPRESS	*Taxodium distichum*	80	40	Native to the midwest, this tree looses its needles in the winter
COAST REDWOOD	*Sequoia sempervirens*	100+	40	A fast growing tree, roots are shallow. Not on the preferred species list: large trunk size
SEQUOIA	*Sequoiadendron giganteum*	150	40	A very fast growing tree, roots are generally deeper than redwood, Not on the preferred species list: large trunk size
DAWN REDWOOD	*Metasequoia glyptostroboides*	60	25	Deciduous conifer, Similar to redwood

APPENDIX G -- TREESENTIALS
FACT SHEETS ON TUBEX TREE SHELTERS

Fact Sheets
by
TREESSENTIALS™

Our forestry staff has developed *the TREESSENTIALS' Fact Sheets* to help you get the most out of TUBEX technology. *The TREESSENTIALS' Fact Sheets* feature:

- Professional management strategies
- Tips for efficient, effective care and maintenance
- Exciting organizations you can join to learn more
- A list of over 50 of the best sources for seedling

Every *fact sheet* is written or reviewed by experts on that subject. *The TREESSENTIALS' Fact Sheets* are:

#1	Open Field Hardwood Plantings	Pages 2 - 5
#2 & #3	Hardwood Stand Regeneration / Enhancement	Pages 6 - 7
#4	Eastern Black Walnut	Pages 8 - 9
#5	Direct Seeding Walnut, Oak & Chestnut	Pages 10 - 12
#6	Nut Trees	Pages 12 - 13
#7	Fruit Trees	Pages 14 - 15
#8	Community Forestry Projects	Pages 15 - 17
#9	Landscape Plantings With Seedlings	Pages 18 - 20
#10	Windbreaks	Pages 20 - 22
#11	Tree Seedling Nurseries	Pages 23 - 24

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P. O. Box 7097, St. Paul, MN 55107
1-800-248-8239

OPEN FIELD HARDWOOD PLANTINGS

TUBEX Fact Sheet #1

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INTRODUCTION

The state forester of a midwestern state recently commented he couldn't remember the last time he saw a successfully established young hardwood stand.

Hardwood plantings often fail because the trees get eaten by animals, killed by drought, or swarmed under by competing vegetation. TUBEX Treeshelters are ideal for establishing hardwood trees in open fields.

TUBEX protects your planting from events that are beyond your control, and makes it faster and easier to tend your trees. With TUBEX Treeshelters, sound planning, and some hard work, the trees you plant will become the forest you want.

DEFINE YOUR GOALS

What do you want your stand to produce--timber, wildlife habitat, or some of each? What do you want your stand to look like--one species, or a mixture? A plantation of regular rows or a random, natural looking forest?

Help is available. Your state forester, county conservationist, or a private forestry consultant can help you define your goals and develop a plan. Cost sharing assistance and tax incentives are also available for forest management activities. Be sure to take full advantage of these programs. Your forester can tell you what programs your state offers.

This fact sheet will help you collect your thoughts before your appointment with your forester.

DEVELOP A PLAN

In establishing your stand on an open site several factors need to be considered:

1) Deciding what to plant
2) Spacing and arrangement
3) Site preparation
4) Planting stock
5) TUBEX and your planting
6) Planting methods
7) TUBEX installation
8) Weed control

1) DECIDING WHAT TO PLANT

Match The Trees To The Site

High-value hardwoods have more exacting site requirements than other trees.

The characteristics of a good hardwood site include:

1) deep, well-drained, fertile soil
2) field is lush with vegetation
3) field was previously used for agricultural crops
4) surrounding woodlots exhibit dense growth

Watch out for sites with these characteristics--they are warnings of slow growth and frustration:

1) sparse vegetation
2) lichens and moss growing on existing vegetation or on exposed soil
3) rock outcrops
4) standing water

NOTE: A healthy, fast growing green ash (for example) is more valuable than a struggling, stressed black walnut. Take what your site gives you. If your site isn't a good one for fine hardwoods, plant other trees. Working within your site's limitations is not only the mark of good stewardship, it makes for a more enjoyable and rewarding experience.

Ironically, better sites often require more work during the first few years. On good sites, *everything* grows fast, including weeds and brush. You will have to be more vigilant in your weed control or your trees will be swarmed under. Your good site, however, will reward your efforts with superior growth in the years to come.

Single Species Stand vs. Mixed

Although single species plantings enjoy advantages of efficiency, introducing a component of diversity to forest stands can produce additional gains. Stand diversity can reduce susceptibility to disease or insect infestation, and at the same time produce a broader range of harvestable products. In addition, a mixed stand enhances the quality of wildlife habitat produced, by offering animals more nuts and seeds at different times of the year.

Chances are your site has several different soil types. A mixed planting lets you match the species to the planting site, to maximize tree growth and health.

"Nurse" Trees

Nurse trees are trees planted in between high-value trees such as oak or walnut. Nurse trees have two important jobs:

1) They "train" crop trees. Nurse trees compete with your crop trees for sunlight, forcing them to grow straight and with fewer knot-producing branches.

2) They provide additional benefits. Some nurse trees provide wildlife habitat. Others fix nitrogen in the soil, making it available to your trees for faster growth.

2) SPACING AND ARRANGEMENT

The number of trees you plant per acre and the way in which they are arranged determines how the planting will look for years to come, and how difficult or easy it is to care for.

High Density vs. Low Density

High density plantings are those with 600 or more trees per acre planted very close together.

Advantages: A densely planted field will be occupied quickly by the desired species. Once established, the closely-spaced trees will shade out competing vegetation. Competition between the trees for sunlight will encourage them to grow tall and straight, with few side branches.

Disadvantages: Planting costs are greater for high density plantings. Also, a high number of trees will have to be thinned frequently, or growth will slow.

Low density plantings are those with fewer trees planted per acre at wider spacing.

Advantages: Besides lower planting costs, the biggest advantage is that you don't spend as much time tending trees that will never become crop trees. The growth rate of individual trees (in terms of volume) will also be greater.

Disadvantages: More sunlight will reach the ground for a longer period of time requiring more weed control. More available sunlight will also increase the number of side branches.

The way to get the best of both worlds is to plant a large number of trees per acre (we recommend 10' by 10' spacing, or 435 trees/acre), with half of them fine hardwoods and half a nurse tree of some kind. Nurse trees are usually easier to establish, so more time can be devoted to tending your fine hardwoods. They will have to be thinned as their crowns begin to compete with your hardwoods.

Regular vs. Random

Regularly spaced plantings, laid out on a grid with even rows across the field, make weed control and other treatments easier. They can be planted and tended by machine.

Random plantings look more natural, but require more manual labor. Planting and weed control must be done on foot, which is much more time consuming.

NOTE: Regular plantings will become more natural looking through time. As trees are trimmed the rows become less apparent.

3. SITE PREPARATION

Site preparation is critical. Newly planted seedlings cannot compete with established weeds and brush for available moisture. Without site preparation your chances for success are very poor.

4) PLANTING STOCK

Once you have decided how many of each kind of tree you want to plant, it's time to order planting stock. There are several factors to consider when choosing and caring for your planting stock.

Bare Root vs. Container Grown

Most trees used for forest plantings are bare root. State forestry departments operate nurseries that produce the most-frequently planted species. Private nurseries provide a wider range of seedling sizes and species.

A bare root seedling is only as good as its root system.

Researchers such as Dr. Richard Schultz at Iowa State University have found that the number of "first order lateral roots" determines if and how well that tree will grow--for years to come. First order lateral roots are at least the thickness of a paper clip and branch off the main "tap" root.

According to Dr. Schultz, oak seedlings should have at least 5-6 lateral roots, and black walnut seedlings should have at least 7-8 lateral roots. These trees establish themselves quickly in the stand. Trees with fewer lateral roots at the time of planting either die or struggle for several years.

Other researchers feel bare root seedlings with a stem diameter of one-quarter inch or more have the best chance to become crop trees. There is a strong correlation between seedlings with thick stems and good root systems, so both are good guidelines.

It is probable that not all of the seedlings you purchase will meet these standards. We suggest that you take the extra step to sort your trees out by size, and plant the high quality seedling at regular intervals. You can then protect the higher quality seedlings with TUBEX, increasing the chances that these will survive to become your crop trees.

Private nurseries usually sort their seedlings and sell by size--usually height. We recommend ordering along these lines: 25% large size seedlings, 75% medium.

Container grown stock is another option. These trees are grown in small pots, so that the roots are not disturbed when planted. They tend to start growing as soon as they are planted, with little or no "transplant shock". You can also plant them later in the season than bare root stock.

Container grown seedlings are more expensive than bare root. You may want to use container seedlings to successfully mix in a small number of a particular type of tree, such as high-value timber trees or special wildlife trees.

Tips For Ordering Planting Stock

1) Order early. Most nurseries sell out long before planting season. This is especially true of black walnut

and northern red oak.

2) Order extra. Order 10% more trees than you intend to plant. This allows you to discard the smallest.

5. TUBEX AND YOUR PLANTING

With TUBEX, hardwood plantings are no longer a numbers game, governed mostly by chance. TUBEX puts you in control. TUBEX:

1) protects trees from animal, mechanical, and chemical damage

2) increases survival

3) accelerates growth

It used to be that a grower could do everything right, (sound planning, site preparation, weed control) and still lose the planting to forces beyond his or her control. Drought or animal damage could waste all that hard work, and send the grower "back to the drawing board".

TUBEX not only protects you from failure due to drought or animals, it makes all the other work you do faster and easier.

Although TUBEX Treeshelters establish individual trees, think of it as a tool for stand establishment and management. TUBEX gives you control over the establishment of a target number of high-value trees per acre.

Why TUBEX?

Our Tree Grower's Guide describes the history of treeshelters, culminating with the development of TUBEX.

TUBEX's exclusive design is doubly crucial in hardwood establishment.

TUBEX is the only treeshelter made from plastic specifically formulated for the purpose of growing trees. The amount of light transmitted, the life span, the design, all come as the result of years of testing throughout the world.

Additional TUBEX benefits:

* fastest installation
* lowest real cost (no assembly, free shipping...)
* longest useful life

If you have specific questions about treeshelter design, our staff is happy to help.

6. PLANTING METHODS

Your trees can be planted either mechanically or by hand. The method you use will depend on the size of the planting, the terrain, and the type and condition of the soil. Your forester will help you decide which is best.

Planting Machine--Machine planting is the fastest method. Many county conservation districts have machines tree planters can rent. You can also hire independent contractors to do the planting for you.

Be sure the machine you use is well-suited to planting hardwood seedlings, which can be 2 or 3 feet tall. Machines used for planting conifers often don't have enough clearance under the cross bar or seat. This results in damaged buds and leaning trees.

NOTE: While machine planting is the fastest, installing TUBEX is more difficult. The packing wheels push sod back around the base of the tree, making it hard to push the base of the TUBEX into the ground. Bring along a tool such as a spade to loosen the sod so the TUBEX can be pushed into the soil.

Auger--Auger planting is a great option for smaller plantings, or those with hilly terrain. Be sure to set the auger for low rpm's and high torque. If the auger spins too fast, it throws the dirt away from the hole, making it tough to back-fill.

NOTE: Auger planting blends planting production and quality. It's not as fast as machine planting, but it is much faster than hand planting, with similar quality. TUBEX is a snap to install with auger planting, because the soil is loosened.

Planting Bar--Planting bars or mattocks create slits into which the seedlings are inserted. This method works well when the soil is not rocky or clay.

Shovel--Many growers use an old-fashioned, long bladed shovel. They simply scoop a shovel full of soil, keeping the soil piled on the blade, position the seedling in the soil, and back fill. This works great in tough soils.

No matter how you plant, watch out for two things:

1) Air pockets--You want the roots to be in full contact with the soil, or else they will dry out and die.

2) J-rooting--Avoid bending the roots to fit into the hole. Roots that start out bent stay bent, and this is bad for the tree. Be sure you are digging the holes deep enough. If a tree has very long roots, prune them off clean.

7. TUBEX INSTALLATION

Getting TUBEX To The Tree

You will probably develop your own method for distributing TUBEX across your field, depending on the number of people in your crew and the size of your planting. Here are some basic tips:

1) Every three rows, unload enough TUBEX and stakes to cover all the trees you want to shelter in those rows.

2) Carry an armload of stakes and a 2 pound mallet down the row, leaving a stake at each tree to be "TUBEXed".

3) Pound in the stakes on your way back to the TUBEX.

4) Carry the same number of TUBEX back down the row, leaving one at each stake.

5) Install the TUBEX on the return trip.

Installing Each TUBEX

Follow the basic instructions for installing TUBEX, found in the Tree Grower's Guide and each box. Here are some special considerations for open field plantings:

1) Make sure stakes are secure and ties are fastened tightly. Winds are greater in the open field. TUBEX can withstand stronger winds than any other treeshelter, but only if installed properly.

2) Double check to make sure everyone in your crew is pushing the base of the shelters 1/2" into the ground.

3) Don't forget to install the mesh covers over the TUBEX. Cavity nesting birds such as bluebirds can get trapped in uncovered TUBEX, killing both the bird and the tree. This is more common in open fields than plantings in the timber.

8. WEED CONTROL

Think of weed control this way: There is only so much available water in your soil to go around. The more water that is used by weeds and brush, the less there is available for your trees.

In the first few years weed control means the difference between life and death for your trees. In the next couple of years, weed control will determine how fast your trees will grow.

You don't have to keep the entire ground weed free. Not only would that be too expensive and time consuming, it would invite erosion and lessen the value of the land for wildlife.

Foresters recommend maintaining a 5 foot weed free zone around each tree. This can be accomplished a number of ways. The method you choose will depend on the equipment you have and the time you can spend on the site.

Herbicides--Systemic contact herbicides such as ROUNDUP® kill weeds, roots and all. Seedlings must be protected during spraying, which is where TUBEX comes in. TUBEX shields seedlings automatically, making herbicide treatments faster and easier.

Cutters and Cultivators--These mechanically remove weeds. TUBEX makes your most valuable trees easy to see and avoid, and protects them from nicking and flying debris.

Organic Mulches--Organic materials such as wood chips or compost do more than control weeds. They keep the soil moist and add nutrients to the soil.

Plastic or Fiber "Mulchmats"--These products do not add nutrients to the soil, but they do an excellent job of controlling weeds and conserving moisture.

Mulches cost more than herbicide or cultivation, but require fewer trips to the field and less labor.

At least 3 years of weed control is recommended.

NOTE: Weed control has an additional benefit. Where mouse populations are high, they can chew through a TUBEX, starting at a tie-hole. This is rare, but can be a problem in isolated situations. Keeping the ground free of weeds around the TUBEX will help avoid this problem.

OUR SUGGESTED PLANTING SCHEME

We designed this planting plan with a number of goals in mind:

1) multiple benefits, including timber and wildlife
2) successful, first-try establishment
3) no wasted time tending hard-to-establish hardwoods that will never produce a crop
4) fast and efficient care & maintenance

We know you have only so much time to spend in the field. With this plan you have half as many hard-to-establish hardwoods to tend, while nurse trees do a lot of pruning for you. With TUBEX you can focus your energy on the establishment and fast growth of the 50-100 trees that have the best chance to become the dominant, high value trees.

Remember: No more numbers game--you're in control! Here's how it works:

* Plant on 10' X 10' spacing, in even rows.
* On the alternate rows plant:
  1 row fine hardwoods (that are suited to the site.
  1 row nurse trees (pines, green ash, autumn olive--whatever your forester recommends).
* Within each fine hardwood row, plant a large or superior seedling in every other spot (seedlings should be pre-sorted).
* Install TUBEX over ½ of the fine hardwoods, making sure to protect the larger, superior stock.

Do your site preparation, plant carefully, and do your weed control, and you'll enjoy watching your stand develop for years to come.

HARDWOOD STAND REGENERATION AND ENHANCEMENT

TUBEX Fact Sheets #2 & #3 (combined)

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ABOUT THIS FACT SHEET

After publishing our *1992 Tree Grower's Guide* we decided to combine Fact Sheets 2 and 3. By forest regeneration we mean the establishment of the next stand following a timber harvest. Forest enhancement refers to the establishment of more desirable tree species within an existing forest stand for a more valuable future harvest of timber, wildlife habitat, or aesthetics.

The needs of the trees you want to establish are the same for both: They need light and they need their fair share of available soil moisture.

In this combined fact sheet we use the term regeneration to cover both stand regeneration and enhancement operations.

INTRODUCTION

After you harvest your hardwood stand, you have one chance to establish the kind of trees you want. In a forest stand, dominant trees are the tall, strong trees that get the lion's share of sunlight and shade out surrounding trees.

Once unwanted trees claim all the dominant positions, it is very difficult--and extremely expensive--to change the composition of the stand.

With TUBEX, you can successfully establish the hardwood stand that meets your management goals, no matter what they are.

First of all, it protects your seedlings from forces that are beyond your control, such as deer and drought, that can wipe them out and allow unwanted species to gain dominance.

Second, TUBEX dramatically accelerates seedling growth. According to researchers, the main reason for oak regeneration failure is the slow growth of oak seedlings. Faster growing trees soon shade them out. With TUBEX, oak and other fine hardwood seedlings get off to a fast start. Trees in TUBEX achieve more growth given the same amount of water. TUBEX also channels that growth upwards, so your trees get their fair share of sunlight.

Third, TUBEX makes it easy to find and release your trees from weeds and brush. You can locate your trees without a time-consuming search through the brush, and can remove weeds without fear of injuring tender young stems.

"THE NIFTY FIFTY"

TUBEX is revolutionizing hardwood regeneration. Foresters can now reliably establish a target number of certain kinds of trees per acre.

A forester in an eastern national forest uses one TUBEX every 30 feet over natural regeneration or planted seedlings. That works out to about 50 TUBEX per acre. He calls these trees his "nifty fifty"; fifty of the trees he wants that are kept safe from deer. With proper weed control they will become dominant trees in the overstory of the new stand. He feels the money that goes into TUBEX is more than justified by the more valuable species composition of the stand in the future.

Another forester said at a recent conference that management of as few as 5 potentially high-value crop trees per acre can be economically viable. Because the quality of the stems--not the quantity--determines the value of the stand, you create more value by spending more time per tree on a few trees than by spending less time per tree on a lot of trees.

That's the whole idea behind TUBEX. Instead of planting hundreds of seedlings per acre and hoping that enough of them make it, you can now focus your attention on the successful establishment of a target number of trees per acre. You can incorporate trees with special wildlife value (an increasingly popular example is sawtooth oak, Q. acutissima) into a hardwood stand. Or, you can make sure the species that you harvested such as red oak or black walnut, are well represented in the next stand.

STEP 1: ORDER YOUR TREES

Since nurseries often sell out, we recommend that you order many months ahead of your planting date. You should order the number of trees you want of each species, plus about 10% so you can sort them out and use the best. When your trees come, store them according to instructions.

STEP 2: CAPITALIZE ON NATURAL REGENERATION

Identify promising natural seedlings and root sprouts of the species you want. Trim these seedlings back to a single leader before installing TUBEX over them. If your plan calls for establishing 30 trees of a particular kind per acre, install a TUBEX every 40 feet.

STEP 3: PLANT SEEDLINGS TO SUPPLEMENT NATURAL REGENERATION

Once you have TUBEXed natural seedlings and sprouts at regular intervals, take stock. You'll be able to see how many seedlings you need to plant to reach your target number of trees per acre, and where you need to

plant them.

First, sort your seedlings according to the number of first order lateral roots branching off the main, or "tap", root. A first order lateral is at least the diameter of a paper clip. Sort the seedlings into two classes: Those with more than seven first order laterals (we will call them "high quality seedlings"), and those with fewer.

If you have enough high quality seedlings, plant only those in the remaining planting spots. If you do not have enough high quality seedlings for every space, spread them equally across the stand and plant the best of the other seedlings to reach your target number.

You will end up with extra seedlings. Should you plant them? It certainly doesn't hurt, but remember that the idea is to devote more of your available time to a smaller number of trees. Plenty of other trees will compete with your trees for light, forcing them to grow straight and tall.

STEPS 4, 5, & 6: WEED CONTROL, WEED CONTROL, WEED CONTROL

There is a saying in real estate that the three keys to success are location, location, and location. In hardwood regeneration or enhancement the three keys are weed control, weed control, and weed control.

In each cubic foot of soil there is a limited amount of water. Each drop of water absorbed by weeds and brush is a drop that's not available to your trees--and they need all they can get.

TUBEX does not take the place of weed control. It makes weed control a lot easier. Think of it this way: Your job is to make as much water available to your trees as you can through good weed control. With that water, TUBEX will "shoot" your trees into dominant position in the young stand.

Trees also need light. TUBEX can't help if blackberry or multiflora rose blocks all the sunlight to your seedlings.

Keep the area around the tree--a ring at least five feet in diameter--as weed-free as possible. This can be accomplished three ways (or through a combination of these):

MULCH-- Mulch can take the form of a plastic or fiber sheet or organic matter such as wood chips. Saw dust, though commonly used, is not recommended. While plastic or fiber "mulch mats" are somewhat more effective at impeding roots, organic material has the advantage of enriching the soil as it decays.

HERBICIDES-- Chemical weed control has the advantage of efficiency. A contact herbicide such as ROUNDUP® effectively kills most kinds of weeds and brush. TUBEX protects your trees from herbicide spray, making application safer and faster.

MACHINES--"Brush hogs" or "weed badgers" can effectively remove weeds and brush from around your trees. Again, TUBEX protects your trees from accidental damage.

An irony of hardwood regeneration is the better the site, the harder you will have to work to establish your trees. On good sites *everything* grows fast, including weeds and brush. You'll have to be more vigilant than your neighbor with a lesser quality site, but once established your trees will add value faster.

BE SURE TO INSTALL THE MESH GUARD

The mesh guard that comes with your TUBEX prevents birds from entering the TUBEX and becoming trapped. It is designed so that a tree can grow out through the openings. It will break down after about a year in the sun, so it won't girdle the stem. For best results, check the mesh when you do your weed control, to make sure it stays firmly in place.

If gypsy moths or other caterpillars are a problem, ask for our special insect mesh. The openings are much smaller, and will prevent caterpillars from getting to your trees. These guards do have to be removed when the tree reaches the top of the shelter.

If you ever need extra mesh guards, we supply them free of charge.

A COMPANY DEDICATED TO YOUR SUCCESS

As your trees grow, so grows our company. That's why we have trained foresters on staff to answer your questions. Customers are consistently and pleasantly surprised by the level of expertise our foresters offer. One customer remarked, "Talking to you is like calling a forestry co-op."

If you have any questions, please call. We are always happy to help.

Eastern Black Walnut

TUBEX Fact Sheet #4

©Split Rock Forestry, Inc., January, 1992

INTRODUCTION

No tree rewards good planning and hard work more than black walnut. TUBEX Treeshelters make the work easier and the rewards greater. With TUBEX you can reliably establish a stand of black walnut trees on the first try. It takes many growers several years just to get their stand started. TUBEX shortens the time it takes to successfully establish a stand, which means your rotation *will start sooner.*

This fact sheet supplements Fact Sheets #1-3, which cover hardwood establishment. It focuses on aspects of establishment specific to eastern black walnut.

Every serious walnut grower should have a copy of *Walnut Notes*, published by the U.S. Forest Service, and should join the Walnut Council (see page 2).

PLANNING

Black walnut has exacting requirements for water and nutrients. When planted on a good site, no tree gains value like black walnut. However, on a poor site, black walnut may disappoint even the hardest working grower. Characteristics of a good walnut site include:

* deep, well drained soil
* dense, lush vegetation
* lower north- or east-facing slope
* soil pH between 5 to 8
* brown or reddish brown soil

NOTE: Avoid steep slopes, coarse or rocky soils, areas prone to flooding, and soils with streaks of red, gray, or yellow. If your site does not meet these guidelines, rethink your plan to plant black walnut. You should either switch to another species, or plant a mixture of trees that includes species that are better suited to the site and that will produce a crop.

PLANTING STOCK

Direct Seeding Walnuts

More and more growers are planting pre-germinated nuts instead of seedlings or grafts. Nut planting offers several advantages, including the ability to plant the offspring of the best local trees. While past attempts at direct seeding were thwarted by rodents and deer, TUBEX makes it a viable practice. Fact Sheet #5 covers direct seeding in detail.

Seedlings

Recent research by Dr. Richard Schultz of Iowa State University and others has shown that a seedling is only as good as its root system. The number of first order lateral roots (roots at least the diameter of a paper clip that branch off the main "tap" root) determines its rate of growth and likelihood of survival for years to come.

Before planting, sort your seedlings into two groups: Those with 7-8 lateral roots or more, and those with fewer. If 50% contain more than 7-8 first order lateral roots, plant these "super seedlings" in every other planting space.

Grafts

A graft is made by fusing a small branch (called a "scion") taken from one tree to the root system of another seedling. Scions are taken from trees selected for desirable characteristics. The scions will grow into trees with the same genetic tendencies as the parent tree. How those tendencies manifest themselves will vary, depending on the site, growing conditions, animal damage, etc. One drawback to grafts is cost. To get around this, many growers plant a graft in every fourth or fifth planting space.

TUBEX AND BLACK WALNUT

TUBEX has proven to be a life-saver for black walnut growers, especially during the recent drought years. One southeastern Minnesota grower used TUBEX on one third of his grafts. Survival of the unsheltered grafts was about 5%, while over 90% of those in TUBEX survived the hot, dry summer.

TUBEX also dramatically speeds the growth of young walnut trees. Plus, trees in TUBEX tend to develop a single, straight stem.

TUBEX saves you money and time by protecting your young trees from chemical and mechanical weed control treatments. One southern Illinois grower reported his weed control now takes 1/4 the time; instead of a two person, two day operation, with TUBEX weed control now takes one person one day.

Preventing Frost Damage & Transplant Shock

Black walnut is vulnerable to damage from early fall frosts and spring cold spells. While TUBEX has been found to decrease the incidence of transplant shock die-back, trees in TUBEX are sometimes more susceptible to frost damage in fall. The following information is especially important for growers using grafted stock.

Walnut trees will grow as long as they have moisture and warm temperatures. Moisture stress is a signal to the tree that winter is coming. Because trees in TUBEX make better use of available water they do not get the signal to harden off as quickly.

Trees that emerge from their TUBEX in early or mid-summer are exposed to ambient conditions for a longer period of time. These early-emergers are generally not susceptible to frost damage. Those that don't quite make it out the top of their TUBEX, or emerge late in the growing season are most likely to suffer from frost damage.

Frost damage takes the form of tip die-back. It very rarely kills the entire tree--a damaged tree will resprout from the first undamaged bud the following spring.

After 5 growing seasons in the United States, researchers agree: The net effect of using TUBEX on black walnut is overwhelmingly positive--it often means the difference between success and failure.

Following the steps outlined below will help prevent *both* spring and fall frost damage to your TUBEXed trees.

1) Use a 2 or 3 foot TUBEX. Walnut trees typically emerge from a 2 or 3 foot TUBEX by mid-summer of the first growing season. They will have established a large root system, and can survive late summer dry spells. They will also harden off in time for winter, thus eliminating the possibility for frost damage.

2) When using a 4 or 5 foot TUBEX to protect from severe deer browsing, you have two options:

a) Lift the TUBEX a few inches in early fall to allow air circulation in the tube. This reduces the humidity in the tube, which encourages dormancy. Simply loosen the ties, slide the TUBEX up the stake so the base is 1-2" above the ground, and re-tighten the ties.

This leaves the base of the tree exposed to rodents. You can greatly reduce the risk of damage by keeping the area around the TUBEX clear of grass and brush. We recommend that you replace the TUBEX soon after the tree hardens off.

b) The other alternative is to let nature take its course and do nothing. Remember: If tip die back does occur, the tree will resprout. A single sprout usually takes over the tube, and will emerge early the following year. With some corrective pruning (which all successful walnut growers do anyway), you'll have a healthy, well-established tree after just a few years.

WEED CONTROL

You must control grass competition for at least three years. There is a limited amount of water in each cubic foot of soil, and grass is able to absorb it faster than young walnut roots. Black walnut simply cannot compete with grass for moisture.

In one well-known study, black walnut seedlings were planted on a good site. The grass around half of the seedlings was mowed weekly. The grass around the other half was controlled with chemical weed control. After eight years, black walnut trees in the mowed section were only waist high. Those where weeds were chemically controlled stood over 20 feet tall.

FOR MORE INFORMATION

Walnut Notes or *Central Hardwood Notes*, both published by the U.S. Forest Service, give more specific information regarding site preparation, weed control, and care of established stands. The prices of these publications are: *Walnut Notes* -- $9.00; *Central Hardwood Notes* -- $32. To order, write:

Superintendent of Publications
Government Printing Office
Washington, D.C. 20402

Two non-profit organizations of interest to walnut growers are listed below. Both organizations have a number of state chapters as well. These provide an excellent chance to share information with growers who face similar conditions:

Northern Nut Growers Association
9870 South Palmer Road
New Carlisle, OH 45344

Regular membership is $15.00 per year. Members receive NNGA's quarterly publication, "The Nutshell", and an annual report.

Walnut Council
5603 West Raymond, Suite O
Indianapolis, IN 46241

Regular membership is $15.00 per year. Members receive four issues of the Walnut Council Bulletin.

Direct Seeding Walnuts, Acorns, and Chestnuts

TUBEX Fact Sheet #5

©Split Rock Forestry, Inc., January, 1992

INTRODUCTION

More and more walnut, oak, and chestnut growers are discovering the many advantages that direct seeding has over transplanting seedlings, including:

* Control over seed source
* No transplant shock
* No twisted or "J" roots
* Extended planting season
* Less expensive stock

Because there is no transplant shock, direct seeded nuts frequently outgrow transplanted one year old seedlings. However, past efforts at direct seeding were largely unsuccessful. Damage by rodents and poor survival of tender sprouts forced growers to abandon the practice.

By protecting nuts from animals and promoting excellent survival and growth, TUBEX treeshelters enable growers to enjoy the benefits of direct seeding.

STEP 1: COLLECT SEED

Collect seed from the best trees in your area. Local seed is best suited to local weather and soil conditions. This is one of the main advantages of direct seeding. When you buy seedlings from a nursery, they could be grown from seed collected hundreds of miles away. If you don't know of any high quality trees nearby, ask your district forester.

Many foresters discourage direct seeders from collecting the first nuts to drop, or acorns with the cap still firmly attached. These were probably aborted by the tree and did not "fill" (mature).

The important thing, however, is to collect nuts before the squirrels and blue jays get them all. Most experienced collectors recommend visiting selected parent trees early and often--some make two trips a day.

Collect two to four times as many nuts as you plan to plant. This assures you of an adequate supply of viable nuts. If seed is not available, or if you want genetically improved seed, contact a nursery that grows walnut. Many nurseries sell seed.

Some nurseries sell genetically improved seed, collected from known trees with superior form or nut-bearing characteristics. However, in many tests local seed has outperformed genetically improved seed collected several hundred miles away. If you try genetically improved seed, use some local seed as well. If the improved seed isn't well adapted to your rainfall or soils, your planting will still be successful.

STEP 2: REMOVE WALNUT HULLS

(optional but recommended)

Many direct seeders of walnut remove the fleshy husk, or hull, that surrounds the shell. This is not necessary, but makes handling and planting the nuts cleaner and easier.

There are many techniques for hulling walnuts. A Wisconsin grower spreads them on the driveway and walks across them, rolling them as he goes. An Illinois collector has perfected a method that involves whacking the hull in just the right place (he doesn't mention exactly where that place is) with a baseball bat, separating it from the shell.

Hulling can also be done mechanically. Several state Walnut Council and Northern Nut Growers Association chapters have machines suited to the task that members can borrow or rent.

No matter how you do it, wear gloves, old boots, and work clothes. Walnut hulls contain juglone which is used to make permanent dyes.

STEP 3: TEST FOR VIABILITY

Many nuts are incapable of germinating. To increase nut planting efficiency, consider trying the commonly used tests described below.

"Floating"

Soak the nuts in a bucket or barrel of water for 1/2 hour. Remove and discard the floaters. They did not fill and are not viable.

Visual Inspection

While many experienced direct seeders swear by floating, others feel it accomplishes little. They claim floating removes only the hollow nuts, while rotten ones sink along with viable nuts. These growers visually inspect each nut, discarding rotten ones or those with pinholes left behind by insect larvae. If possible, we recommend you perform both viability tests.

STEP 4: STORING SEED

Until the seeds are planted or buried for the winter, they should be kept cool and moist, but not under water. One good way to do this is to put the nuts in a bucket with holes drilled in the bottom, along with some sand or wood chips. Water periodically to keep moist.

STEP 5: SITE PREPARATION

Site preparation is extremely important. There is only so much available water in the soil, and you want your trees to get it, not grass or brush. Clear a four to five foot circle or strip of vegetation before planting nuts.

This can be done mechanically or chemically. *Walnut Notes* and *Central Hardwood Notes* (see page 3-4) cover site preparation more thoroughly.

STEP 6: SOWING THE SEED

Chestnuts, walnuts, and most oaks require a cold treatment in order to break dormancy and germinate. The cold treatment can be provided two ways:

1) Fall planting
2) Cold storage + spring planting

Many growers use a combination of both to extend their planting season.

Basic Planting Technique

1) Drive the Tubex stake into the ground on the windward side of the planting spot.
2) Put the TUBEX into place, and tap gently to mark a circle "target" on the ground. With practice, this step can be skipped.
3) Remove the TUBEX and dig a small hole, about 3 inches deep, in the middle of the "target".
4) Back fill 1 inch of loosened soil, place the nut in the hole, and cover it up. The nut should end up 1-2" deep.
5) Replace the TUBEX.
6) Drive the base of the TUBEX 1/2" into the ground.
7) Secure the ties to the stake.

Fall Planting

The main advantage of fall planting is avoiding the need for "stratification" (cold storage) of seed. The disadvantage is that despite testing, germination is not assured.

Follow the basic planting instructions (above), with three exceptions:

1) Sink the base of the TUBEX 2-3" into the ground, to protect the nuts from rodents. After the first growing season, raise the TUBEX so that the base sits 1/2" deep in the soil.
2) Plant the nuts on their side.
3) Plant 3-6 nuts per TUBEX, to assure germination. The strongest seedling "takes over" the tube and establishes dominance. If more than one grows up, simply lift the TUBEX and clip the unwanted seedlings. If none germinate, you can plant a pre-germinated nut in that tube in spring.

Spring Planting

Spring planting gives you the ability to pre-germinate the nuts. You can plant one nut per TUBEX, because pre-germinated nuts have the same survival rate as seedlings. If you have a limited number of nuts to work with, spring planting is the way to go.

The disadvantage is that you have to provide a cold treatment. This process of breaking seed dormancy is called "stratification". Stratification is not difficult if you follow these steps:

1) Place the nuts in a water permeable, rodent proof container. Many growers use plastic milk crates lined with hardware cloth or chicken wire. Spread sand, sawdust, wood chips, or peat over each layer of nuts. Be sure to cover the container with the hardware cloth or chicken wire. If you stored the nuts in buckets with holes drilled in the bottom (as described above), you're already set for stratification.
2) Bury the nuts in your garden in late fall. The container should be covered with at least 6" of soil.
3) Dig up the nuts when the frost is out of the ground.
4) Re-test for viability, using either the float test or visual inspection.
5) Keep the nuts moist. Some growers keep them in plastic bags. Others spread them on trays lined with moist paper towel.

Nuts can be planted any time after stratification, but you'll get better results if you wait until they germinate.

Store some of the nuts in a warm place, and put some in the refrigerator. Be sure to keep them moist. Those stored in a warm place will begin germinating in spring. The nuts will crack and the root will emerge.

There are two special instructions for planting pre-germinated nuts:

1) Plant with the root end of the nut pointing down.
2) Long roots can break during planting, and should be pruned. This does not hurt it, and often causes the development of two tap roots.

The nuts stored in the refrigerator will germinate more slowly. These can be used to extend the planting season, or to replace fall or spring planted nuts that do not germinate by mid-June. A Wisconsin grower has successfully planted germinated nuts as late as June 21.

STEP 7: ESTABLISHMENT CARE

Care for your young trees just as you would transplanted seedlings. That means weed control. Nut-bearing trees, especially black walnut, compete poorly with grass and brush for moisture. It is crucial that you maintain a four to five foot weed free zone around the young trees. This can be done mechanically or with a herbicide such as ROUNDUP®.

TUBEX makes weed control fast and easy. First, it's easy to find your trees among the weeds. Second, TUBEX protects the trees from your machines or herbicide spray, so it takes less time to treat each tree.

TUBEX: THE IDEAL TREESHELTER FOR DIRECT SEEDING

Several exclusive features make TUBEX the treeshelter of choice for experienced direct seeders:

* **Rigidity**--TUBEX can be driven into the ground quickly and easily, to prevent damage by rodents.

* **Durability**--TUBEX stands up to years of use in the

field. Two footers can be used 2 or 3 times, while four footers will support young trees until firmly established.
* **Seamless design**--There are no gaps that create a dangerous chimney effect.
* **Continuous flare**--The TUBEX flare has no slits or overlaps to scrape tender bark.

TUBEX is the only treeshelter made from plastic that is specially formulated for the task of establishing trees. It withstands a wide range of temperatures, and does not react with chemical herbicides.

"What Size TUBEX Should I Use For Direct Seeding?"

The two most popular sizes for direct seeding are the 2 and 4 foot TUBEX. The 1 foot size does not provide an adequate deterrent to squirrels.

If deer are not a problem, use 2 foot TUBEX. Two footers are doubly cost-effective; not only do they cost less, you can start 2 or 3 trees with a single TUBEX. The tree will typically grow out the top in the first growing season. After the second growing season it is strong enough to support itself. Wait until the following spring, to get another winter of animal protection, then remove the TUBEX to start another nut.

Use 4 footers if deer are a problem--5's if the problem is severe. Reusing 4 foot and taller TUBEX is not recommended. Due to the dramatic acceleration of growth, it takes longer for the tree to become wind-firm. While supporting the tree, the TUBEX serves the purpose of protecting it from antler rubbing ("buck rub"). Four foot and taller TUBEX should stay in place for 5-6 years.

NUT TREES

TUBEX Fact Sheet #6

©Split Rock Forestry, Inc., January, 1992

INTRODUCTION

You plant nut trees with visions of bumper crops in your head. If everything goes well your first harvest is a mere ten years away.

In the first year, a drought wipes out most of your trees, sending you back to the drawing board. The next year you get plenty of rain, yet the weeds grow fast and swarm your trees. In the process of spraying and mowing, a number of trees are accidentally damaged. In the third year deer eat the new growth on the trees; later that fall, the bucks rattle their antlers against the biggest of your trees, scarring them and snapping off branches. After three years you're *still* ten years away from tasting that first big crop--and the trees are vulnerable to damage again next year.....

With TUBEX, those same trees would be well on the way to that first crop. In fact, TUBEX might hasten that first crop, because it not only protects your trees from damage, it accelerates growth.

Nut growers from around the country have used TUBEX to establish trees more efficiently. This fact sheet is not a complete guide to growing nut trees. It is meant to answer the most common questions about TUBEX asked by nut growers, and help you get the most out of TUBEX technology.

TUBEX AND YOUR TREES

TUBEX performs several jobs at once. While protecting trees from damage, it conserves moisture, enhancing survival and fueling growth.

Protection

ANIMALS--In many parts of the country deer populations are at record levels. While this is good news for hunters, it's bad news for nut growers. Many have experienced the frustration of watching deer destroy their hard work.

With TUBEX, deer are not a problem. A 4, 5, or 6 foot TUBEX protects a tree from deer until it grows safely out the top.

Rodent damage is also reduced by TUBEX. With clean cultivation to reduce habitat, TUBEX provides protection from rodent damage.

MACHINES--TUBEX customers who use weed badgers and mowers report much less damage to tree trunks. TUBEX makes young trees easy to see and avoid--which not only keeps trees safe, it makes the operation go faster.

HERBICIDES--TUBEX is made with a specially formulated plastic that does not chemically react with herbicides. Because TUBEX protects young trees from accidental over spray, it takes much less time to spray a row of trees. One southern Illinois walnut grower reported TUBEX cut the time needed for weed control by three fourths.

Self Watering

TUBEX reduces moisture loss from transpiration in plants and from evaporation in the soil. The result: Typical survival of 90% or more and growth as much as 5 times that of unsheltered trees.

TUBEX shields trees, so the moisture they transpire is not carried away by desiccating winds. Instead, transpired moisture is trapped in the tube, keeping the air layer surrounding the leaves cool. Water vapor

condenses when the air cools and trickles back down into the soil, so the tree can use it again.

Because TUBEX conserves moisture, the need for supplemental water is dramatically reduced--and in some cases it is eliminated altogether.

An extreme example of TUBEX's self watering ability was demonstrated by an experimental planting in the Sonoran Desert, where rainfall averages only 3 inches per year. There, in the poorest of soils and with only 1 - 2 liters of water given to each tree every few weeks, the trees protected by TUBEX exhibited rapid growth and high survival. All of the control trees not protected by TUBEX died.

NOTE: In order to provide its full range of benefits, the TUBEX you use must be taller than the tree you plant. Nurseries that sell trees suitable for use with TUBEX are listed on TUBEX Fact Sheet #11.

THE IMPORTANCE OF WEED CONTROL

Experienced nut growers know weed control is key to fast growth and early yields. Grasses absorb available water faster than trees, robbing them of growth--and sometimes survival. When you control weeds there is more available water for your trees. Although mowing keeps an orchard looking tidy and reduces rodent habitat, it does little to prevent grass from competing for water with your trees. We recommend maintaining a weed-free zone at least 4 feet in diameter around each tree.

If using organic mulch, a circle of mulch 3-4 inches deep will not only prevent weed growth, it will add nutrients to the soil as it decomposes. Another alternative is a combination of mechanical and chemical weed control.

TUBEX is not a substitute for weed control, it just makes the weed control you do more productive and efficient. Whether your method for controlling weeds is chemical, mechanical or a combination of both, TUBEX will aid this time consuming but essential task.

TUBEX AND INSECTS

It is possible to control some insects without chemicals. We provide a special mesh cover for TUBEX that excludes large flying insects such as grasshoppers and Japanese beetles (our standard mesh is meant only to exclude birds--ask for our "insect mesh" when you order).

One Michigan apple grower puts a bead of grease around the TUBEX to prevent caterpillars from climbing and entering the TUBEX. Others use commercially available "sticky" substances.

With TUBEX trees often enjoy natural insect protection. Spiders inside the tubes catch many insects. Wasps will also inhabit TUBEX. Both wasps and spiders prey on a variety of insects which otherwise might harm your trees.

NOTE: The wasp nests present no problem unless they block the tube and interfere with tree growth. If you chose to control the wasps using insecticide, be certain to avoid using one which is phyto-toxic.

Many growers find that their use of TUBEX makes insecticide application easier. One blast from a nozzle sprayer is usually all that is needed. There is no need to worry about drift and its affect on non-targeted species.

TUBEX AND LEAF DISEASES

Upon hearing that the air inside a TUBEX stays very humid, experienced nut growers ask about the incidence of leaf diseases such as anthracnose. They need not worry.

Foliar fungi such as anthracnose need two conditions in order to thrive: High humidity and slow leaf growth. Because your trees will be growing rapidly inside TUBEX, they are less susceptible to leaf diseases. The incidence of leaf disease is rare, and where they occur they have almost no affect on the overall health of the tree. If a more severe problem develops, fungicide can be sprayed directly into the TUBEX.

Water is trapped between leaves and the shelter wall. This may cause those leaves to darken, but this is not a cause for concern.

TUBEX AND DIRECT SEEDING

TUBEX makes growing trees directly from nuts reliable and easy. Fact Sheet #5 covers direct seeding walnut, acorns, and chestnuts in detail.

TUBEX AND TREE FORM

Nut trees grown in TUBEX rarely branch before growing out the top. Since forked stems are inherently weak and susceptible to storm damage, this aspect of TUBEX is a plus for nut growers. You get a well-formed tree with less pruning.

What size TUBEX is best for you? Most nut growers use three or four foot TUBEX. These sizes offer some protection from deer, and get trees off to a fast, safe start. If your deer problem is severe, use five or six foot TUBEX. We like the five footers because it's easier to see down the tube and monitor a tree's progress.

If your main problems are rabbits and first-year survival, use two foot TUBEX. The trees will grow out the top in the first year, and will be wind-firm after the second growing season. Some growers leave the two footers in place for a third winter, and then remove them to start another tree. If rodent damage is not a problem, this is a very cost-effective way to use TUBEX.

OTHER CULTURAL CONSIDERATIONS

With grafted trees it is necessary to check for sprouting from the root stock. This is easily accomplished by loosening the tie and lifting the TUBEX a few inches. Our exclusive tie is designed so that it can be loosened with a gloved hand on a cold day

FRUIT TREES

TUBEX Fact Sheet #7

©Split Rock Forestry, Inc., January, 1992

INTRODUCTION

More for less. More fruit (and sooner) in less time, less labor, and less money. That's the bottom line for fruit growers, no matter if you have acres of trees or just a couple trees in the back yard. And that's what TUBEX gives you; it provides an array of benefits that save fruit growers time and money--and a lot of frustration.

TUBEX can be used on every type of fruit tree. Pears, apples, cherries--even paw paw and kiwi have benefited from TUBEX.

TUBEX AND YOUR TREES

TUBEX performs several jobs at once. While protecting trees from damage, it conserves moisture, enhancing survival and fueling growth.

Protection

ANIMALS--Many growers have not been able to get apple trees to grow past deer. With TUBEX, deer are not a problem. A 4, 5, or 6 foot TUBEX protects a tree from deer until it grows safely out the top.

Rodent damage is also reduced by TUBEX. With clean cultivation to reduce habitat, TUBEX provides excellent protection from rodent damage.

MACHINES--TUBEX customers who use weed badgers and mowers report much less damage to tree trunks. TUBEX makes young trees easy to see and avoid--which not only keeps trees safe, it makes the operation go faster.

HERBICIDES--TUBEX is made with a specially formulated plastic that does not chemically react with herbicides. Because TUBEX protects young trees from accidental overspray, it takes much less time to spray a row of trees (one grower reported TUBEX cut the time needed for weed control by three fourths).

Self Watering

Ken Asmus owns Oikos Tree Crops in Kalamazoo, Michigan. In 1987 he started a paw paw planting of 300 trees on a windy site with sandy loam soil. Only 2% of the trees lived. In 1989 he tried again, this time with TUBEX treeshelters. Despite the hot, dry conditions that summer, he had 100% success. Now, every paw paw Ken sells is shipped with a TUBEX.

TUBEX reduces the amount of water a plant loses, and recaptures the water it uses, so it can be absorbed again. The result: Typical survival of 90% or more and growth as much as 5 times that of unsheltered trees.

TUBEX shields trees from the wind, so that the moisture they transpire to stay cool (and grow) doesn't get blown into the next county. Instead, transpired moisture is trapped in the tube, keeping the air layer surrounding the leaves cool. Water vapor condenses when the air cools and trickles back down into the soil, so the tree can use it again.

NOTE: In order to provide its full range of benefits, the TUBEX you use must be taller than the tree you plant. Nurseries that sell trees suitable for use with TUBEX are listed on TUBEX Fact Sheet #11.

TUBEX AND IRRIGATION

Because TUBEX conserves moisture, the need for supplemental water is dramatically reduced--and in some cases it is eliminated altogether.

Tubex's remarkable ability to conserve water was proved during the establishment of a windbreak in the Sonoran Desert, where annual rainfall averages 3 inches. By simply pouring 1 or 2 liters of water in a TUBEX every few weeks, a high degree of survival was achieved. Although it is doubtful that your conditions are as extreme as this example, periodic drought is a possibility for most growers.

Drip irrigation can be installed to emit directly into the shelter. A small amount of water poured or fed directly into the TUBEX is the most efficient method.

NOTE: If you have clay soils, don't over water.

TUBEX AND INSECTS

It is possible to control some insects without chemicals. We provide a special mesh cover for TUBEX that excludes large flying insects such as grasshoppers and Japanese beetles (our standard mesh is meant only to exclude birds--ask for our "insect mesh" when you order).

One Michigan apple grower puts a bead of grease around the TUBEX to prevent caterpillars from climbing and entering the TUBEX. Others use commercially available "sticky" substances.

Often trees enjoy natural insect protection in TUBEX. Spiders spin webs inside the tubes that offer natural protection.

Wasps are often found building nests about a foot down from the top of the shelter. Since wasps prey on other insects, their presence can benefit the tree. If you chose to kill the wasps with an insecticide, be sure to read the directions carefully since some insecticides are phytotoxic.

NOTE: A TUBEX is a confined space that

concentrates any chemical used in it. Use insecticides sparingly.

TUBEX AND LEAF DISEASES

Upon hearing that the air inside a TUBEX stays very humid, experienced fruit growers automatically ask about the incidence of leaf diseases such as apple scab and rusts. They need not worry.

Foliar fungi such as leaf rusts and anthracnose need two conditions in order to thrive: High humidity and slow leaf growth. Because your trees will be growing rapidly inside TUBEX, they are less susceptible to leaf diseases. The incidence of leaf disease is rare, and where they occur they have almost no affect on the overall health of the tree.

If a more severe problem develops, fungicide can be sprayed directly into the TUBEX.

Water is trapped between leaves and the shelter wall. This may cause those leaves to darken, but is not a cause for concern.

VINES--Grape and kiwi vines gain special benefits from TUBEX. Vines are often grown on a six foot tall three wire trellis. TUBEX simplifies and accelerates the process of establishing a vine. With a five or six foot TUBEX you can grow the vine straight to the top trellis wire with no pruning--in less time. Growers report TUBEXed vines produce a year sooner.

TUBEX AND TREE FORM

Using a six foot TUBEX to protect an apple tree from deer means there will be no branches below six feet. To a fruit grower used to starting branch scaffolds at 3 feet, this seems like a drawback. However, if deer have free access to the tree, branches below six won't bear fruit anyway, and with deer populations what they are, 5 or 6 feet of protection is often necessary just to get a tree started.

Some growers use the taller shelters to "shoot" a single straight stem past the deer. Then they remove the TUBEX, stake the tree, and head back the leader, forcing the tree to branch out. At this point this practice should be considered experimental.

Other growers use two foot or three foot TUBEX to improve initial survival and growth. They also get protection from animals, machines and chemicals. The tree develops a low scaffold but is susceptible to deer, a trade-off the grower must consider.

TUBEX AND WEED CONTROL

Although TUBEX is not a substitute for weed control, it makes the weed control you do more productive and efficient.

Experienced nut growers know weed control is one key to fast growth and early yields. Grasses absorb available water faster than trees, robbing them of growth--and sometimes survival. When you control weeds there is more available water for your trees. Although mowing keeps an orchard looking tidy and reduces rodent habitat, it does little to prevent grass from competing for water with your trees. We recommend maintaining a weed-free zone at least 4 feet in diameter around each tree.

If using organic mulch, a circle of mulch 3-4 inches deep will not only prevent weed growth, it will add nutrients to the soil as it decomposes.

Another alternative is a combination of mechanical and chemical weed control.

OTHER CULTURAL CONSIDERATIONS

PRUNING--The part of a tree inside of a TUBEX tends not to develop branches. After a tree emerges, it branches normally. If small side branches develop in the TUBEX, they should be pruned to prevent the formation of narrow branch crotches.

STOCK SIZE--TUBEX gives you the most value when used with young, healthy stock that is under 30 inches tall (remember--you can put an 8 inch seedling in a 5 foot TUBEX). TUBEX often pays for itself right away by allowing a grower to use small stock, instead of four to six foot "standards".

ROOT SPROUTING--With grafted trees it is necessary to check for sprouting from the root stock. This is easily accomplished by loosening the tie and lifting the TUBEX a few inches. Our exclusive tie is designed so that it can be loosened with a gloved hand on a cold day.

COMMUNITY FORESTRY PROJECTS

TUBEX Fact Sheet #8

©Split Rock Forestry, Inc., January, 1992

INTRODUCTION

Why have *Midwest Living, Practical Homeowner, Harrowsmith/Country Life* and *Organic Gardening* magazines all written about TUBEX Treeshelters?

Because with TUBEX you can turn tiny seedlings into established trees in just 2 or 3 years.

In the spring of 1991 TUBEX was also featured on both the "Today Show" and "Good Morning America".

Find out why all these gardening experts are so excited about TUBEX Treeshelters.....

SAVE MONEY AND GROW BETTER TREES

When most people think about planting landscape trees they think about the big, expensive trees you find at garden centers and nurseries. Nurseries sell those large trees because in the past people had terrible luck establishing small seedlings.

TUBEX has changed all that. With TUBEX seedlings survive as well as larger trees--and often catch up in height after a few years.

TUBEX Treeshelters helps a seedling several ways at once.

1) Protection. TUBEX protects a seedling from lawn mowers, rabbits, kids, deer--everything a yard can throw at it.

2) Fast growth. TUBEX is like a seedling's own greenhouse. Inside a TUBEX the air is warm and humid, perfect for fast growth.

3) Excellent survival. TUBEX shields a seedling from the scorching wind, and captures moisture lost through its leaves. That water vapor condenses, and trickles back into the soil so the tree can use it again.

Planting small seedlings with TUBEX has other advantages over planting large nursery trees:

Big savings. A high quality seedling, a TUBEX Treeshelter with the companion stake, and organic mulch cost a total of about $10--a fraction of the cost of large nursery trees. Six foot tall potted nursery trees usually start at $50. Two inch caliper "B & B" trees can cost $200 or more.

Healthy, fast-growing trees. Often when large "B & B" trees are dug from a nursery and moved, more than 80% of the root system gets cut off. It can take years for the tree to recover.

On the other hand, a seedling (especially a container grown seedling) "hits the ground running". There is little or no transplant shock, so it starts growing right away. And once it gets established, you never have to move it.

With TUBEX, many kinds of trees will reach 6 feet after only 1 or 2 growing seasons.

Vastly Increased Tree Selection. Many types of trees, including most native species, are not available from garden centers that sell large trees. Planting seedlings with TUBEX opens up hundreds of possibilities, allowing you to grow natives, nut and fruit trees, exotic ornamentals--whatever you want.

Once you start growing trees from seedlings, the biggest problem you'll have will be finding space in your yard for all the different kinds of trees you want to plant.

TIPS FOR A SUCCESSFUL PLANTING

Soil A successful planting begins and ends with the soil. Experienced growers learn to match the trees they plant to the soil. Trying to change the soil to meet the needs of the tree is not only expensive, it doesn't work.

A tree in the wrong type of soil will be a source of disappointment, frustration, and expense for years to come. It will grow slowly, making it susceptible to a variety of insect and disease problems.

If you are unsure of your soil's characteristics, have a soil test done. Most land-grant universities have soil science extension departments that will do soil tests at little or no cost. Garden centers and nurseries often have kits for mailing your soil samples.

This test will tell you about your soil's texture and fertility. With that information you can go back to your nursery catalogs and find out which trees will perform well in your soil.

Once you have a list of trees that will do well in your soil, you can choose those with the characteristics you want.

NOTE: Your favorite tree might not grow well in your soil type. Don't fight the soil. You will be much happier with a healthy, fast-growing tree of another variety than watching your favorite tree struggling against the elements.

Seedlings

Size TUBEX turns small trees into established trees safely and quickly. The treeshelter is initially much taller than the seedling it protects, but not for long. TUBEX is used with very small planting stock, from 4" to 30" tall (actually, TUBEX can even be used over planted seeds and nuts).

Species Almost every kind of tree imaginable grows well in TUBEX; everything from red oak to mesquite.

Of all the deciduous trees that have been grown in TUBEX worldwide, only European beech does not react favorably.

Of the conifers (evergreens), white pine and loblolly pine have not done well in TUBEX, though results are limited and mixed. Ponderosa, Austrian, and Scotch pine, cedars, spruces, and other conifers have performed well.

If you have questions about using TUBEX on a certain type of tree, please call.

Container Grown vs. Bare Root

Seedling trees are grown and sold two different ways. Each has its advantages.

Container grown (potted)--Trees grown in small (usually 2-3" square, 6 inch deep) pots have two advantages. 1) Planting does not disrupt or damage the roots, so there is little or no transplant shock. Container grown seedlings typically start to grow right away after planting. For example, a 6 inch container grown seedlings will usually emerge from a 4 foot TUBEX in the first growing season. 2) With adequate water they can be planted any time during the growing season.

Bare root--Bare root trees are grown in beds at a nursery, and then dug roots and all for sale. Trees grown this way often cost less than container grown stock. Bare

root trees can only be planted at certain times of the year (your nursery will know the right time to plant in your area). Because digging the trees disturbs the root systems, bare root trees take longer to start growing after planting.

However, when done correctly bare root planting is extremely successful.

Ordering Seedlings

Many nurseries sell out of trees long before planting season. Be sure to order early. Your nursery will ship the trees at the right time for planting.

Ordering TUBEX

Some special considerations for using TUBEX in the landscape:

Size--Use 3 or 4 foot TUBEX. Both sizes offer protection from rabbits, mowers, children, and other dangers to seedlings. Three footers will get the job done; four footers will result in somewhat faster growth.

Use 5 foot TUBEX if deer are a problem, as is the case in an increasing number of residential areas around the country.

NOTE: Half the fun of using TUBEX is watching the trees develop and grow. Choose a TUBEX short enough so that the smallest members of your family can look down the tube and see the tree.

Color--Use brown TUBEX (they're actually tan in color) for planting in full sun. Use white TUBEX for planting in partial shade.

Be wary of planting in the shade. Some trees, such as sugar maple, will tolerate shade, but nearly every type of tree prefers at least part sun. TUBEX does not compensate for insufficient sunlight.

Planting

Follow the instructions that come with your trees to the letter, as well as the instructions for installing TUBEX that come with your shipment.

The single most important part of installing TUBEX is making sure the base of the TUBEX is pushed into the ground 1/2". This seals out air currents that could dry out the tree.

Mulching

When planting seedlings, weed control is especially important. Weeds compete with your trees for available water and nutrients (grass is considered a weed because it steals moisture from your seedlings).

Keep a 4-5 foot weed-free zone around your TUBEX and tree. The best way to do this is to scrape the sod away from the planting area and spread 3-4" of organic mulch such as wood chips or compost.

Not only will organic mulch prevent weed growth, it will enrich the soil as it decomposes. It also keeps soil moisture from evaporating.

Laying a plastic sheet under the mulch layer will block weeds more effectively, but will prevent nutrients from the decaying mulch from leaching into the soil. Fiber mats ("landscape fabrics") also block weeds effectively, but do not hold water in the soil as well as plastic.

Another reason not to use a plastic or fiber layer under the mulch is that annual weeds often sprout on top of it. Even if you use crushed rock (which we don't recommend) as a mulch, leaf litter will decompose on top of the sheeting, providing a seed bed for weeds.

With straight organic mulch, if weeds sprout in the decaying material you can simply pull them and spread fresh mulch on top.

Watering

Believe it or not, more landscape trees are killed by over watering than a lack of water.

Tree roots need two things: Water and air. If water fills all the open pores in the soil for too long, the roots will literally suffocate.

Ironically, the symptoms of over watering are identical to a lack of water. Because the roots die, the leaves don't get any water and they wilt. Too often growers water even more, making the problem worse.

How can you tell if a tree needs water? Check the soil, and not just on the surface. Using your fingers or a garden trowel, check the soil 2-3 inches deep. If it is moist, do not water. Water only when the soil 2-3 inches deep dries out.

NOTE: Trees in TUBEX require even less water than an unsheltered seedling. Never water a tree in TUBEX without checking the soil around the base of the TUBEX first.

Call Us! We're Here To Help.

Our job isn't done when we make a sale. We know you--or your neighbors--won't order from us again if your trees don't do well.

We enjoy hearing from our growers--those with one hundred acres and those with 4 trees, so we can share the fun of your successes and help if you run into trouble.

If you have questions, use our direct toll-free line to talk to one of our foresters.

LANDSCAPE PLANTINGS WITH SEEDLINGS

TUBEX Fact Sheet #9

©Split Rock Forestry, Inc., January, 1992

Introduction

On an April Saturday in 1990, dignitaries from Washington DC and hundreds of residents gathered in Pekin, Illinois. There were speeches, a parade, and a picnic.

What caused all the commotion? An innovative tree planting program using TUBEX Treeshelters and seedling trees.

The "Pekinites" used TUBEX Treeshelters and seedlings to establish more trees than they thought their budget could possibly allow. The program has become a model for communities across the country.

Before TUBEX Treeshelters you, as a community tree planter or urban forester, had two options: 1) You could plant large nursery stock, and plant only a small number of trees, or 2) you could plant seedling trees, with usually disappointing results.

TUBEX Treeshelters give you an exciting third option. For only a few dollars per tree, TUBEX reliably turns seedlings into large, established trees in just 2 to 3 years.

ADVANTAGES OF PLANTING SEEDLING TREES WITH TUBEX

-The Most Successfully Established Trees For Your Budget-

Two inch caliper balled and burlapped trees often cost more than $75. Labor costs can escalate the price to over $150 per tree.

-More Trees To Choose From-

Price is not the only reason to use seedling trees and TUBEX Treeshelters. Nurseries only grow selected kinds of trees to large caliper size. You will find a far wider range of trees--including native species-- at nurseries that sell seedlings.

-Increased Community Involvement-

Large trees do make an immediate visual impact. However you need trucks, tree spades, back hoes, and skilled (expensive) crews to plant them.

Anyone can plant a seedling and install a TUBEX. The entire community, young and old, can get involved.

EXAMPLE PROJECTS

Hundreds of community groups nationwide have used TUBEX to get the most out of their budget.

Here are some of the ways people use TUBEX. As you can see, you are limited only by your imagination!

-School Projects-

School children love using TUBEX. They can plant in April and see results before summer vacation. Younger students enjoy decorating the TUBEX with permanent markers with their names, drawings of how they're going to care for the tree, etc. Be careful not to block out too much light, however. Kids can use TUBEX over seedlings, or over nuts and acorns they collect (see Fact Sheet #5).

-Utility Company Plantings-

Some utility companies provide a free TUBEX and seedling to replace trees removed for line clearance. That way they can control the species planted, offering only short trees such as eastern redbud or Amur maple.

Others offer seedlings and TUBEX to promote energy saving plantings. They give seedlings and TUBEX to homeowners, along with instructions on where to plant trees for the greatest savings on heating and cooling.

Several utility companies also use TUBEX to reforest power line right-of-ways. Fact Sheets #'s 1-3 cover techniques for forest regeneration.

-Community Seedling Giveaways-

Many cities have an Arbor Day seedling giveaway or sales to promote awareness of tree planting and care. Unfortunately, most of the seedlings planted don't live to become part of a healthy, growing urban forest. Some communities sell TUBEX along with seedling trees to raise money for forestry programs.

-Municipal Nurseries-

Municipal nurseries allow city foresters and park crews to grow hard-to-get species and cultivars for future transplant. It also means the trees you want will be available when your crews are. With TUBEX you can produce quality shade trees in just a few years, with minimal care.

-Roadside and Highway Plantings-

High visibility, low cost establishment, and greater species selection--make it especially ideal for roadside and highway plantings. The Minnesota Department of Transportation planted bur oak seedlings with TUBEX Treeshelters. Bur oak (and many other native trees) is not available in large sizes, and would be too expensive to plant on a large scale if it was. With TUBEX, the agency can for the first time establish this long-lived, drought resistant tree along its roads and highways. The California, Maryland, Arizona and several other

highway departments are using TUBEX on a range of projects.

-Community Forest Groves-

Some plans call for planting a large number of trees, in an effort to create a new forest setting in a park or along a bike path. Again, B & B trees are too expensive and seedlings are too fragile if left unprotected. Other TUBEX Fact Sheets tell you how to successfully establish forest stands of trees.

TIPS FOR A SUCCESSFUL PROJECT

-Buying Seedlings-

Most city-dwellers are used to planting large potted or "balled & burlapped" trees. The trees used with TUBEX are one or two year old seedlings, ranging in height from 4 to 30 inches tall.

You can buy 2 types of seedlings:

1) Potted ("container grown"): Trees grown in small (usually 2-3" square) pots have two advantages: First, transplanting does not disrupt the root system, so there is little or no transplant shock. Container seedlings start to grow right away after planting. For example, 6 inch container grown seedlings will usually emerge from 4 foot TUBEX in the first growing season. Second, you can transplant potted seedlings any time during the growing season.

Many nurseries grow named cultivars with known genetic characteristics in containers.

2) Bare root: Bare root seedlings are grown in beds at a nursery, and then dug roots and all for sale. Trees grown this way cost less than container grown stock. However, you can plant bare root seedlings only at certain times of the year. Because digging the trees disturbs the root systems, bare root trees take longer to start growing after planting.

With proper handling and planting both potted and bare root seedlings will produce a very successful project.

TUBEX Fact Sheet #11 is a list of sources for seedlings of all kinds.

-Acceptance And Involvement-

These are the common denominators for successful tree planting projects. Here are some tips for getting more community support and involvement:

1) Decorate the TUBEX with brightly colored decals, briefly explaining the project, and giving credit to responsible parties. (Contact our staff regarding decal specifications.)

2) Post a sign proclaiming the project, along roads or bike paths.

3) Make a celebration of the planting, with entertainment and a picnic lunch. Keep it fun!

4) If project includes trees planted on private property, give the homeowners instructions for proper care. Again, our staff can assist in designing and writing instructional materials.

-Minimizing Vandalism-

Humanizing TUBEX plantings with decorations, decals, and signs goes a long way toward eliminating vandalism. Would-be vandals think twice before damaging work done by children or friends, as opposed to nameless agencies or businesses.

Another way to reduce vandalism is to involve the most likely vandals in the projects. Teen-agers typically do the most property damage. When young people feel a part of a project (especially when they have fun doing it), they are much less likely to damage it.

-Installing TUBEX-

It is crucial that TUBEX Treeshelters be installed correctly. When volunteers or city crews install TUBEX, sometimes installation instructions do not get communicated. Make sure everyone understands how to install TUBEX properly. Use a good, sturdy stake that will last at least 5 years in the ground. And be sure to supervise the planting, to make sure all the TUBEX are pushed into the ground 1/2".

-Watering-

Especially with plantings on private property, the tendency is to over water trees in TUBEX. Remember: TUBEX captures moisture, and returns it to the soil. Trees in TUBEX require less water than unsheltered seedlings. Do not give instructions to give trees a fixed amount of water per week. Tell them to check the soil to a depth of 3 inches. If the soil is dry, give the tree deep watering with a trickling hose.

-Mulch-

Three to four inches of organic mulch holds moisture and enhances the soil as it decomposes. TUBEX also keeps mulch away from the stem of the tree, avoiding insect and disease problems from contact between mulch and stem.

-Don't Forget Maintenance-

Down the road, the trees you plant today will require care, including pruning and watering in times of drought.

Remember: When you use TUBEX you'll have more successfully established trees to take care of. Be sure to budget for their care in the future. Talk to your state urban forester about funding for tree care.

PUTTING IT ALL TOGETHER: THE PEKIN, ILLINOIS STORY

Pekin, Illinois, a community of 30,000, began a major replanting program in April of 1990. The Illinois Department of Conservation helped Pekin evaluate the condition of trees growing along city streets. Pekin's trees were beginning to decline and die, and few new

trees were being planted. A long range planting program was designed to begin filling the 15,000 vacant planting sites located on public and private property.

Seedling trees and four foot tall TUBEX Treeshelters were used in the first year of the program to establish 500 maple, oak, and linden trees along prestigious Park Avenue, a divided street that runs the length of the town. Trees were only planted in front of homes of people who requested a tree.

Articles in the newspaper hailed the project, and a parade marched down Park Avenue, with several dignitaries riding in a horse-drawn carriage. Bright orange decals promoting the program were affixed to each TUBEX.

Politicians got to play a role in the planting as well. The mayor's signature was on each decal, and several local and state politicians spoke at a picnic following the parade.

After six months, tree growth averaged between 2 and 3 feet. Vandalism was not found to be a problem; only one seedling and shelter were damaged due to intentional misconduct. Pekin planted 500 more seedlings and protected them with TUBEX in April of 1991.

Beyond the statistics are the stories of how people have accepted TUBEX/seedlings, and how excited they are about trees.

Last winter and spring, during Operation Desert Shield, townspeople wrapped yellow ribbons around the TUBEX. This winter, the acceptance of TUBEX reached new heights. The forester who started it all called to say people had decorated their TUBEX for the Holidays with lights, ribbons, and bows!

The local garden center now sells seedlings and TUBEX each spring.

The success of this project can be seen when driving through Pekin. Not only have trees been planted along city streets, but homeowners have begun planting additional trees in their yards.

PEKIN VIDEO AVAILABLE

The Pekin, Illinois project was documented on video tape, with a grant from the U. S. Forest Service. It follows the planting from planning through the first growing season.

Call our office for information on obtaining a copy of the video.

WINDBREAKS

TUBEX Fact Sheet #10

©Split Rock Forestry, Inc., January, 1992

INTRODUCTION

Windbreaks do more than prevent soil erosion. A field windbreak reduces moisture loss from wind blowing on crops, helps wildlife, reduces crop blowdown or "lodging", and captures snow to improve soil moisture.

Farmstead shelterbelts protect people and animals from cold wind. A shelterbelt reduces snow drifting, attracts song birds, traps blowing soil, cuts down noise, and saves energy.

Our Great Plains were treeless because of alkaline soils and harsh weather conditions. Windbreak planting, whether for farmstead, feedlot, or field, represents one of the toughest tree establishment challenges.

To succeed you will have to achieve high survival, prevent animal damage, and get fast growth. TUBEX is the only tool that gives you complete coverage. TUBEX gives every fragile young seedling the same kind of protection the windbreak will someday provide to your crops or home.

[For the purposes of this fact sheet "windbreak" and "shelterbelt" will be used interchangeably. The two terms are often used to distinguish between rows of trees protecting fields (i.e., field windbreak) and trees protecting feedlots and farm buildings (i.e. farmstead shelterbelt).]

PLANNING

A windbreak must be properly designed to perform its functions. Windbreaks function as precision tools or machines. It has little in common with forests or plantations. The design features that make the difference between a functioning windbreak and simply a row of trees include:

1) Cross-sectional shape.
2) Orientation to seasonal wind patterns.
3) Tree height at maturity.
4) Distance between trees.
5) Distance between rows.
6) Branching habit of selected species.
7) Setback from buildings.
8) Setback from roads.
9) Feedlot setback.
10) Number of rows.

Good planning is critical. A poorly designed windbreak can create huge snowdrifts that delay spring planting, drop branches that interfere with equipment such as cultivators, seeders, and combines, trap stagnant air around the farmstead, and dump snow into feedlots and onto roads. Most importantly, it won't provide any

of the wonderful benefits of a properly designed, well-established windbreak.

This fact sheet does not cover all the types and configurations of windbreaks. That would require a book. It is meant to offer supplemental information, and tips for a successful planting, using information from experienced TUBEX customers and researchers.

Fortunately, financial and technical assistance is available. Windbreak expenses can largely be paid for with federal cost sharing programs. Contact your county conservation district for design help and financial aid. Your university extension service, the USDA Soil Conservation Service, and your state forestry department will also help you.

TUBEX FOR WINDBREAK ESTABLISHMENT

Since a windbreak is a precision instrument, it is vitally important that all the trees you plant survive and thrive. TUBEX will help get your seedlings through drought, past animals, and will make caring for your trees much easier.

Survival

The biggest barrier to windbreak establishment is seedling survival. TUBEX has been proven to help establish trees even under the harshest of conditions. TUBEX users have reported 80, 90 even 95% survival during droughts that killed all other trees planted without a treeshelter.

Water and wind abrasion are the first problems your seedlings face. Without adequate moisture the seedlings will die and the windbreak will fail. Wind increases water loss through evaporation from transpiring leaves.

Moisture

TUBEX captures the moisture that evaporates from the leaves of seedlings. Instead of losing moisture to the wind, the humidity increases in the TUBEX until condensation forms. The water drips back to the soil and is reabsorbed by the roots again.

In arid regions it is best to use 2 or 3 foot TUBEX and avoid the 4, 5 and 6 footers. The reason has to do with the increased volume of warm air in the larger TUBEX. The condensation won't form if the seedling cannot transpire enough to humidify the shelter. Any height TUBEX can be used in arid regions if supplemental watering is provided.

If you have severe browsing by deer it may be necessary to start with a short TUBEX and either extend it or switch to a taller TUBEX in year two.

Wind

Windblown soil can "sand blast" the bark, leaves or needles of tender young trees. Blowing grit removes the thin waxy layers on leaves and needles. Conifers are especially vulnerable to this kind of damage since much of their food reserves are stored in the needles.

Animals

TUBEX protects seedlings from animals, until the tree grows out of reach and is firmly established.

TUBEX is available in six lengths and two colors. Since windbreaks are always planted in full sun, specify the "brown" TUBEX. The brown color shades the tender seedling and blends in with the countryside better than the stark white shelters. The white shelters are the best choice in shady or forested areas.

Windbreaks are one application where you might use any of the six sizes. You may want to refer to the size selection discussion in our TUBEX Tree Grower's Guide for more information. Remember deep snow means you need taller shelters for animal protection. If you have a rabbit problem and deep snow, a three or four foot TUBEX is recommended.

Livestock

Livestock and trees are not compatible. Grazing animals can hinder windbreak establishment by browsing or trampling small seedlings. Long term, their activities can lead to damage or mortality of larger trees.

Although keeping the animals away from your trees may be ideal for the trees sake, it is not necessarily practical. With a few changes and some extra care it is possible to protect trees from grazing livestock for short periods of time. If you must graze animals temporarily in the area during seedling establishment, TUBEX is a great help.

For sheep, a four or five foot TUBEX will be needed. Use a stout stake that is at least two inches square. Install a second stake on the opposite side to prevent rotation from rubbing. The second stake should not be more than about six inches out of the ground. The sheep will stand on it to reach the leaves that pop out the top of the shelter.

A six foot shelter is necessary to protect seedlings from cattle, along with an even heavier stake at least three inches in diameter. Again install the second stake to prevent spinning. A strand of barbed wire wrapped like a candy cane will discourage rubbing.

Soil compaction from the hooves of grazing animals is very damaging to tree growth and health. Permit grazing only with dry soil conditions. It is beneficial to maintain a grass free area around the base of the tree which encourages growth and discourages close grazing.

TUBEX cannot protect the trees forever. Ideally, you should completely restrict livestock access, or at least severely limit it to a couple of weeks of the year--and even then only when the soils are dry.

Growth

Fast growth is critical to the success of your windbreak. The taller the shelterbelt the more protection it provides. If growth is slow it will be many years before the windbreak starts to function.

TUBEX aids growth in several ways. Initial growth

is dramatically increased by the recycling of water transpired by the plant. Seedlings in TUBEX are able to continue growing even under dry conditions.

A treeshelter also protects the seedling from wind. Wind whipping causes unseen damage to the stem and root system and even breakage. Wind also dries out the seedling and stresses the plant. TUBEX supports the seedling and shields it from wind.

CARE AND MAINTENANCE

The long term growth of your windbreak will depend on the care you give it. As with all types of tree planting, care means weed control. With a limited amount of soil moisture, weed control is crucial. You don't want your trees to fight grass for available water--the trees will lose that battle every time.

TUBEX does not eliminate the need for weed control, but it does make it faster and easier to do. Follow the directions about weed control given by your local experts. Weeds can be controlled by mowing, mechanical cultivation, herbicides, fabrics, or mulches.

Mowing around newly planted seedlings provides limited relief from competition. A maintained mowing regime will also reduce rodent habitat, thus reducing incidence of mouse damage.

Cultivation

TUBEX also makes mechanical cultivation easier by improving the visibility of seedlings. Churning the vegetation and breaking up the root mass effectively frees more nutrients for your seedlings. TUBEX guards your trees from accidental nicking and flying debris.

Herbicides

Herbicide applications are made easier, safer, and more effective with TUBEX. TUBEX allows you to spray without fear of harming your seedlings. This allows you to control unwanted vegetation anytime of the year with a variety of herbicide choices. TUBEX is made from polypropylene and will not react with agricultural chemicals.

Mulch

For long term benefit, mulching also can provide weed control. Organic materials such as compost, ground corn cobs, and wood chips not only control grass and weeds, but also help to condition the soil.

Fabric mats and plastic sheeting also do an excellent job of controlling weeds and conserving moisture.

SPECIES SELECTION

Below is a list of tree species that have performed extremely well in TUBEX Treeshelters. If you don't see the species you want to plant on the list, give us a call. We will let you know what past results have shown or direct you to local experts who will know the best tree species for your area.

Hardwoods:	Conifers:
Russian olive	northern white cedar
all oaks	pinyon pine
mesquite	ponderosa pine
cottonwood & hybrids	Rocky Mtn. juniper
willow and hybrids	Colorado blue spruce
aspen & hybrids	tamarack
hackberry	white spruce
green ash	Austrian pine
white ash	eastern red cedar
mulberry	
Nanking cherry	
Siberian crab	

Seedling Nurseries

NAME	ADDRESS	PHONE	CATALOG	COMMENT
Alpine Nursery, Inc.	PO Box 5381, Kalispel, MT 59903-5381	800-735-6434	free	Seedlings are hardy, northern-grown stock from selected seed sources.
Armintrouts Evergreen Nursery	1156 Lincoln, East M89, Allegan, MI 49010	616-673-2704	free	Conifer seedlings.
Bear Creek Nursery	Box 4112, Northport, WA 99157	509-732-6219	free	Cold hardy & drought tolerant stocks for timber, wildlife & windbreaks. Antique apples & more at very inexpensive prices.
Burnt Ridge Nursery	432 Burnt Ridge Road, Onalaska, WA 98570	206-985-2873	SASE*	Hardy fruit & nut trees selected for their disease resistence.
Central Florida Lands & Timber	Rt. 1, Box 899, Mayo, FL 32066	904-294-1211	free	Bareroot & containerized pine & hardwood seedlings, ornamentals, wildlife & hard to find Florida native tree species.
Cold Stream Farm	2030 Free Soil Road, Free Soil, MI 49411-9752	616-464-5809	free	Hardwood and conifer seedlings. Specialize in wildlife habitat.
Delta-View Nursery	Rt. 1, Box 28, Old Highway 61 South, Leland, MS 38756	800-748-9018	free	Hardwood seedlings for reforestation, reclamation, wetlands & wildlife.
Edible Landscaping	PO Box 77, Afton, VA 22920	804-361-9134	free	Mail order potted fruit trees.
Endangered Species	Box 1830, Tustin, CA 92681-1830	714-544-9505	free	(Big catalog is $6) We deal in things you can't get elsewhere: Bamboo, palms, cycads, grasses, sansevierias, crown-of-thorns & variegated plants. Many are hardy. Especially the bamboo.
Farmer Seed & Nursery	818 NW 4th Street, Faribault, MN 55021	507-334-1623	free	Mailorder - Specialize in northern grown stock.
FEDCO Trees	Box 340, Palermo, ME 04354	207-426-9005 207-993-2837	free	We offer hardy and unusual fruit, nuts, and other shrubs & trees. We use a no-frills format. We are a cooperative from which anyone can purchase. Our prices tend to be quite low.
Forrest Keeling Nursery	PO Box 135, Elsberry, MO 63343	314-898-5571	free	Growers of 4 million bareroot tree & shrub species. Mainly wholesale.
Gurney Seed & Nursery	110 Capital St., Yankton, SD 57079	605-665-1930	free	In business since 1866: we grow much of our own stock under conditions designed to provide customers with extremely hardy trees & plants.
Henry Field's Seed & Nursery Co.	415 N. Burnett St., Shenandoah, IA 51602	605-665-4491	free	A long time gardening friend, the Henry Field's catalog supplies you with a large choice of trees, including fruit, nut and ornamental trees, as well as vegetable and flower seed, perennials and hedges.
Hidden Springs	Rt. 4, Box 159, Cookeville, TN 38501	615-268-9889	$1.00	Rare & unusual fruit & nut trees
International Forest Seed Company	PO Box 490, Simpson Road, Odenville, AL 35120	800-679-6461	free	Quality hardwood seedlings for ecological restoration, land reclamation and forest regeneration.
James Pecan Farms, Inc.	Rt. 3, Box 212, Brunswick, MO 65236	816-548-3427	free	10,000 pecan trees. We hold 3 US Patents on pecans and hicans, we have the best pecans that grow.
J. W. Jung Seed Company	Randolph, WI 53957	414-326-3121	free	Native shade & nut trees.
Moon's Nursery	PO Box 1097, Oroville, WA 98844	509-476-3188	free	Oriental pears, chestnut, English walnuts.
Needlefast Evergreens	4075 West Hansen Road, Ludington, MI 49431	616-843-8524	free	Conifer seedlings.
Northwind Nursery & Orchards	7910 - 335th Avenue NW, Princeton, MN 55371	612-389-4920	free	Hardy fruit trees for northern climates.
Owen Farms	2951 Curve-Nankipoo Rd., Rt. 3, Box 158A, Ripley, TN 38063	901-635-1588	free	Container grown trees, shrubs & perrenials.
Pony Creek Nursery	PO Box 16, Nursery Lane, Tilleda, WI 54978-0016	715-787-3889	$1.00	Evergreen & hardwood seedlings. Numerous varieties of nut trees, fruit trees, shrubs (flowering, windbreaks & birds), shade trees & garden needs.
Richard Owen Nursery	2300 East Lincoln, Bloomington, IL 61701	309-662-3511	free	Native shade and nut trees, ginseng.
Pine Grove Nursery	R.D. #3, Box 146, Clearfield, PA 16830	814-765-2363	free	Quality seedlings & transplants for Christmas trees, reforestation, windbreaks, soil banks, conservation planting, etc.
Rivendell Botanic Garden	PO Box 17, Beardstown, IL 62618	mail only	$2.00	Index Quercus, offers small lots of oak seed and seedlings, as well as selected grafted pines and ginkgo.
St. Lawrence Nurseries	RR 5, Box 324, Potsdam, NY 13676	315-265-6739	free	Extremely hardy seedling hardwood, nut trees and fruit trees for reforestation, reclamation, Christmas trees & ornamentals.
F.W. Schumacher Co., Inc.	36 Spring Hill Road, Sandwich, MA 02563	508-888-0659	$1.00	We offer SEED of trees and shrubs.
Schumakers Nursery	RR 2, Box 10, Heron Lake, MN 56137	507-793-2288	free	Hardwood seedlings, shrubs, potted conifers. Mainly wholesale.
Smith Nursery Co.	PO Box 515, Charles City, IA 50616	515-228-3239	free	90 hardwoods. High quality stock, including hard to get items. Also Dependable and fast personal service.
Spandel Nursery	Rt. 2, Box 125, Claxton, GA 30417	800-553-5771	free	Specialize in bareroot seedlings & shrubs for wildlife habitat enhancement.
Starhill Forest Arboretum	Rt 1, Box 272, Petersburg, Il 62675	217-632-3685	$1 or SASE*	Custom collect fresh SEED from oak species and hybrids, (over 30 varieties) for direct seeding with Tubex.
Stark Bro's Nurseries	Highway 54 West, Louisiana, MO 63353	800-325-4180	free	Nursery stock to be grown in Tubex, we have flowering ornamental trees, shade trees, nut trees and decidous trees.
The Environmental Collaborative - TEC	PO Box 539, Osseo, MN 55369	mail only	free	Nut trees, hardwoods, shrubs -- over 50 species available.
Van Well Nursery	PO Box 1339, Wenatchee, WA 98807	509-663-8189	$1.00	Fruit trees only.
Vernon Barnes & Sons Nursery	PO Box 250, McMinnville, TN 37110	615-668-8576	free	Listing of over 250 varieties of shade trees, perennials, berry plants, wild flowers, etc.
Warren Co. Nursery, Inc.	Rt 2, Box 204, McMinneville, TN 37110	800-848-1272	free	We offer flowering shrubs, ornamental & shade trees, nut & fruit trees and evergreens.
Whitman Farms	1420 Beaumont, Salem, OR 97304	503-585-8728	free	Unusual deciduous trees.
Windy Hills Farm	1565 E. Wilson Road, Scottville, MI 49454	616-757-2373	free	Hardwoods and shrubs for reforestation and wildlife habitat. Variety of hardy nut trees, hybrid poplars.
Woodlanders, Inc.	1128 Colleton Ave, Aiken, SC 29801	803-648-7522	$2.00	Large selection of rare and hard to find tree species. Native southern U.S. & exotics.

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SEEDLING NURSERIES

TUBEX Fact Sheet #11

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Seedling Nurseries offering TUBEX				
NAME	ADDRESS	PHONE	CATALOG	COMMENT
Arboreal Enterprises	PO Box 434, Powers, OR 97466	503-439-5485	free	Small & custom orders of hard to find trees.
Cascade Forestry Nursery	22033 Filmore Road, Cascade, IA 52033	319-852-3042	free	Northern hardy deciduous seedlings & conifer transplants. Also full line of reforestation services.
Chestnut Hill Nursery	Route 1, Box 341, Alachua, FL 32615	904-462-2820	free	Mailorder blight resistant chestnuts & cold-hardy oriental persimmons.
Chippewa Farms	10295 Nursery Lane NW, Brandon, MN 56315	612-524-2244	free	Containerized conifer & deciduous seedlings. Hardy stock for the northern Great Plains
Cornflower Farms	PO Box 896, Elk Grove, CA 95759	916-689-1015	free	Extraordinary collection of California trees, shrubs & beneficial plants. Our containerized seedling stock are used for wildlife, windbreak & biomass plantings.
C. P. Daniel's Sons, Inc.	PO 119, Waynesboro, GA 30830	800-822-5681	free	Specializing in trees, shrubs & seed that produce crops for wildlife. Seed sources for entire US & parts of Canada.
Early Bird Nursery	RR 1, Box 411, Parrotville, TN 37843	615-625-1362	free	Specialize in Pawlonia.
Great Lakes Nursery Co.	1002 Hamilton, Wausau, WI 54401	715-845-7752	free	Conifers & deciduous seedlings or transplants. Growers of superior native plants & purveyors of fine native seeds.
Greenwood Nursery	PO Box 686, Rt 6, Box 152B, McMinnville, TN 37110	800-426-0958	free	The best quality seedlings for wildlife, reforestation and ornamental production at reasonable prices.
INSTI-TREES Nursery	PO Box 1370, Rhinelander, WI 54501	800-236-5353	free	Genetically improved trees for wildlife habitat, Christmas trees, conservation & timber.
Native Oak Nursery	20316 Fallen Leaf Drive, Tehachapi, CA 93561	800-949-OAKS 805-822-4746	free	Specialize in seedlings of native California oaks, 1 and 4 gallon seedlings.
Nolin River Nut Tree Nursery	797 Port Wooden Rd., Upton, KY 42784	502-369-8551	free	Over 150 varieties of grafted nut trees and persimmons.
Northwoods Nursery	27635 South Oglesby Road, Canby, OR 97013	503-266-5432	free	Unique fruit & nut trees including chestnuts, walnuts, disease-resistant fruit trees, paw paws, persimmons, hardy kiwis and unusual ornamentals.
Oikos Tree Crops	721 North Fletcher, Kalamazoo, MI 49007	616-342-6504	free	Seed source identified specialties include hybrid oaks, native fruits, nuts. Milk carton containers in '92. (Free 3 trees to bona fide business/ landowners who require proof of tree quality).
Plant-A-Plug-Systems	PO Box 1953, Pine Bluff, AR 71613	501-536-4768	free	Specialists in growing and marketing deep plug type tree seedlings for the nursery trade, reforestation and wetlands applications.
Raintree Nursery	391 Butts Road, Morton, WA 98356	206-496-6400	free	Best fruit, nuts and berries for Pacific NW and also nationally.
West Wisconsin Nursery	Rt. 4, Sparta, WI 54656	608-272-3171	free	We supply deciduous & evergreen nursery stock & Christmas trees to maintain forests, tree farms & other wildlife habitats. Currently applying biological methods to produce healthy plants.
Van's Pines, Inc.	7550 144th Ave, West Olive, MI 49460	800-888-7337	free	Native trees & shrubs for timber, windbreaks & conservation. Offering 183 cultivars. Over 30 million trees in various growing stages.
Von Trapp Nursery	Tyler Bridge Road, P. O. Box 2280, Hinesburg, VT 05461	802-482-3454	free	Hardy northern grown caliper shade trees. Sugar maple with TUBEX available through mailorder.

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APPENDIX H -- MYRTLE POINT TREE TRAIL