Volunteer Park

Vegetation Management Plan

DRAFT

Prepared by:
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Seattle Department of Parks and Recreation

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VOLUNTEER PARK VEGETATION MANAGEMENT PLAN

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Date of Orthophoto: July 1999
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Chapter 1 – Introduction and Executive Summary

1.1 Introduction

Volunteer Park is Seattle's premier developed landscape park, centerpiece of a comprehensive park and boulevard system laid out for the city by the Olmsted Brothers Landscape Architects in 1903. The park's Olmsted design origins - while highly significant – have been overlain by generations of landscape change visible in the growth, embellishment and attrition of its vegetation. Volunteer Park today presents a rich mix of plants and human imprints on the landscape.

This vegetation management plan seeks to address conservation within the dynamic realities of societal and landscape change. Because plants are growing organisms, they cyclically mature, decline, die and are replaced by new generations; whether this process is directed or left alone distinguishes gardens from wild places. A designed landscape like Volunteer Park requires active management to conserve originally-envisioned character; without, these qualities are lost.

Although no landscape can be frozen in time, management guided by clear objectives can safeguard historic qualities while accommodating evolving conditions. Today, parts of Volunteer Park have effectively lapsed from active management in face of constrained resources, and are growing increasingly wild. Were the consequence simply a "return to the native" one might advocate letting this trend continue; however, loss of heritage coupled with issues of user safety and invasive species suggests more active intervention.

To visitors, Volunteer Park offers 48 acres of still-beautiful, peaceful landscape, sited to capture outstanding views of both city and surrounding water and mountains. Key Olmsted-designed features remain intact and much enjoyed. Inconsistent, eroded landscape quality is less evident to the casual observer. Rarely dramatic, such losses are cumulative. The intent of this vegetation management plan is to provide a tool by which Park managers and citizens can combine long-term vision with action, appropriately applied over time. Because trees are both the longest-term investment and the most prominent element of the park's landscape, they form the primary focus for this plan.

1.2 VMP Format

This VMP is organized and can be used in a variety of ways, depending on one's orientation. The plan can be digested in its entirely or gleaned in parts, read for broad ideas and information, or for guidance about particular park areas or topics. From this introductory chapter, the document moves to goals and objectives for vegetation management, followed by summary and analysis of existing conditions, area-specific recommendations for vegetation management, maintenance and management techniques, and concluding with discussions of implementation approach and priorities, and guidance on monitoring for VMP fulfillment. A series of appendices at the end corresponds with the above sequence of topics. Maps are collected in the last appendix for easy reference.

Although chapters and appendices contain much stand-alone material, implementation of VMP recommendations depends on the integrated research, management objectives, and sequenced actions described in the plan. Vegetation management inherently involves multiple players interacting with the landscape over many years. By using this plan consistently over its twenty-year lifespan, much can be achieved in way of vegetative health, longevity and beauty. Conversely, piecemeal activity at best will yield mixed results.

1.3 Executive Summary

The Volunteer Park Vegetation Management Plan's overall Goal is:
To sustain through time Volunteer Park's vegetation, consistent with contemporary park conditions and resources as well as its Olmsted Brothers design heritage.
Objectives include: 1) To manage vegetation to provide practical guidance for park vegetation management;
2) To manage vegetation to provide a safe environment; 3) To reclaim lost vegetative character; 4) To build community stewardship; 5) To enhance tree canopy and native habitat; 6) To preserve and reinstate Olmsted design landscape features.

To develop the above goal and objectives, multiple factors affecting park vegetation were assessed: Volunteer Park's design, planning and landscape evolution, relevant policies and regulations, current usage, citizen concerns and involvement, and management and maintenance trends. Composition and condition of existing vegetation and related characteristics were documented and evaluated as well, with an emphasis on park trees.

This evaluation was distilled into findings that reveal a picture of what needs to be addressed in vegetation management recommendations. Not all identified concerns are exclusively (or partially) the purview of vegetation management. Findings that underlie VMP goals and objectives and resultant management recommendations follow.

<u>Trees</u>

- Park tree population is skewed toward near-mature, mature, and declining generations; ongoing replenishment will be needed.
- Crowding among trees, and between trees and overgrown shrubbery compromises user safety, plant health and aesthetic quality of the landscape.
- Self-sown trees are competing with intentionally-planted trees both aesthetically and culturally, and also escalating invasive plant problems in the park and nearby forests.
- Relatively few trees pose immediate risk of failure in Volunteer Park; these need to be mitigated through inspection, pruning and/or removal. Given mature trees and near-constant park use, hazard must continually and proactively be addressed.
- Cultural problems like compaction, drought, nutrient stress and overcrowding are contributing to pests and pathogens affecting tree health and longevity.
- The park's tree population represents unusual species richness, specimen quality and size; management should actively protect and perpetuate this valuable collection.
- Native species are limited and could be increased to enhance wildlife habitat where appropriate.

- Tree species and locations correspond to original Olmsted plans in many places. Attention is needed to reclaim lost vistas, openings and vegetative layers where accretion and alteration have compromised the original design character.
- Evergreens with low-sweeping limbs contribute positive landscape character and are to be retained as fully as possible while addressing fact that they harbor illegal activities posing health and security risks to visitors.

Understory

- Shrubs have grown to enormous size throughout the park, resulting in view and light blockage, and competition with canopy trees.
- Shrub bed maintenance greatly outstrips available resources; the consequence is an ever-mounting pruning, weeding and refurbishment need.
- Deferred maintenance has adversely affected user safety, greatly reducing visibility and mobility through the park and offering habitat for illicit activity.
- Overgrown shrubs have significantly altered landscape character from the original Olmsted design.
- Annual color plantings compete with the overall landscape for finite staff resource.
- A key Olmsted design element was shrub masses providing seasonal color; the current palette has shifted from the original and narrowed considerably; variety should be reinstated within a modern context.
- Invasive plants infest almost all park shrub beds, to varying degrees. Most originate from ornamentals planted nearby: English ivy, holly and laurel, and self-sown tree saplings of cherry, Norway maple, horsechestnut, hawthorn and black locust.
- Native species grow together with ornamentals and invasives, but not in pure communities. Opportunities exist for revegetating neglected park peripheries with natives.

History

- Volunteer Park's Olmsted plans have been substantially realized and are extant in much of the grading, circulation, site features and plantings. Vegetation is the most vulnerable of these elements.
- Vegetation management should broadly respect original design intent. Altered contemporary uses and maintenance levels affect what is feasible to preserve.
- Volunteer Park is a resource of national significance that merits a level of care currently not conferred to its landscape.
- Declining maintenance has occurred over a very long period, acutely so for nearly a generation. Improvements have addressed particular landscape areas but not issues of routine upkeep. Some alterations have increased maintenance demand.
- Volunteer stewardship and philanthropy have benefiting the landscape, but both resources have enormous, untapped potential.

Contemporary uses

- Intensified landscape use has generated adverse impacts on park vegetation: compaction, trampling and turf wear.

- Vegetation management must deal directly with consequences of societal problems like homelessness and drug addiction that affect the park landscape.
- Volunteer Park plays an important role as green infrastructure and natural refuge within the city, consistent more than ever with its original intended function.

Summary of Issues

Key issues relating to vegetation management in Volunteer Park are:

- Reconciling historic character with contemporary resource constraints.
- Sustaining landscape beauty while improving user safety.
- Insuring perpetuation of Olmsted landscape heritage.
- Proactively addressing issues of plant growth and change.
- Remediating landscape quality lost to neglect, encroachment and overuse.
- Cultivating community support and stewardship.

Vegetation management recommendations form the core of the plan, describing What needs to be done, while ensuing chapters detail How, When, by Whom and in what priority actions should be taken. Management recommendations that apply parkwide, include:

- Maintain park trees for safety of people and property, through regular monitoring, tree care and timely hazard mitigation pruning and removals.
- Provide replenishment generations of trees through continuous, strategic replanting.
- Selectively prune and remove vegetation to preserve and reopen key internal and external vistas defined by the Olmsted plan.
- Reclaim vegetation layers lost to cumulative shrub overgrowth, self-sown and invasive plant accumulations, and denuding of low understory, through targeted pruning, plant removal and replanting.
- Maintain screening at park peripheries while accommodating security needs, using a combination of pruning, replanting, and removing vegetation.
- Reduce long-term landscape upkeep by replacing invasive and high-maintenance species with durable plants consistent in character with the original Olmsted plant palette.

Individual areas of the park have vegetation management needs particular to their location, landscape characteristics and use. Volunteer Park has been divided accordingly into nine Management Areas (MA's). Not all are continuous, and size and configuration vary. Identified Management Areas, as delineated on Map 5 - Appendix G, include:

Active Play	**Formal Landscape**	**Greensward**
Glade	**Reservoir Slope**	**Residential Buffer**
Service Yard	**Street Buffer**	**Tennis Court**

For each Management Area (MA), vegetation-related objectives are described, as well as key actions needed to fulfill them. Chapters 7, 8 and 9 respectively provide supporting guidance on how to perform specific tasks, set project priorities, and monitor success in

meeting objectives over time. Management recommendations emphasize the immediate needs of park vegetation, but cover a timeframe of at least twenty years. This document should be revisited at that point and modified, based on progress made in providing effective vegetation management for the park.

Achieving VMP objectives will require significant capital and labor, strategically applied over time, particularly in an era of constrained resources. Implementation recommendations emphasize the most urgent priorities, and projects with the greatest benefit-to-investment potential. These are summarized by management area and recommended action in Chapter 8 - Table 8.1. Locations of all identified tree work and outstanding trees are combined on Map 10 – Appendix G. This map and related master database are tools for Parks Urban Forestry to track ongoing management of park trees.

Identified resources for implementation include:

- District, Horticulture and Urban Forestry staff, for ongoing maintenance and small projects (redirecting tasks as appropriate to best address VMP objectives).
- Enhanced resource management appropriation.
- Targeted Major Maintenance Fund (MMF) capital projects.
- Public engagement through volunteer activities, donations and grant partnering.
- Partnership with institutional "tenants" and neighbors: Seattle Asian Art Museum, Seattle Public Utilities (Water Division), Metro Transit, Lake View Cemetery, tapping their longstanding, continuing interests in specific areas of the park.

At intervals in the future, implementation accomplishments should be measured against VMP objectives and any needed course corrections made. Sector resource staff, Horticulture, Landscape Architecture and Urban Forestry staff should collaborate in this assessment, using an "adaptive management" model. Monitoring will provide a means to cumulatively, quantitatively track progress, a key tool for evaluating implementation success.

Chapter 2 - Vegetation Management Goals and Objectives

2.1 VMP Goal

The Volunteer Park Vegetation Management Plan's overall Goal is:
To sustain through time Volunteer Park's vegetation, consistent with contemporary park conditions and resources as well as its Olmsted Brothers design heritage.

2.2 Overall Objectives

Objectives add specificity to this overarching goal, and help define the range of actions needed for its fulfillment. Identified Objectives include:

- To provide practical guidance for appropriate park vegetation management, to encompass planting, removal, pruning and beneficial tree care and horticultural practices.
- To manage vegetation to provide a safe environment for park users (including visitors and staff).
- To reclaim Volunteer Park's essential vegetative character lost over time due to plant growth, senescence and deferred maintenance.
- To build community stewardship, support and appreciation for Volunteer Park's landscape.
- To enhance quality of tree canopy and native habitat within the park.
- To preserve and reinstate where possible specific features of Volunteer Park's Olmsted Brothers landscape legacy.

2.3 Establishing Goals and Objectives

The above Goal and Objectives flow from an evaluation of several elements affecting park vegetation, both today and into the future:

- Park history
- Relevant planning, design and policy documents
- Current landscape uses, issues and opportunities
- Maintenance practices and constraints
- Existing vegetation composition and condition

Summary and discussion of these key factors follow in Chapters 3 and 4.

Chapter 3 – Summary of Plan Context

3.1 Context for Vegetation Management

In addition to its landscape composition and condition, several factors directly affect vegetation management for Volunteer Park. Key elements are park history, public policy and regulations, prior design and planning, current usage patterns, citizen concerns and organizational involvement, and existing maintenance practices. Each will be discussed in turn in this chapter.

3.2 Park Planning, Design and Evolution

Volunteer Park is among Seattle's oldest parks, the undisputed jewel of the city's historic park and boulevard system**.** A timeline of the park's landscape planning and development since the land's acquisition in 1876 is included in Appendix A – Historic Documents. Also contained in this appendix are selected original plans, correspondence, Olmsted Brothers plant list and historic photographs, representing a sample of material available in the Seattle Municipal Archives and other local and national collections. The following summary of Volunteer Park's landscape evolution focuses on changes in vegetative composition and character since the settlement of Seattle, and on the park's significant Olmsted design legacy.

Looking at Volunteer Park today, it takes imagination to visualize the towering forest and pioneer cemetery that once existed in its place. Like all of Seattle, for millennia Capitol Hill was cloaked in lush conifer forest, logged in the early decades of Euro-American settlement after 1850. The City purchased most of what is now Volunteer Park (40 acres) in 1876, for burial purposes. Providing a public cemetery filled an obvious need for the young city; parks came later, a tangible sign of Seattle's maturation beyond basic necessity to civic identity. Minor acreage was added in the early 1900's to bring the park to its existing boundaries and size.

Initially, the property was so inaccessible it remained a brushy, unused clearcut for almost a decade. Despite its condition, the site's scenic value was evident from the outset. Regarding adjacent Masonic (Lake View) Cemetery just to the north, the Seattle Post-Intelligencer wrote, "The location of this tract of land (which opened in 1873) cannot be surpassed for natural beauty. From elevated locations Seattle and Salmon Bays and Lakes Union and Washington can all be seen." Securing the summit of this ridge between the lakes made possible eventual development of an outstanding public park. The mandate to preserve this site's vistas for citizens to enjoy dates back to its original purchase, and remains a key value affecting vegetation management.

In 1885, the still-undeveloped property was designated Washelli Cemetery, a Makah name for the west wind (direction of the land of the dead). Bodies were relocated there from what is now Denny Park. Only two years later, the property was set aside as Lake View Park and the same bodies moved again, to adjacent Lake View Cemetery. The park was soon renamed City Park to distinguish it from the cemetery, and changed once more to Volunteer Park in 1901, to honor volunteers serving in the Spanish-American War.

In 1893 six acres at the north end of the park were cleared for construction of a greenhouse and plant nursery, near where such facilities remain today. Parks Superintendent Edward Schwagerl was particularly interested in horticulture and sought to grow a variety of native and exotic species for new parks throughout the city. Besides establishing this nursery, the city's commitment to park development was uncertain. Park Commissioners almost simultaneously decided to sell the property because of its isolation, lack of water and resulting high maintenance costs, intending to use the revenue for purchase of Bailey Peninsula (Seward Park) on Lake Washington. The proposal was defeated by the city council.

Development of Volunteer Park as we know it today started around 1900, when developer James A. Moore began installing extensive infrastructure on Capitol Hill, and brought in the neighborhood's first trolley line along 15th Avenue East. He promoted the area for "the perfect panorama presented" with "attractions and surroundings neither surpassed nor equaled in any other part of the city." By 1907 all of Capitol Hill was platted and within a few more years largely developed with sizeable houses. Demand for park development increased dramatically as population grew. Seattle had gained considerable wealth provisioning fortune-seekers for the Alaska Gold Rush, wealth it directed in part to enhancing civic amenities.

The 1904 Park Commissioners' Report notes that about a quarter of the park had been improved with "...walks, by-paths, lawns and beds of flowers, and, together with the growth of native firs, pine, hemlock, alder, madrona and balsam, give a very attractive blending of the artificial with the natural." The park also had benches, picnic tables and swings. It notes that the reservoir is one of the park's most attractive (and defining) features. The reservoir was built in 1901, followed by the Volunteer Park Standpipe (water tower) in 1906. In the interim, the Olmsted Brothers Landscape Architects came to Seattle from Boston to develop a citywide plan for interconnected parks, boulevards and playgrounds. Immediately thereafter they set to work creating a design for still minimally-improved Volunteer Park. Planning occurred over a protracted period, from 1904 to 1909.

On his first visit to Volunteer Park in June, 1903, John Charles Olmsted made detailed field notes concerning site character and extant vegetation (see appendix for full text):

> *At [west] park boundary begins a weedy, gravel road which continues as a cart path…Thick each side with bushes and young firs some 30' to 40' high….Soil, sand gravel. Grass poor and thin….Thick plantation of larch…Cemetery in full view…nursery of collected maples….Open land…with scattering firs and a few dogwood. Belt of little larches, thick, view of distance….Next N. boundary is part way a privet hedge 3' high. To left a temporary rough fence. Below fence steep gravel bank. No soil but ivy newly planted in it a year or so ago – growing…long mass of shrubbery is needed to screen cemetery…bank…covered with grass and brake and a few trees of various sizes….single and masses of firs 1' to 1 ½' diameter. Alder, among firs. Pretty groups with winding grassy areas….Larch plantation is neglected nursery stock 10 yrs. Old, may be 10 to 15' high, some less. Soil poor, larches thin….new ornamental planting…Cotoneaster buxifolia, Eng. Holly, European beech,*

Laburnum, Japan quince, 1 Sequoia gigantea tree box, Baccharis halimifolia, (dead) Betula lutea, white cedar (dead), Amorpha fruticosa…Pinus austrica, lots of Yucca filamentosa,…White Weigelia,…big phlox, 1 red cedar,…summer house grove which has been grubbed and seeded smoothly and surrounded by a temporary fence and mixed hedge of lilac, pine, Deutzia gracilis, Prunus laurocerasus, 1 Pinus ponderosa, Genista alba (12), …Scotch broom,…14 Rosemary (Rosmarinus officinale) 11 Thuya orientalis, 1 Crypt. Jap., 1 wild syringe, 14 tree box…under 4 or 5 firs….bed of 7 Phliadelphus Gordonianus…newly seeded lawn surrounded by firs 6" to 8" diameter. Opposite the rosemary and filling over to street is a thick larch plantation….Water pipe newly laid from street to rosemarys. Looking at the new lawn, most of the firs should be cut. Depend on alders until other deciduous trees to be planted grow…Near…street…Some short leaved pines have been planted for a border plantation at fair distances apart, needs shrub border. …Nursery…In points at its s. end are pretty good shrub plantations. Sambucus variegate (show green only). Ribes sanguineum and white broom on E. and Ligustrum ovalifolium, Pinus strobus, Jasminum fruticans, 1 Vaccineum parvifolium to W. S. of the walk running W, is a big lawn too much cluttered….clump of big native bushes which should be saved. About 100' E. of house in park is a dogwood and a big bed of hybrid rhododendrons like bedding out….across walk is a formal bed of tender plants with agave in middle and 2 Picea engelmanni, 2' high. 47 p. further S.E. of walk is a mound with sprinkling of big boulders in clipped grass….circular bed of Petunias and so on….large alders;…lath house,…little greenhouse…potting shed…Row of cold frames. S. boundary (on hill) is about 75' from nearest cross street. This land should be secured….The reservoir appears to be a triangle with big round corners. The view is across…long W. side, and view of sound is bounded on N. by Queen Anne Hill and on s. by N. end of W. Seattle.

Olmsted documented that now-invasive English ivy, holly and laurel predated his arrival at Volunteer Park, as did several tree species evident today, among them European larch, beech, cryptomeria, Eastern white and Ponderosa pines. Several of these trees likely remain in the park landscape today. Of natives he observed, Douglas fir and dogwood remain, but few if any alders or stands of wild shrubs.

The 1903 report specifically distinguishes Volunteer Park from other parks, observing:

The different parks of the city should not be made to look as much like each other as possible, but on the contrary, every advantage should be taken of differing conditions to give each one a distinct individuality of its own….There being no rugged topography in this park, and as it will be surrounded by a highly finished style of city development, it will be best to adopt a neat and smooth style of landscape gardening throughout, thus harmonizing the park with its surroundings and making it contrast with the outlying parks, and those having rugged topography, in which a wild style and greater respect for the preservation of the natural forest undergrowth would be appropriate and most desirable.

While the Olmsted Brothers held native Pacific Northwest vegetation in great esteem, they did not envision its role in Volunteer Park continuing much beyond an interim period while the planted landscape matured, especially trees. They included native species in the

park's ornamental plantings, but not naturalistic communities. Today, we can both continue incorporating natives ornamentally, and increase their use to fulfill other objectives as long as we respect the park's intended Olmstedian character.

The 1903 report further notes, "This park is situated at the summit of one of the high hills of the city, and at present commands fine distant views;…It may be worthwhile, therefore,…to erect an observation tower at the summit, sufficiently high to enable visitors to overlook all the surrounding trees." The firm soon afterward sited and designed the water tower, prior to full park development. Tree growth obscuring views today clearly conflicts with original plan intent, most obviously but not solely in relation to the water tower. Other views from the ridge were carefully planned, the most fundamental being the westward vista across the reservoir. Vegetation currently is eroding these prime views, which are officially recognized for both their heritage and environmental value.

Internal park views were important to the Olmsted vision as well, although incremental planting and growth itself have caused significant change. Appendix G contains the original Olmsted planting plan superimposed on a 1999 aerial photo, revealing both similarities and differences in vegetative patterns between historic and modern configuration. This map shows where plant additions and removals could be made to bring the park landscape into closer alignment with its historic character.

As an example, John Olmsted recommended that the park have at least one large, unbroken lawn free of large buildings and statues, suitable for informal recreation, "graded with graceful surfaces, so that large portions of it would be more nearly level, while the borders would be steeper." Large lawns were created, but the west (amphitheater) lawn today is far more broken than originally envisioned. To the east, the other large lawn was intended to be edged on the north by considerable plantings, completely absent today. Their function presumably was to screen the Conservatory, active play area, and cemetery beyond, maximizing the landscape's restorative, pastoral effect.

The Olmsted Brothers also observed, "The boundaries of this park are not satisfactory. It should be extended to the nearest streets on the south and west, both for the sake of the dignity of facing upon a street and because it is very undesirable to have the rear premises of private residences backing on the park." While property southward to Prospect Street was added, funds never were allocated to expand the park to Federal Avenue, and preliminary plans were modified. Vegetative screening along all peripheries was an important (and typically Olmstedian) aspect of the park design, to give users the most undisturbed experience of nature possible in the heart of a developed urban neighborhood.

Issues of security today conflict with retention of these buffers at their full, original density. Perimeter plantings have been considerably eroded in places, while elsewhere they are quite overgrown and congested with self-sown invasives like holly. With forethought and care, a functional balance between visibility and screening could be achieved. Establishing view corridors, adding barrier-species and limiting use of middle-tier vegetation are all potential tools to employ. Such alterations will require planning to achieve sustainable results.

A letter of October 31, 1904 summarized Olmsted's ideas for the park: "...we found the principal natural feature to be the hilltop or ridge extending from the north end of Fourteenth Avenue to about the middle of the north boundary of the park and the principal artificial feature to be the sheet of water formed by the city reservoir." Their design capitalized on these features, with "an elongated concourse" on the crest of the ridge. "At the point where this concourse crosses the long axis of the reservoir, we have suggested a formal treatment consisting of a stone-walled terrace overlooking the reservoir and the views beyond it, with a formal garden below the terrace and between it and the reservoir, embracing two ornamental fountains." To the east they suggested "a large terrace supported by a retaining wall and planted with trees which when grown will serve as a concert grove." Large uninterrupted lawns were to be gradually graded and kept "... neatly clipped, adding masses of ornamental shrubbery from time to time as the funds and increasing use of the park may warrant."

In addition to the shade provided by trees, "we suggest a long, vine-covered pergola, interrupted at the center by an open shelter and terminated at the ends by suitable houses for public comfort." They prescribed the concourse as having a driveway forty feet wide, with a 100-foot wide circle at each end and a sixty-foot wide rectangular concourse in the center in front of the pergola. The walkways were to be 10 feet wide, separated from the drive by tree-planting strips between five and fifteen feet wide. Other than the museum, the active uses were (and are) clustered along the north boundary. East of the 1912 Conservatory are the children's playground, wading pool and restroom. To the west are a large production greenhouse, lath houses, cold frames, several maintenance structures and four tennis courts.

The Olmsted Brothers put considerable thought into the circulation system, which consisted of carriage drives and pathways. The drives were sited to allow visitors in carriages to drive through the park, enjoying both plantings and scenic views, but sited so as to be "the least obstructive and objectionable to visitors on foot." Walkways were planned for convenience and to allow strollers to enjoy plants and views without interference from vehicles: "Walks have been introduced wherever the convenience of people who wish to short-cut through the park seems reasonably to demand, as well as to lead visitors from the various entrances to points of interest in the park and to places where they enjoy the view in the park.

The drives and walks within the park were laid out in a curvilinear manner, to create circular movement patterns through the landscape. This configuration allows people to move through the park great distances without returning the same way, enlarging the apparent breadth of the landscape. Vegetation plays an important role by sequentially revealing and concealing views, offering great variety of experience within the park's relatively few acres. Together, park vegetation, topography and circulation shape spaces and differentiate them from each other, and thus enrich visitors' experience. The Olmsted s used this skillful interweaving in many urban park designs. Future plantings and removals need to be done in a manner sensitive to these interactions, to reinforce rather than diminish these experiences.

Upon completion of design in 1909, construction proceeded promptly. The Park Commissioners' Report that year stated that "A large amount of work has been done this year...to completely improve this park, as per detailed plans by Olmsted Brothers." In March of 1909 city staff was working on the overall grading and on the road from the standpipe to the cemetery, intending to macadamize it, not gravel it temporarily as had been suggested. In December of 1909 Dawson paid a visit to Seattle and expressed surprise at the amount that had been done at the park, as the drives, walks and grading were largely completed. In 1910 the lily ponds and surrounding landscaping, the pergola and the children's area with a comfort station, wading pool and lawn were completed. The heritage horsechestnut allee was planted that year.

The Park Commissioners' Report for 1910 summarizes the condition of the nearly-completed park and its role in the city:

> *Considered as the down-town park of the system on account of being the closest park of any size, to the hotel and business district. For this reason it was desired that it should present a metropolitan appearance and very extensive formal improvements have been made, largely during the last year. The park occupies the highest vantage ground in the city, with a magnificent panoramic view of Lake Washington and the Cascades to the east, the Sound and the Olympics to the west and sectional views of the city to the north and south. The high service reservoir and standpipe of the Water Department are within the park but blend so nicely with the park improvements as to be an attraction rather than a detriment. The standpipe has been encased with an outer wall of clinker brick with a winding stairway extending to the top, which has been arranged inside as a public observatory and being highest point in the city, the lake, mountains, Sound and landscape view is incomparable.*
>
> *Surrounding the reservoir, lawns, slope plantations, and formal gardens have been developed and present a very pleasing appearance. A series of macadam drives 4,750 feet in length have been completed within the park, two lily ponds a large children's wading pool have been constructed, also a Children's Shelter and Comfort Station and a combination Pergola, Music Pavilion and Comfort Station. The Seward Monument has been placed at the head of the main concourse and with the construction of the Conservatory, planned for 1911, the formal improvements in Volunteer Park will be practically complete.*

By 1915 construction of the Olmsted design for Volunteer Park was substantially complete.

In 1929, cherry trees donated by the Japanese government were planted throughout the park. Of these very few remain today, victims of age, disease, shade and pests; rare surviving cultivars should be propagated before they are lost entirely. The advent of

cherry bark tortrix (a boring insect) has compounded survival problems among ornamental cherries and related species. Despite historic precedent, their replanting should be judicious in the future. With pesticide use all but eliminated in Seattle parks, other flowering trees must supplant, if not completely replace, cherries in Volunteer Park. Positive consequences will include broadened genetic diversity and expanded seasonal interest.

The most major landscape alteration was construction in 1933 of the Seattle Art Museum, which replaced the long vine-covered pergola, music stand and concert grove. The central part of the concourse and nearby formal plantings were changed at this time, and updated again in the 1970's with the installation of the sculpture *Black Sun*. The museum is a much larger and more imposing structure than the Olmsted pergola, is set considerably farther back from the concourse, and rises to a higher elevation. The museum's character is the antithesis of the rusticity of the pergola. Most significantly, its windowless opacity physically and visually divides the east and west park landscape areas. Notable Northwest landscape architect Noble Hodgson designed plantings to complement the museum's entry, of a restrained and formal character; plant materials emphasized conifers. This landscape was substantially changed in wake of recent disease-related conifer losses and the removal of Chinese statuary integral to his design.

Over the decades, plantings in the park have evolved, most evident in both attrition and additions of understory species based on dynamics of competition, maintainability, and shifting plant popularity. Photographs of formal areas like the lily ponds and water tower through the years provide visual evidence of such changes. In addition, the original Olmsted 1909 plant list and plan correspond only partially with contemporary conditions. The Olmsted Brothers were less concerned with specific species selections than with placement, texture and spatial effects achieved through vegetation. These are thus the more important parameters to bear in mind in managing park vegetation; original taxa are of interest, but others well-chosen and placed can be introduced without violating design intent.

In 1972, the Prospect Street and Highland Drive entries on the west side of the park were eliminated, and the roadway areas converted to lawn. The park gained more continuous greensward, although the southwest corner has never been completely integrated into the overall landscape character. A 2003 stairway project began to address this need, with planting to follow in the future. In the late 1990's, dog off-leash areas were introduced to the park in two locations. One along the southwest periphery was quickly eliminated; the other occupied much of the east lawn behind the museum where outstanding specimen trees grow. This dog run was expanded southward to reduce concentrated impacts on trees, but was closed in 2000 after damaging effects on trees were documented. Compaction was found to be the primary culprit in tree decline; although some were lost, remaining specimens have since rebounded. Trees were treated with mycorrhizae, fertilizer and layers of decompacting mulch.

A variety of memorial trees have been added to Volunteer Park over the years, many identified by historic ground plaques (which Parks no longer permits). In 2000, the

Concourse horsechestnut allee was renovated between the museum and the conservatory. These trees are arguably the park's most significant Olmsted planting legacy. In 2002 the entire park designated a City of Seattle Heritage Tree Collection.

3.3 Relevant Policies, Plans and Regulations

In addition to its considerable heritage of planning and design, Volunteer Park falls under the umbrella of several overarching policy documents, plans and regulations. The most notable are: Parks and Recreation Plan 2000, Tree Management, Maintenance, Pruning and/or Removal Policy (2001), Urban Wildlife and Habitat Management Plan (and 2000 update), Parks Construction Standards (continuously updated, found online at: *http://www.cityofseattle.net/parks/projects/standards/details.asp*), Best Management Practices (1999, under revision) and Historic Resources Strategic Plan now in development. These documents provide broad direction for vegetation management in Volunteer Park, mandating that:

- Tree canopy extent and quality be maximized;
- Wildlife habitat be enhanced wherever and however possible;
- Least-toxic methods be utilized in park maintenance whenever possible;
- Park maintenance provide optimal public access, health, safety and enjoyment;
- Resources be used wisely with overall goal of environmental sustainability;
- Identified historic resources be protected, especially Olmsted heritage;
- The park landscape be accorded premier care as a regional, destination park;
- Community education and partnerships for park stewardship be encouraged.

In particular, Volunteer Park's management must respect regulations, constraints and incentives relating to its special Federal, State and Local status, as follows:

- National Register Historic Landmark designation of the whole park. Any Federal funds used for the park are subject to project review and must be consistent with protection of identified historic features, including landscape elements. Funding for preservation and restoration of public National Register sites may be available.
- Washington SEPA-designated public views in Volunteer Park; two are identified: 1} 360-degree vista from the water tower observation deck, and 2) westward from the Black Sun terrace, across the Reservoir to the downtown skyline, Space Needle, Puget Sound, and Olympic Mountains. These official views must be maintained for public access and enjoyment.

- Seattle Landmark designation of Seattle Asian Art Museum and associated front landscape, as well as the Conservatory. Local landmark status is more restrictive than federal designation; alterations cannot be made without approval of the Seattle Landmarks Board. Local designation of the entire park may occur in the future, consistent with draft recommendations of the Historic Resources Plan, and will affect landscape management far more than currently is the case.

3.4 Current Park Usage

Although Volunteer Park immediately abuts a mostly Caucasian, middle-class neighborhood, a full array of ages, cultures and socio-economic groups use the park day-to-day as well as for special events like wedding ceremonies, concerts and rallies. National and international tourists visit Volunteer Park as a popular destination. The park provides an important venue for national conference tours and events involving horticultural, urban forestry and historic preservation; within the past three years these have included the International Society of Arboriculture, the American Association of Botanical Gardens and Arboreta, American Forests and the National Association for Olmsted Parks. Volunteer Park is a landscape resource possessing local, regional, national and international significance.

Given its prominence, central location and easy accessibility, it goes without saying that Volunteer Park is heavily and diversely used. While some activities have little bearing on the park's vegetation, others have quite a strong relationship. Principally, users come to Volunteer Park for relaxation and unstructured active and passive recreation: strolling, dog-walking, running, cycling, playing frisbee, visiting the Reservoir viewpoint, Conservatory, Museum, playground, wading pool and water tower - or reading, meeting friends, picnicking, resting, and enjoying trees and plantings in their many seasons of beauty.

Heavy foot traffic compacts park lawns and occasionally denudes areas subject to intense use such as pick-up ballgames, or where shade limits turf vigor. Due to park users occasionally break limbs, steal and pick plants, hit trees with errant vehicles, and forge social trails or allow off leash dogs to do so. Invasive ornamental plants migrate into the park from adjacent private landscapes, and from the park outward, representing a significant indirect human impact.

One of the most major issues stems not from user behavior, but from the maturation of the landscape itself. As park trees grow, they increasingly are obscuring vistas visitors come to enjoy, and for which the park was specifically designed. The view both toward and from the water tower has diminished, and panoramic vistas from the reservoir's west edge where viewing benches were once arrayed, have now all but disappeared. Shading in general has reduced physical and psychological user comfort, rendering the park's atmosphere considerably gloomier than it once was. Some describe the park landscape beyond the open concourse as "creepy."

A significant darker side of landscape usage - not originally imagined - also exists in Volunteer Park. Widespread illicit activity includes illegal drug use, consensual gay sex and sporadic transient encampment. While most prevalent after hours and in park peripheries, these behaviors occur throughout the park during all times of day. Most illegal activity consists of victimless crime; general users face little direct personal danger.

Overgrown landscape areas have created what a park gardener in the 1980's described as "perfect habitat for illicit activity." Those frequenting the park's dense shrubberies and

secluded glades denude understory vegetation, compacting, soiling, and eroding the bare earth, and leaving behind biohazard litter and debris. Such activities compound the decline of park vegetation, and put at significant risk exploring children, pets and grounds maintenance staff. This usage has aroused heated exchange and engendered lingering animosity among constituencies in the community, and has yet to find resolution. Acknowledging the full spectrum of Volunteer Park's use-related issues, vegetation management may help point toward synergistic solutions.

3.5 Citizen Concerns and Public Involvement

An important contribution in setting the agenda for vegetation management in Volunteer Park has been to assess community perception of key, relevant issues and opportunities. Park users bring a variety of experience and personal history to the table. Their direct observations of, and interactions with, the landscape provide valuable perspective. Ideas and concerns have ranged from broad to highly focused in nature, and are collected in Appendix C – Public Involvement.

The official public involvement process for this project commenced in late September, 2003 and has included the following elements:

- Informational signage posted throughout the park
- Two mailings to 3,000+ surrounding households, plus individuals and organizations with known interest in Volunteer Park
- Two community meetings at Stevens Elementary School to inform and gather input from citizens concerning the VMP, in mid-October and mid-November
- Web posting and hard copy distribution to local libraries of Draft VMP for a three week public review and comment period in December
- Project manager receipt of citizen correspondence, phone, email and direct communication concerning park vegetation issues throughout

Given the high visibility, heavy use and importance of Volunteer Park to Seattle and its broader region, public participation in VMP development has been remarkably low. From comment received, however, significant issues are on people's minds, and many correlate to those identified by park resource managers and staff. Themes can be summarized as follows:

- Parks staff provides wonderful care for parts of the landscape, especially seasonal plantings; they are not to be blamed for chronically-underfunded maintenance, which is clearly taking a toll.
- People care a lot about park plants and views, and are concerned about the future in face of such visible decline and invasive plant incursion.
- Volunteer Park doesn't receive the attention it deserves given both its location at the heart of city population and its nationally-recognized design heritage.
- The park's Olmsted heritage is universally enjoyed by users but still not widely understood; public awareness needs to be cultivated further and protected status secured.
- Much of the park is extremely overgrown, with resulting harborage of illegal, unsanitary and antisocial activities that diminish safety and positive public use. Parks

and Seattle Police response to the problem has been persistently/frustratingly inadequate.

- Many people want to help address the park's landscape needs, including a range of volunteers and potential contributors to long-term endowment for upkeep and restoration. Some are discouraged by unfruitful past efforts.
- Wildlife and native plants should be increased in the park, if added without hurting the historic landscape character.

3.6 Interested Organizations

The presence of memorials both grand and small testifies to Seattle's abiding devotion to Volunteer Park over nearly a century, through gifts of trees, benches, sculpture and monuments. Although currently in a lull, community stewardship has included several types of active engagement in recent years. Neighbors, scouts, garden societies, nonprofit groups and school children have donated time to care for the park landscape through both one-time and continuing projects. Organizations with long-term commitment to Volunteer Park include Stevens Elementary School, Seattle Art Museum, Friends of the Conservatory, Capitol Hill Lions, Friends of Seattle's Olmsted Parks, and since its recent founding, the Seattle Parks Foundation.

For much of the 1990's, west side neighbors joined together as Friends of Volunteer Park to help staff address neglected areas behind their homes. In 1999, citizens led a successful effort to eliminate the heavily-used off-leash dog run east of SAAM, which was documented as destructive to valuable heritage plantings. Individuals and groups continue intermittently to assist park grounds staff, and others are actively seeking an organizational umbrella under which to help.

Particularly striking is the apparent disconnection between community stewardship for this much-loved park and its enormous, latent potential. This dormancy may result from public frustration that the park's needs are daunting, that special interests seem polarized and decline irreversible – or conversely, a perception that the park is fine, beautiful, and perfectly usable as it is. While the potential is great, steps to engage and re-engage park users in its care appear needed.

Recent philanthropic gifts for Olmsted Centennial improvements at Volunteer Park have demonstrated a level of caring that, with encouragement, could blossom into diversified gifts of time, talent and financial support. This document's intent is to clarify the landscape's vegetative needs and suggest future management direction that will preserve and improve this "crown jewel" of Seattle's park system. In time, Volunteer Park's name may through citizen stewardship assume a much-enlarged, contemporary meaning.

3.7 Current Maintenance and Management

Volunteer Park currently is managed as part of the Central East District. Before departmental reorganization in 1991, it was managed as a citywide resource by Parks Horticulture. This and selected other parks of special stature were cared for by permanently assigned gardening staff; Volunteer Park had three fulltime positions at the time of reorganization.

Volunteer Park's current landscape maintenance emphasizes turf care, irrigation, mulching, seasonal color plantings, and pruning to improve security. The senior gardener and a second gardener responsible for Volunteer Park care for several additional district parks, together providing roughly one fulltime gardener to the park. Maintenance and general laborers assist in this work, plus seasonal workers varying as budget fluctuates. Parks Horticulture staff formerly supplemented district labor at Volunteer Park when available, before relocating headquarters to the new Beacon Hill facility a decade ago. Citywide Horticulture's Conservatory staff and Landscape crew continue to help with annual display plantings, and maintain a special loyalty to the park. Shrinking resources recently have reduced the extent of spring bulbs and annual color.

Occasional district crew days bring additional hands to the park for special projects, generally winter pruning. The predominant approach has been to clear out lower branches and dead wood rather than "radically renovate" substantially-overgrown shrubs. Selective removals have been made to improve visibility through beds for police vehicles patrolling park roads after-hours. Public backlash against past restoration pruning has discouraged staff from initiating extensive, highly-visible projects despite the apparent need. Gardeners feel circumspect regarding the park's Olmsted legacy as well, wishing to avoid "doing the wrong thing" or absorbing backlash without supporting direction. In a landscape once staffed by two dozen gardeners and needier than ever as it ages, existing maintenance falls far short of need.

Tree care in Volunteer Park is handled by Parks tree crew on a work-order basis. This work has been supplemented in the recent past by professional arborists contributing services, particularly in preparation for the 2002 International Society of Arboriculture conference for which Volunteer Park provided the climbing competition venue. In 2000, restoration of the north park Concourse included evaluation, two removals and tree care for eighteen historic horsechestnut trees. Removals in response to disease, death, blowdown and hazardous condition dominate work performed in the last five years. Records indicate that pruning has been driven by need to maintain clearance above roadways and eliminate dangerous dead wood in canopies. Little pruning and few removals have been done to improve light levels, air circulation and growth environment for the park's many high-value trees.

Chapter 4 - Assessment of Existing Resource

Vegetation management begins with documentation of existing landscape elements, to establish an objective baseline for plan development. Aspects examined typically include soils, slope stability and drainage, irrigation, canopy character and condition, understory vegetation composition and condition, wildlife habitat, and physical encroachments. Individual parks may have special landscape features to consider, such as riparian corridors, shorelines or wetlands. The latter do not pertain here. At Volunteer Park, extant historic plantings are a special feature which bears heavily on future management direction.

4.1 Soils, Slope Erosion & Drainage

The native soil in Volunteer Park is a sandy loam, well-drained where not subject to excess compaction. Ornamental beds, particularly those recently renovated or used for seasonal display, are well-amended and richer in organic matter than the leaner native soil. Mulch is sporadically used in the park, due to limited personnel availability to apply and maintain it. Leaves fallen or blown into beds to decompose add some organic cover for bare soil.

Due to heavy use, park lawns, wooded groves, and large shrub areas all suffer from compaction to varying degrees. While this condition cannot be eliminated, the landscape can be managed to reduce its occurrence and minimize negative impacts to plant health. Restoring soil oxygen by means of mechanical aeration and mulching to improve its structure and tilth are ongoing strategies to employ. Expanded use of these practices would provide great benefit.

All planting beds immediately surrounding the Water Tower have been found to contain concentrations of lead and boron exceeding legal limits. These toxins are believed to have accumulated as a consequence of building maintenance over the years (practices like sandblasting and painting). As a Washington Department of Ecology "Institutional Control" soil in this area cannot be cultivated, dug, planted, grubbed or otherwise disturbed, and a protective mulch layer must be maintained. Constraints on landscape maintenance and renovation are significant. In the future, complete soil removal and replacement to the full depth of contamination can solve the problem. Such action may be coupled with seismic retrofit of the tower, for which options are now under evaluation. Left alone, the soil poses little risk to park users.

Despite its hilltop location, steep slopes are limited within the park, the result of site grading accomplished in the early 20th Century. Off-path trampling has denuded understory on slopes west of the reservoir and in the grove immediately to its north; soil erosion occurs wherever thus exposed. Elsewhere, steep slopes are covered with invasive ivy and blackberry, or overgrown ornamentals. If and when such areas are restored, erosion control will be an important consideration. No landslide activity has occurred in Volunteer Park, despite slides in nearby Boren and Interlaken Parks, both of which are very steep and expose underlying clay and till at their lower elevations.

Native soil-borne pathogens have posed problems in Volunteer Park in limited areas, notably *Phytophthora* fungus that is believed culpable for the death of numerous conifers formerly flanking and fronting the Seattle Asian Art Museum. *Armillaria* and *Verticillium* root rots affect certain park trees, particularly where factors of species susceptibility, compaction, poor drainage and old age converge.

Drainage problems appear localized in the park, mostly in places where extreme compaction and level terrain yield puddling. A sizeable zone northeast of the museum is notably wet much of the year; utility lines traversing the general area have not yet, but should be, checked for breakage. A succumbing, rare Japanese maple in the vicinity may be dying as a consequence of excess soil moisture fostering soil pathogen attack.

4.2 Irrigation

Volunteer Park has a patchwork of irrigation conditions, ranging from none to fully automatic. Although many mature trees and shrubs survive and grow without supplementary watering, significant vegetation in the park suffers from drought stress – notably rhododendrons, azaleas, katsura trees, heavily-used turf and new plantings. Lack of irrigation constrains both plant selection and establishment potential for the future. A project to renovate and upgrade park irrigation is recognized as a Major Maintenance Program priority, but has yet to be funded.

Outside the loop drive, there is no automatic irrigation. Grounds maintenance staff uses sleds to spot water rhododendrons and azaleas along the west side. The 15th Avenue border once had hose bibbs throughout, but now all are capped and hidden deep within beds; only minimal overspray from lawn heads reaches this area. The west slope of the reservoir formerly had an irrigation system but this no longer works; at times of extreme need, gardeners utilize sleds with tower and hose bibb hookup to water this area. The slope is an excellent candidate for xeric planting in the future, in conjunction with restoration. Along the north side of the Galer drive, quick couplers are available for hand watering but staff is available only sporadically to do so.

Notably, while katsuras growing near the wading pool showed considerable drought stress in summer 2003, thousands of gallons of pool water were drained to the sewer daily. Recycling this greywater, available during peak-demand season, should be explored. Never-implemented plans for low-water demand landscape renovations between the museum and the reservoir were developed by staff landscape architects circa 1990, to provide a highly-visible demonstration project in a park designed to accommodate – even celebrate - major water utility features.

Although Volunteer Park clearly merits priority irrigation based on its heritage landscape and its high visitation levels, conservation measures should be cultivated here as throughout the system. Continued infrastructure abandonment and disuse, from which vegetation suffers and which discourages replacement plantings, needs to be supplanted by intelligent, integrated water use. As part of vegetation management, the irrigation

agenda includes not only redoing pipes and controllers, but more clearly defining appropriate plant palettes and water demand zones throughout the park.

4.3 Canopy Composition and Condition

Trees are among Volunteer Park's greatest assets, notable for their maturity, variety and beauty. Their contribution to the overall landscape composition as both formal and informal elements cannot be overstated. For purposes of this plan, park trees were assessed in several ways, to create a picture of park canopy from multiple perspectives. Most important from a management perspective was a full-park hazard tree screening identifying trees that need priority attention (pruning, inspection, monitoring or removal). In proportion to the number and age of park trees, relatively few trees require urgent attention.

Park-wide, outstanding trees were individually identified, as well as additional treework needs according to group or stand. This assessment sought to determine the extent and locations of trees with crowding, disease, pest, invasiveness and decline problems to be addressed over time. These are distinguished from trees requiring hazard abatement work. Finally, an inventory of all trees growing in the northeast quarter of the park was undertaken prior to VMP development, and yielded a "snapshot" sample of canopy composition, size and health. Local tree experts have assisted Urban Forestry staff in undertaking these several evaluations. Results from each type of assessment are summarized in following sections.

Hazard Screening

Volunteer Park trees were screened by walkthrough observation for potential hazard, yielding 82 trees needing some kind of followup action. The total number of trees growing in Volunteer Park is unknown, but can be estimated at roughly 1,000 extrapolating from a NE quadrant population of 254. Based on this figure, hazard trees represent 8% of all park trees, and those considered high risk only 1.3%. Recommended mitigation measures - some multiple for a single tree - range from periodic monitoring (45%), to detailed inspection (22%), to pruning or other tree care (37%), to priority removal (8%, or 10 trees).

To be considered a hazard tree, both a defect and a target must exist. Inherently, most of Volunteer Park has a moderate or high "target" designation because it is fully accessible to pedestrian movement, is much used in all seasons and times of day, and contains roadways, structures, vehicles and other property vulnerable to harm should a tree fail. That said, the number of trees posing near-term danger was found to be small, and immediate risks fewer still. While five genera account for over half of identified hazard trees, they represent only 6% of high hazard trees. All are abundantly planted in the park: *Pinus, Chamaecyparis, Acer, Aesculus, Picea*. While more among these genera may require attention than the broader tree population, they should not be considered inherently suspect taxa.

Outstanding Trees

Outstanding trees have been mapped but not field-tagged; they are catalogued by taxa, size and notable qualities: stature, rarity, aesthetic quality, Olmsted design association, commemorative status. Some qualify on multiple counts, some on just one. Of 143 identified, not all are impressive to behold (as in the case of some rare taxa or declining memorial trees), nor is every beautiful, large specimen included in the list. Volunteer Park has too many fine ornamental trees for all to be noted, whereas elsewhere they might earn such distinction. The list is best considered a work in progress: in the future, commemorative trees will need to be added as they are documented or planted, also new rare trees and yet-to-be confirmed Olmsted heritage trees. Size and botanical rarity are characteristics most completely and accurately catalogued to date.

Outstanding trees are listed in Appendix D - Vegetation Data, with their locations shown on Map 4 – Outstanding Trees in Appendix G – Maps. Combined, these sources will enable VMP users to find and more fully appreciate Volunteer Park's remarkable trees. 116 different taxa are included, the vast majority as unique specimens. Most numerous are five Deodar Cedar (*Cedrus deodara*), then Giant Sequoia (*Sequoiadendron giganteum*), London Plane (*Platanus x acerifolia 'Pyramidalis'*), Red Oak (*Quercus rubra*) and Horsechestnut (*Aesculus hippocastanum*), totalling just nineteen or 13% of listed trees.

Rare taxa found in the park include:

- *Tetradium [Evodia] hupehensis* — Hupeh Evodia
- *Crataegus sanguinea* — Siberian Hawthorn
- *Robinia x ambigua 'Decaisneana'* — Pink-flowering Black Locust
- Acer shirasawanum 'Aureum' — Golden Fullmoon Maple
- *Thuja occidentalis 'Aureospicata' ['Semperaurea']* — Eastern White Cedar cultivar
- *Quercus prinus* — Chestnut Oak
- *Betula lenta* — Sweet Birch
- *Crataegus crus-galli var. Canbyi* — Cockspur Hawthorn cultivar
- *Daphniphyllum macropodum* — Daphniphyllum
- *Prunus 'Mikuruma-gaeshi'* — Japanese Flowering Cherry cultivar

Identification as Outstanding does not mandate retention at all cost, rather that such trees be accorded a special measure of consideration and care. Some individuals are clearly dying, suppressed or hazardous, and in such instances removal should be coupled with advance propagation (if rare), and prompt, appropriate replacement planting. Hazard tree screening indicates that twenty-five Outstanding specimens present potential risk; of these, only eight were rated "high." Although trees of notable stature and age in time will need to be removed, short-term the pressure is not strong. Good long-term care can reduce the rate of Outstanding tree loss, coupled with proactive measures to maintain species and age richness in Volunteer Park's tree population.

Olmsted Trees
The original 1909 Olmsted Brothers planting plan and plant list were examined for modern correlations, of which many were found among existing park trees. In addition, several trees from firm lists for other Seattle landscapes also are present; these are incorporated, as suitable, in Appendix E - Recommended Plants for Volunteer Park. Almost all of the following, specified taxa (using original names & spellings) are believed to grow in Volunteer Park today:

- *Acer saccharinum* Silver Maple
- *Aesculus hippocastanum* Horsechestnut
- *Cornus nuttali* Pacific Dogwood
- *Crataegus crus-galli* Cockspur Hawthorn
- *Crataegus oxicantha* English Hawthorn
- *Ilex aquifolia* English Holly
- *Koelreuteria paniculata*? Golden Rain Tree
- *Magnolia grandiflora* Southern Magnolia
- *Pinus monticola* Western White Pine
- *Pinus mugho* Mugo Pine
- *Prunus laurocerasus* English Laurel
- *Pseuodtsuga douglassi* Douglas Fir
- *Quercus alba*? White Oak
- *Syringa japonica* Japanese Tree Lilac
- *Tilia americana* Basswood
- *Tilia europa?* European or Common Linden
- *Tsuga canadensis* Eastern Hemlock
- *Ulmus americana* American Elm

Among these taxa at least fourteen are true trees; another three originate as shrubs but naturally mature to treelike form. Whether the Olmsted Brothers intended for the latter to occupy canopy positions, or anticipated they would freely reproduce as they have in Volunteer Park, is debatable. In addition, several Olmsted-specified large rhododendrons and viburnums also have achieved treelike stature in the park.

Among the above list of originally-specified trees are four conifers, three broadleafed evergreens and ten deciduous species, a ratio somewhat favoring the deciduous but containing a significant evergreen presence. Five of the taxa are flowering and two, native. Regarding stature at maturity, six are tall-growing, five middle canopy, the remainder understory – a fairly even balance of layers. Modern canopy composition retains a mix of evergreen and deciduous taxa, but with proportionally fewer small trees than the original palette contained.

The most remarkable original canopy feature is the horsechestnut allee that flanks the park's formal concourse from north to south. These twenty-three trees were evaluated in detail in 2000 as part of a larger roadway restoration project. Urgent pruning, cabling, fertilization, inspection, removal and replanting work ensued. As valuable heritage

landscape assets with a 300+ year potential lifespan, these horsechestnuts warrant both regular monitoring and enhanced levels of tree care. While most are currently in good condition, at least one damaged, decaying specimen (the most southeasterly) may require near-term removal and in-kind replacement, pending detailed resistograph inspection. Also notable are linden tree rows planted along the southwest internal park drive, and group plantings of certain species listed above; hemlock, pine, hawthorn, etc.

Although not included in the 1909 planting plan or list, many trees frequently used in Olmsted Brothers designs exist in the Volunteer Park landscape as mature specimens:

- *Acer circinatum* Vine Maple
- *Acer macrophyllum* Bigleaf Maple
- *Acer platanoides* Norway Maple
- *Acer pseudoplatanus* Sycamore Maple
- *Acer rubrum* Red Maple
- *Betula lutea* Yellow Birch
- *Catalpa* Catalpa
- *Cornus florida rubra* Pink Flowering Dogwood
- *Cryptomeria japonica* Japanese Cryptomeria
- *Chamaecyparis lawsoniana* Lawson Cypress
- *Fagus sylvatica* European Beech
- *Laburnum anagyroides* Golden Chain Tree
- *Malus spp.* Crabapple
- *Prunus lusitanica* Portugal Laurel
- *Quercus robur* English Oak
- *Quercus rubra* Red Oak
- *Robinia pseudoacacia* Black Locust
- *Thuja occidentalis* Arborvitae

Additional taxa specified by the Olmsted firm for Seattle parks have been incorporated in the list of plants appropriate for use in Volunteer Park (Appendix E).

Treework Assessment

While tree hazard identification and abatement are the first order of responsibility in managing a public landscape, tree work needs do not end there. To insure the health, longevity and beauty of this living, changing resource, selective pruning, removal and replanting are important as well. In addition, valuable and borderline-condition trees require monitoring for potential future action.

In the case of Volunteer Park, the canopy has been kept relatively free of hazardous conditions; however, based on work order history, staff interviews and field observation, maintenance to enhance overall stand condtion has been quite limited and is much needed. As the park's general tree population matures and ages, new generations need planting and dozens of declining, crowded stems need selective culling to improve

growth conditions for the whole. In preparing this VMP, a general assessment of treework needs followed hazard screening. Urban Forestry staff and a consulting arborist inventoried groves and stands to estimate type and extent of work needed within the park. Treework Areas are shown in Appendix G – Map 4.

As an example, in the Northeast quadrant of the park, approximately 56 trees have been identified for potential non-hazard related removal, ranging from 2"saplings to 20" diameter, mature plants. The great majority have stems measuring six inches or less (59%). Removals include just nine trees larger than one foot in diameter, and none more than two feet. Nearly half of recommended removals (48%) are invasive and self-sown trees. The remainder are clearly dying, damaged, or declining due to competition, excess shade, disease or insect attack. In the Northeast sector only half this many trees need pruning or related treework (fewer than thirty), mostly to improve visibility beneath them, to correct structure and to remove deadwood. About six trees need more detailed inspection, and the same number regular monitoring.

Parkwide treework recommendations are listed and summarized in Appendix D – Vegetation Data. Needs are fairly evenly-distributed throughout the park, although certain Treework Areas contain far more work than others. Removals account for 80% of activity, tree care 15%, and diagnosis/monitoring 5%. Recommended removals total nearly 500 trees; the average tree diameter is 9 inches, with over 30% having trunks smaller than 6 inches. Fewer than 25% of trees are larger than 12" trunk diameter, only ten larger than 24". These statistics reveal that predominantly small trees with low canopy volume, not specimen-stature trees, need to come out.

The dominant reasons for taking trees out are: 1) to eliminate suppressed and crowded trees (62%); and 2) to reduce numbers of trees with poor structure, form or species characteristics like disease and pests problems or invasiveness. The important lesson in these statistics is that future trees should be judiciously chosen, carefully sited, and adequately spaced to avoid repeating current problems in years ahead.

Of 84 trees identified for treework, over half require deadwood pruning, and a quarter corrective structural pruning. Other prevalent tree care needs include: ivy removal, raising crowns for visibility, thinning canopy for view or light, and repairing lifted pavement. The overall number of trees needing care is quite small, and their size considerably larger than those recommended for removal (averaging almost 20" diameter). Only 31 trees need further inspection, monitoring or diagnostic investigation; all but five are 24" diameter or greater. This finding bears out that small, young trees rarely need such attention.

The species profile for recommended treework points to large numbers of few taxa, with 86% of trees coming from roughly one quarter of the 36 total genera. Holly (*Ilex*) alone represents close to a third of all trees identified for work, followed by spruce (*Picea*) 12.5%, false cypress (*Chamaecyparis*) 8.8%, and pine (Pinus) 7.4%. Together, these four genera – all evergreen – account for over 60% of trees. *Picea*, *Pinus* and *Chamaecyparis* account for almost two-thirds of non-invasive tree removals needed; a visible attrition of

evergreen trees may well result. Future plantings should include evergreens chosen with species health, structural integrity and non-invasive qualities foremost in mind. *Ilex*, *Robinia* and native *Prunus emarginata* – all invasive - account for 89% of total removals; where replacement plantings are needed, species likewise should be carefully selected.

While the count of removals and amount of pruning identified may appear very high, this work can be spread over several years and accompanied by thoughtful replenishment where suitable. Canopy quality is best measured by factors besides total number of trees in a stand, or a park. Age and genetic diversity, vigor, health, total photosynthetic (leaf) volume and wildlife value also must be considered. Treework recommended for Volunteer Park aims to generate a more healthy, long-lasting, resilient tree population, and to help add richness and beauty to the park landscape for generations ahead. If consistently managed after a period of catch-up, park trees should never again require such dramatic levels of attention.

Partial Inventory

To provide an initial picture of Volunteer Park trees, an inventory of the park's northeast quadrant was undertaked in mid-2002. This approximately quarter-sample of park canopy suggests - but cannot fully describe - the character and condition of the whole. 254 trees of 28 genera were identified, with nearly three-quarters of trees falling into just one quarter of those genera. The most prevalent four genera were conifers, accounting for half of all trees inventoried. By far most abundant was *Pinus* (20% of trees), followed by *Thuja*, *Pseudotsuga* and *Picea*. This weighting toward evergreens reflects that the inventory area included extensive perimeter screening along Lake View Cemetery and 15th Avenue East. Other park quadrants may not contain such high proportions of coniferous trees. The most prevalent deciduous genera are frequently-used Olmsted Brothers selections: Maple, Beech and Horsechestnut. Other trees were significantly less well-represented than the top seven, split closely between evergreen and deciduous taxa.

Of 254 trees sampled, 85% were in good condition, 13% fair and 2% poor, with two trees identified for priority removal and two others for priority pruning. These findings do <u>not</u> document treework needed to thin crowded stands and improve tree longevity, evaluated later. Although perhaps skewed toward conifers and certainly less taxanomically diverse than the park tree population as a whole, this inventory confirms certain empirically-evident trends. Low numbers of hazard and poor condition trees likely reflect both recent tree care and the fact that Volunteer Park is much used and surveillance of its trees consequently higher than for less frequented parks.

Particularly noteworthy are findings relating to tree size distribution. Among those sampled, nearly equal numbers were small (12" stem diameter or less) and very large (over 30" diameter), as well as within three intermediate classes. While such even ranges could indicate a healthy distribution of tree cohorts, field observation suggests this pattern is due far more to stem suppression and crowding than ongoing canopy replenishment. In this regard, height data are telling. Only four trees inventoried (<2%) were sapling height - 15 feet or less. More than half were over 75 feet tall, and another

28% of moderate height (36-75 feet). Besides confirming the presence of many mature and proportionally tall, slender trees, findings corroborate that few understory trees populate the current canopy.

4.4 Understory Composition and Condition

Understory vegetation includes herbaceous and woody plants growing beneath the tree canopy. In Volunteer Park today, this distinction is more difficult to make than it would have been in an earlier era, or in a less-overgrown setting. In many parts of the park the understory is, in fact, indistinguishable from the canopy. Management for tree and understory health is closely interconnected in such areas.

Component understory species were documented informally by type and relative abundance; plants were not individually inventoried by specific area. Species composition and proportion were broadly compared to original Olmsted-specified taxa and planting plan distribution. Because the current vegetation management plan is urban forestry-driven, landscape elements other than trees have received secondary attention, aware that this part of Volunteer Park's vegetation merits more detailed evaluation as part of plan implementation.

The original Olmsted planting plan and plant list paint a picture of the park's understory vegetation far different from what one observes today, in terms of both species and scale. Nonetheless, certain "backbone" shrubs remain - some in abundance. Today, large evergreen shrubs dominate, notably Rhododendron, English laurel and holly, Yew, Pieris and Boxwood (the latter not Olmsted-specified plants). Among large deciduous shrubs, Hydrangea and Viburnum species are most prevalent. Low understory dominants include Mahonia (Oregon grape), Sword fern, English ivy, Otto Lukyen laurel, Spirea and deciduous as well as evergreen Azalea.

The most diverse shrubs and perennials are found in planting beds at park entries and near the formal Concourse. Most reflect recent-era landscape renovations and do not strongly echo an Olmstedian palette. One notable exception is the accurate recreation of the Fourteenth Avenue south entry planting beds, a 2003 Centennial project. The potential to build on this example is significant, given the availability of original planting plan, period photographs and historic plant list. Eventual designation as a Seattle Historic Landmark could help insure that future landscape changes are universally consistent with Volunteer Park's Olmsted heritage.

Interestingly, many Olmsted-specified plants commend themselves to reintroduction in the park, either as original species or modern correlates. Several genera used heavily in 1909 fit today's key criteria: barrier characteristics, expanded seasonal interest, durability, low water and pesticide demand, non-invasiveness, native, etc. Other taxa clearly are obsolete, due to such qualities as high maintenance requirement, invasiveness, excess height potential, or unavailability in the modern nursery trade.

Original shrub genera suiting a 21st Century palette for Volunteer Park include:

Berberis	Barberry
Chaenomeles	Quince
Cornus	Redtwig dogwood
Cotoneaster	Cotoneaster
Cytisus	Broom
Euonymus	Burning bush
Forsythia	Forsythia
Hebe	Hebe
Hypericum	Hypericum, St. John's Wort
Juniperus	Prostrate Juniper
Kalmia	Mountain laurel
Leucothoe	Leucothoe
Ligustrum	Privet
Lonicera	Shrub Honeysuckle
Mahonia	Oregon grape
Philadelphus	Mock orange
Pyracantha	Firethorn
Ribes	Flowering Currant
Rosa	Rose
Rosmarinus	Rosemary
Spiraea	Spirea
Yucca	Yucca, Adam's Needle

Among these genera, compact and disease-resistant cultivars may work better than originally-specified varieties. Historic taxa should be tapped wherever feasible, in the interest of fidelity. For certain locations within Volunteer Park, where opportunities to exactly replicate Olmsted-designed elements exist, only original species should be used. Species that over time have proved invasive should be eliminated from future plantings, and existing plants gradually replaced. English laurel, holly and ivy are the chief culprits (in addition to certain trees); however, privet, cotoneaster, broom and rose selections should be carefully made to minimize future invasiveness problems.

In designing landscapes, the Olmsted Brothers sought not so much to create exact plant groupings as to achieve an overall textural effect, scale and composition. For this reason, close examination of historical documents regarding shrub bed locations, configuration and plant types is key to appropriate renovation and maintenance. Plant lists, while relevant, are secondary sources for perpetuating Olmstedian characteristics in the landscape.

Appendix E – Plants for Volunteer Park includes many taxa suitable for understory replenishment, but it is by no means a comprehensive list. It assembles an Olmsted Brothers-based palette that can expand to encompass other plants consistent with this group's qualities. Essential characteristics are: multiple seasons of interest, balance of deciduous and evergreen material (including conifers), varied texture, absence of unusual foliar color and variegation, few herbaceous species. While tall shrubs appear on the list,

these should be used judiciously compared with lower-growing material, primarily to replace invasive plants like laurel.

4.5 Wildlife

Because Volunteer Park's landscape is ornamental rather than natural in character, only limited native fauna occupy the park. Indigenous animal and plant species have co-evolved over millennia, and occur most abundantly where living together. Seattle Audubon members have noted an extreme "paucity of birds" at Volunteer Park, lack of birdsong, and overabundance of very few species like crows (which while native tend to exclude other species through nest predation).

Mammals regularly found in the park include raccoon, Eastern grey squirrel, opossum, and large numbers of rats. Native birds observed include: sharp-shinned hawk (usually around the water tower), merlin (also usually around the water tower--but never when the sharp-shinned hawk is present), glaucous-winged gull (almost always on the reservoir), snowy owl (once circa 1984, perched on the roof of the museum), great horned owl (fairly regular, in the large cedar trees southwest of the conservatory), red-breasted sapsucker (rarely seen; once, about 15 years ago, 11 were sighted in park), downy woodpecker (nearly always), Steller's jay (regular), kinglets (both species, almost always), hermit thrush (several occasions, always in the low shrubbery adjacent to 15th Avenue), cedar waxwing (seen once-- flock of about 12 in a berry bush right at the entrance off 15th), brown creeper (nearly every year, in the trees around the reservoir), flicker, crow, robin, spotted towhee, goldfinch, juncoe, red-breasted nuthatch, black-capped chickadee, chestnut-backed chickadee, wrens, sparrows, rufous and Anna's hummingbirds, bushtits, migratory warblers, pine siskins (rare), and owls. Redtailed hawks often soar over Volunteer Park but are not known to nest there.

The above bird list primarily documents species found during Audubon Christmas bird counts, and may omit species present during other seasons. Counts reveal that the park supports a fair number of wintering species, despite the general lack of understory vegetation. Not surprisingly, most of these species are found in trees. The presence of hermit thrush, wrens and sparrows indicates that some functional understory habitat is available, almost all of it around the borders of the park, plus small areas surrounding the water tower and southeast corner of the reservoir. Non-native birds frequenting Volunteer Park include starling, California house (Hollywood) finch and English sparrow.

There are usage, species and structural reasons for Volunteer Park being considered a wildlife "dead zone." User pressure on the park landscape is high and disturbance potential for wildlife consequently great. Off-leash dogs as well as domestic and ferile cats threaten park birds; additional predators include aggressive, mostly non-native birds and rats. Native Douglas squirrels have long since vanished from all but Seattle's wildest parks, displaced by the commonly-seen Eastern grey. Surrounded by urban development, Volunteer Park provides no direct links nor sufficient space for most native mammals.

The potential exists to increase both the quantity and species richness of natives in Volunteer Park, through thoughtful expansion of the original plant palette. Natives can replace similar, non-native ornamentals where used in ways respectful to the historic design character. Certain natives offer additional benefits beyond habitat enhancement value, notably ruggedness, low maintenance demand and drought tolerance. Where resources for landscape upkeep are limited, such characteristics are clear assets.

Structurally, restoring park vegetation to its original, multi-layered composition would simultaneously serve to improve habitat value, particularly for birds. Much low understory has been eliminated in recent years to improve visibility; where intact, it frequently is disturbed by human, feline and canine intruders. Reinstated, it could add avian refuge and food. Every vegetative layer serves multiple potential purposes for wildlife, with niches and usage patterns varying by species. The more diverse and extensive the offerings made in the landscape, the more opportunities for wildlife we create.

4.6 Encroachments

On two sides Volunteer Park is bounded by city streets, and on the north by a large institutional neighbor, Lakeview Cemetery. The park's entire western edge borders single-family residential lots fronting on Federal Avenue East. Several encroachments by neighboring properties have been identified and owners notified. Resolution of encroachments is the responsibility of Seattle Parks' property management office. This vegetation management plan can support their efforts by offering guidelines for appropriate landscape treatment if and when private development is removed and park land reclaimed. It is not the purview of this plan to either pursue abatement or set its timeframe.

Chapter 5 - Findings

5.1 Findings and VMP Scope

Evaluation of existing park vegetation and relevant contextual factors yields a short list of observations and findings germane to vegetation management in Volunteer Park. Findings reveal a picture of what needs to be addressed through this document's management recommendations, to the extent these can provide useful tools or direction. Not all concerns and opportunities identified lie within the realistic purview of vegetation management. Key findings are grouped by subject.

5.2 Trees

- Volunteer Park's tree population is skewed toward near-mature, mature, and declining generations, with relatively few juvenile trees present; ongoing replenishment will be needed.
- Crowding among trees, as well as competition between trees and overgrown shrubbery exists throughout the park, and compromises user safety, plant health and aesthetic quality of the landscape. Understory species trees in group plantings have been particularly adversely affected.
- Self-sown non-native trees are establishing in many areas, some of significant size; holly, English laurel, Norway maple and Mazzard cherry are most prevalent. These exotic species compete with intentionally-planted trees both aesthetically and culturally, and also escalate invasive plant problems in the park and natural areas nearby.
- Relatively few trees pose immediate risk of failure in Volunteer Park; these will need to be addressed through inspection, pruning and/or removal. The prevalence of mature trees with structural defects, near-constant park use, and multiple potential targets suggest that hazard continually and proactively be addressed through monitoring and tree care.
- Disease has eliminated several Lawson cypress trees that formerly flanked the SAAM lawn; pathogens also have affected pine, true cedar, maple and horsechestnut trees in limited numbers. Cultural problems like compaction, drought, nutrient stress and overcrowding are contributing to pests and pathogens that adversely affect tree health and longevity.
- Unusual species richness, and specimen quality and size, distinguish Volunteer Park's tree population, a heritage management measures should actively protect and perpetuate.
- Native species exist in limited number and variety in Volunteer Park, and could enhance wildlife habitat if increased in appropriate locations and species broadened.
- Olmsted-specified tree species and their planting locations correspond to the original plan in many places. Elsewhere, accretions compromise intended design character. Attention is needed to help reclaim lost vistas, openings and vegetative layers through active management.
- Evergreen trees with limbs to the ground harbor much illicit activity and intermittent encampment, posing health and security risks to both park visitors and maintenance staff; however, because these conifers contribute significant positive landscape character that should be retained as fully as possible.

5.3 Understory

- Shrubs have grown to enormous size throughout the park, many now effectively small trees due to natural maturation or intentional "arborization" pruning. View and light blockage, and competition with canopy tress has resulted.
- Shrub beds represent a maintenance challenge significantly outstripping available resources, the consequences of which is ever-mounting pruning, weeding and refurbishment needs.
- Deferred shrub maintenance has adversely affected user safety, creating abundant environments for illegal activity and greatly reducing visibility and mobility through the park.
- Overgrown understory plants have significantly altered the aesthetic character of Volunteer Park and compromised the landscape's fidelity to its original Olmsted design.
- Although popular and consistent with original plan intent for formal landscape areas, annual color plantings compete with the parkwide landscape for finite staff time. This balance needs to be evaluated and alternate approaches to satisfying both needs examined.
- Informal shrub masses providing seasonal color were a key element of the Olmsted design for Volunteer Park. While partially intact, the current plant palette, bed definition and ratio amongst species has shifted from the original planting plan. The extent to which reinstatement or reinterpretation is possible in a modern context deserves attention.
- Invasive species are almost universally present in park shrub beds, with the degree of degradation ranging from minimal to complete. Many infestations originated from ornamentals planted nearby, notably English ivy, holly and laurel. Himalayan blackberry, bindweed, wild clematis, nightshade and herbaceous weeds also grow in variable abundance.
- Native understory species grow throughout the park in combination with ornamental and invasive species, but nowhere as part of purely native communities. Opportunities to recreate such communities offer themselves particularly for revegetating neglected park peripheries.

5.4 History

- Volunteer Park's Olmsted plans have been substantially realized and are retained in much of the grading, circulation, site features and plantings extant today. Vegetation is the most transitory and vulnerable of these elements and must be continuously managed to perpetuate it.
- Vegetation management can and should respect original design intent, but cannot do so to the full extent or in full detail. Altered contemporary uses and maintenance levels affect what and how much is feasible to preserve.
- Volunteer Park's landmark designation, central role in Seattle's Olmsted Park and Boulevard system, location and enormous popularity confer on it special status. A resource of national significance merits a level of care currently clearly not conferred to this landscape.

- A pattern of declining maintenance has occurred over a very long period, and has been acute in terms of its consequences for nearly a generation. Periodic improvements have addressed particular landscape needs but not issues of routine upkeep. In some cases, alterations actually have created additional maintenance demand.
- Community affection for Volunteer Park has generated intermittent volunteer stewardship and philanthropy benefiting the landscape; however, both resources have enormous, untapped potential.

5.5 Contemporary uses

- Population growth and global tourism have intensified landscape use and consequential impacts to park vegetation, notably compaction, trampling and turf wear.
- Societal problems like homelessness and drug addiction, little known when Volunteer Park was designed, now bear directly and adversely upon the park landscape. Vegetation management must deal directly with these realities.
- Volunteer Park plays an important role as green infrastructure and natural refuge within the city, consistent more than ever with its original intended function.

5.6 Summary of Issues

Key issues relating to vegetation management in Volunteer Park are:

- Reconciling historic character with contemporary resource maintenance constraints.
- Sustaining landscape beauty while improving user safety.
- Insuring perpetuation of landscape heritage through sustained vision, replenishment planting and sensitive care.
- Proactively addressing the realities of plant growth and change through time.
- Remediating lost landscape quality due to neglect, encroachment and overuse.
- Cultivating community support for and stewardship of this widely-treasured civic landscape.

Chapter 6 - Vegetation Management Recommendations

Vegetation management recommendations form the core of this plan, providing direction based on evaluation of existing conditions and identified goals and objectives. This chapter describes What needs to be done, while following chapters detail How, When, by Whom and in what priority actions should be taken.

6.1 Parkwide Vegetation Management Recommendations

Several management recommendations apply parkwide, across all types of management areas:

- Maintain park trees for safety of people and property, through regular monitoring, tree care and timely hazard mitigation pruning and removals.
- Provide replenishment generations of trees through continuous, strategic replanting.
- Selectively prune and remove vegetation to preserve and reopen key internal and external vistas defined by the Olmsted plan.
- Reclaim vegetation layers lost to cumulative shrub overgrowth, self-sown and invasive plant accumulations, and denuding of low understory, through targeted pruning, plant removal and replanting.
- Maintain screening at park peripheries while accommodating security needs, using a combination of pruning, replanting, and removing vegetation.
- Reduce long-term landscape upkeep by replacing invasive and high-maintenance species with durable plants consistent in character with the original Olmsted plant palette.

6.2 Vegetation Management Areas

Individual parts of the park have vegetation management needs particular to their location, landscape characteristics and use. For purposes of this VMP, Volunteer Park has been divided accordingly into nine Management Areas (MA's). Not all MA's are continuous, and their size and configuration vary considerably. While walking the park, users should find these landscape units reasonably easy to discern, although in net effect they flow into one another.

Identified Management Areas are as follows:

- **Formal Landscape**
- **Greensward**
- **Glade**
- **Active Play**
- **Street Buffer**
- **Residential Buffer**
- **Tennis Court**
- **Service Yard**
- **Reservoir Slope**

For each Management Area (MA), vegetation-related objectives are described below, as well as key actions needed to fulfill them. Chapters 7, 8 and 9 provide supporting guidance on how to perform specific tasks, set project priorities, and monitor success in meeting objectives over time. These management recommendations emphasize the immediate needs of park vegetation, but cover a timeframe of at least a generation, or twenty years. This document should be revisited at that point and modified, based on progress made in providing effective vegetation management for the park.

6.3 Formal Landscape Management Area

Location & Character:

The Formal Landscape includes Volunteer Park's Olmsted-designed central spine of constructed features and immediately associated plantings. These include from north to south: Conservatory, adjacent pergola comfort station, Seward Monument circle, Concourse and horsechestnut allee, lily ponds, front of Seattle Asian Art Museum, Reservoir, Black Sun overlook and terraces, Water Tower circle, and Fourteenth Avenue entry. This MA encompasses the most formal, symmetrical and ornamental vegetative features in the park. It is Volunteer Park's most visited and highly maintained landscape component, and possesses a high degree of integrity relative to the 1909 Olmsted design.

Issues:

- Reclaiming and maintaining integrity of plantings and vistas, in face of diminished maintenance resources and resultant landscape congestion and decline.
- Equity of maintenance distribution relative to parkwide landscape needs.
- Preserving landscape extent and character in face of potential future alterations to focal park features owned by Seattle Water Department (Water Tower, Reservoir), as well as Seattle Asian Art Museum and Conservatory facilities.

Objectives:

- Preserve integrity of heritage landscape features relating to vegetation, including vistas, landscape layout and specific plant materials.
- Improve growth environment for plants.
- Minimize tree hazard.
- Replenish and perpetuate healthy tree canopy.
- Reduce maintenance required to provide high-quality seasonal display.

Actions:

- Maintain active management for Concourse horsechestnut allee, to include regular monitoring and inspection, plus timely tree care, removal and replacement planting.
- Remove selected trees obscuring axial, Olmsted plan views toward the Water Tower, as well as SEPA-protected public vista from its observation level.
- Thin canopy surrounding lily ponds to improve light levels and reduce falling plant litter, by removing declining, crowded and diseased trees in favor of outstanding specimens.
- Rebuild multi-tiered understory where overgrown, through a combination of radical pruning, shrub removal and replanting with lower-growing, Olmsted character material.

- Simplify slope plantings east of lily ponds to reduce maintenance intensity while providing seasonal color and reinforcing heritage character, by emphasizing low-upkeep flowering subshrubs and groundcovers.
- Focus seasonal color plantings for maximum impact in minimum, strategic areas, seeking community participation in planning, funding, installation and care under staff leadership.

6.4 Greensward Management Area

Location & Character:

Greensward constitutes the general landscape matrix for Volunteer Park and is the most extensive MA, spanning all four quadrants in a nearly-continuous flow. Greensward includes most park lawn areas and related trees and planting beds. This MA provides the pastoral, informal landscape component central to Volunteer Park's Olmsted design, a counterpoint to its highly-structured core. This MA contains few built elements besides walks and roadway, and while informal in character is not "natural." Greensward areas were skillfully graded and planted to capture and create vistas, to expand apparent landscape size and to offer an experience of movement through a green and peaceful setting, secluded from the surrounding city. While topography, lawns and trees still provide a pastoral setting, designed vistas and continuity among spaces has been compromised by vegetative growth far denser than originally intended.

Issues:

- Reclaiming and maintaining integrity of plantings, vistas and pedestrian flow in face of deferred maintenance and reduced resources.
- Reducing settings for illegal activity and associated risk to legitimate park users.
- Sustaining a healthy tree canopy over time, diverse in both age and species.

Objectives:

- Preserve and reinstate the continuous flow of vistas and pedestrian movement throughout park greensward areas.
- Address turf compaction, drainage, irrigation, shading and wear concerns through specific measures as well as continuing care.
- Minimize tree hazard.
- Replenish and perpetuate healthy, diverse tree canopy, appropriately placed.

Actions:

- Prune, inspect and remove identified high-risk trees throughout greensward; monitor tree condition at least annually and after severe weather events, taking prompt follow-up action as needed.
- Eliminate invasive plants, both planted and self-propagated; certain outstanding individual trees may be retained and their progeny continuously controlled, but should not replanted (Norway maple, Euodia?, Portugal laurel)
- Selectively prune and remove suppressed, declining and self-sown trees in congested groups; propagate identified rare specimens before removing.
- Remove tall understory and low-sweeping branches from individual trees and groves, to achieve at least 50% clear view (at 3-6 foot height) between lawn areas and from road to lawns; mulch and replant as appropriate with either turf or low, primarily barrier-type vegetation.

- Reduce breadth of shrub beds to 20 feet maximum, returning areas to lawn and creating mulch rings for all trees. Reference Olmsted planting plan in reconfiguring plantings to respect original spatial definition; greensward north of reservoir particularly has lost intended visual and functional continuity.

6.5 Glade Management Area

Location and Character:

The Glade MA includes three small, separate areas with high-density, mature tree stands and no underlying turf. The largest glade lies west of the stage and comfort station, immediately north of the reservoir and east of the loop drive. Canopy here includes tall deciduous and coniferous trees closely-spaced, predominantly elm, linden, Norway spruce, redwood and Eastern hemlock. Traversed by heavily-shaded paths, this glade is avoided by many park users who consider the area unpleasant, even dangerous. Consensual illicit activity occurs in this vicinity and interior understory is largely absent due to trampling and intentional clearing for safety.

To the east, abutting the north lily pond is a much smaller glade traversed by paths that connect the northwest greensward and Concourse. This glade includes a grove of specimen pines beside the reservoir, large Deodar cedars and additional conifers and ornamental deciduous trees. Unlike the west glade, much of this area possesses extremely dense, overgrown shrubbery blurring into the canopy.

A third glade borders the south lily pond to its west and south, and incorporates the Burke Memorial grove. Large Deodar cedars, Norway spruce and Eastern hemlock dominate the glade's north end, while further south additional conifers, Kobus magnolia and weeping Japanese cherry supplement dense Norway spruce. Understory varies in density and height, but includes considerable evergreen and deciduous, mature shrubbery as well as ivy and sword fern. The nearby Water Tower is partially obscured by tree growth. Major walks transect the glade.

Issues:

- Improving stand health and longevity, especially for specimen trees.
- Reclaiming significant vistas obscured by vegetation.
- Reducing illicit activity and increasing positive use.
- Decreasing shading and plant litter impacts on restored lily ponds.

Objectives:

- Minimize tree hazard.
- Preserve valuable trees and improve their growth environment.
- Reduce canopy crowding and excess understory shading.
- Reinstate understory vegetation while maintaining visibility through groves.

Actions:

- Adjacent to lily ponds, substantially thin both canopy and near-opaque understory to partially restore vistas, reduce plant litter on water and improve light levels to water.
- Enhance stand quality by removing suppressed, diseased and hazardous trees, and by mulching root zones deeply where ground is denuded or compacted.

- Remove invasive plants and majority of overgrown shrubs; arborize or radically-renovate remainder and replenish understory primarily with rugged, shade-tolerant plants having barrier characteristics (prickly, thorny) and ability to regenerate if broken (suckering, spreading).
- Maintain view and light penetration through glades via timely pruning and removals; canopy, invasive and tall understory thinning should significantly reduce future demand.

6.6 Active Play Management Area

Location and Character:

The Active Play MA lies north of the Galer Street entry drive and extends from the pergola-comfort station eastward to Fifteenth Avenue, at the northeast corner of the park. Immediately adjacent is the Lake View Cemetery. Although this MA includes both buffer and greensward landscape characteristics, it is uniquely defined as a zone for children's play. This use was designated in the original Olmsted plan, and most historic design elements remain intact: abutting pergola-comfort station, wading pool and "Little Children's Lawn," property line vegetative screen, and playground (the latter re-sited east of the wading pool circa 1990).

Significant canopy includes mature beech and pine groves, katsura, elm, maple, larch and a specimen giant Sequoia tree. Ivy underlies and grows up many trees, interspersed with natives; ornamental shrubbery east of the play area has been significantly thinned. A poorly-defined path threads among shrubs here and connections to a much-used bus stop. Lawn south and west of the wading pool is subject to extremely heavy wear throughout warm months, irrigated sporadically by hand. The entire MA receives year-round use by families, for everything from Easter egg hunts among the trees to skating and soccer practice in the empty wading pool.

Issues:

- Insuring user safety related to personal security, traffic visibility and tree condition.
- Maintaining healthy vegetation where subject to constant compaction and trampling.
- Accommodating pedestrian circulation from bus stop to conservatory through this area.
- Being a good neighbor to cemetery in regard to maintaining screening and tree safety.

Objectives:

- Minimize tree hazard.
- Maintain and replenish quality trees, especially as screen along north boundary.
- Reduce canopy crowding while adding understory tree species.
- Replace invasive plants, both ornamental and self-sown, primarily using natives.
- Maintain visibility and better delineate paths among shrubs.
- Improve irrigation system.
- Maintain turf at high level, eliminate where unsuccessful due to shade and heavy use.

Actions:

- Minimize risk to area's many on-site and off-site users, through timely tree pruning, hazard removal and mulching to reduce root zone compaction.
- Enhance boundary screen by culling suppressed stems, then adding shade- and edge-adapted understory trees and tall canopy trees where gaps exist; include evergreens.
- Eliminate invasive plants from area: most critical are ivy in trees upslope, and English laurel shrubs posing safety and maintenance concerns east of playground.
- In non-lawn areas, revise understory plantings to better define circulation, discourage widespread trampling, enhance native habitat, and reduce pruning required to maintain visibility. Palette should emphasize low and treelike barrier species, natives, and Olmsted plan taxa, and exclude all known toxic and invasive plants.
- Extend automatic irrigation to heavily-used play lawn and katsura trees located there, with at least temporary, establishment irrigation provided for north buffer and east landscape areas. Investigate recycling wading pool "gray water" for irrigation use.

6.7 Street Buffer Management Area

Location & Character:

The Street Buffer MA parallels Fifteenth Avenue East and East Prospect Street along the park periphery. The original design intent for this perimeter was to visually seclude the park from surrounding development, thereby enhancing the refreshment experienced by visitors. The Olmsted plan's buffer plantings were multi-layered, punctuated by gaps at entry points and intermittent locations. Today the composition, character, condition and breadth of perimeter vegetation ranges from dense, tall shrubs merging into upper tree canopy (at the northeast end), to formally-spaced shade trees underplanted with turf (toward the southwest end).

Extent of recent upkeep has varied. Along much of Fifteenth Avenue understory is dense enough to harbor encampment and illicit activity, with unchecked ivy, blackberry, and bindweed as well as tree-sized rhododendron, pieris, boxwood, laurel and holly. The south buffer is generally more open than the east, with parts actively cleared. A neglected bed near Eleventh Avenue East contains colonizing black locusts and blackberry intermingled with declining ornamentals. Street Buffer canopy includes numerous unique and specimen-stature trees, plus areas with crowded canopy and suppressed small ornamental trees. Few lower tier trees remain in this buffer MA, while tall pine, spruce, beech, London plane and horsechestnut are especially prevalent. Only Galer and Fourteenth Avenue entries have special landscape treatment, the latter replicating Olmsted 1909 plantings.

Issues:

- Improving park's external "face" and identity of its entries.
- Heightening user safety and public perception thereof.
- Balancing Olmsted-mandated screening with need for visibility.
- Replacing overgrown and invasive species with enriched plant palette.

Objectives:

- Minimize tree hazard.
- Reclaim street-edge tree-and-shrub screening, consistent with original design character.
- Provide strategic openings to enhance entry identity and user safety.
- Replace invasive ornamentals with native and alternate Olmsted-palette species.
- Increase seasonal interest plantings visible within and outside park.

Actions:

- Selectively prune and remove trees to improve canopy quality, protect major specimens and minimize hazard along streets regularly used by transit, pedestrians and vehicles.
- Remove planted and self-sown invasive ornamentals and weeds, replacing incrementally with durable Olmsted-palette and native understory species to screen park periphery.
- Recreate and/or maintain focal openings at park entry points, reinstating original Olmsted plantings wherever feasible and modifying as necessary for maintenance and safety.
- Gradually supplement understory tree layer with diverse ornamental species adapted to a low-care environment, especially where light gaps result from needed plant removals.

6.8 Residential Buffer Management Area

Location & Character:

This narrow band runs along the entire west margin of the park, and is composed of lawn and nearly continuous screening trees, informally planted. Species vary from native maple and fir, to exotic conifers and shade trees, to overgrown evergreen shrub-trees such as holly and laurel. Limited original understory remains, much eliminated through time to help curtail illicit activity. This area receives limited regular use, primarily by neighbors running and walking dogs. Adjacent residents report significant levels of continuing illegal use. Encroachment of rear yards occurs in many places, with loss of effective park landscape area.

Issues:

- Balancing Olmsted-intended landscape screening with security needs.
- Improving user safety and public perception thereof.
- Appropriately reintegrating privatized areas into full park landscape.

Objectives:

- Minimize tree hazard.
- Reduce shading and invasive species encroachment on neighboring properties.
- Screen adjacent structures to maximize visual extent and quality of park landscape.
- Eliminate as much as possible vegetation that accommodates illegal activity.

Actions:

- Maintain trees adjacent to private yards to control hazard, deadwood buildup and excess shading, consistent with sound arboricultural practices.

- Throughout area, remove invasive trees, shrubs and groundcovers, both wild and ornamental.
- Plant narrow band of rugged, mixed native and ornamental vegetation along fence lines to provide screening and habitat, minimizing mid-height shrubs to insure visibility; as encroachments are removed, expand breadth of planting.
- Encourage immediate neighbors to eliminate invasive plants from and add native species to their abutting properties.

6.9 Tennis Court Management Area

Location & Character:

Tennis Courts were purposely located near the northwest corner of Volunteer Park to minimize their encroachment into the pastoral landscape. This corner of the park is its least developed and maintained, and while somewhat wild in character contains little intact native vegetation. The MA encompasses the two fenced, double courts and their immediate peripheries, reflecting the special vegetation issues associated with these facilities. Shading, wind screening and plant litter all affect safe play and area upkeep. The existing vegetation varies from lawn and mature shade trees to a regenerating wild cherry thicket and invasive-choked hillsides. Primary pedestrian access from Federal Avenue traverses the edges of this area and is well-used despite overgrown condition and user safety concerns.

Issues:

- Dealing with shade and litter generated by adjacent large trees, some notable specimens.
- Improving aesthetic and functional quality of vegetation, balancing needs of tennis players and general park users.
- Controlling aggressively-encroaching invasives.
- Reversing public perception of neglect and danger.

Objectives:

- Minimize tree hazard.
- Reduce shading and tree litter negatively affecting play on courts.
- Eliminate invasive plants encroaching on and adjacent to tennis courts.
- Add native vegetation to integrate courts with landscape and increase wildlife habitat.
- Improve visibility and sense of safety for park users traversing area.

Actions:

- Remove invasive vegetation abutting tennis courts and work outward; mulch heavily and when eradicated, replant with predominantly low, native evergreen species and strategically-located small trees for screening.
- Selectively prune and remove trees around tennis courts, for hazard, shading and tree litter reduction.
- In conjunction with Service Yard management, remove overhanging laurels along shared fence line, to improve visibility for pedestrians; add path lighting and replant edges with narrower, shorter, non-invasive species.

6.10 Service Yard Management Area

Location & Character:

The Service Yard MA occupies a band of property along the north edge of Volunteer Park, running from behind the Conservatory westward. The Olmsted plan intentionally concentrated park propagation, maintenance and storage facilities in this periphery, both to minimize visual encroachment on the general park landscape and to screen views of Lake View Cemetery. Evergreen screening shrubs planted outside park-side fences currently vary in height and continuity, as a result of deferred pruning and security-related removals and pruning. Invasive planted shrubs and self-propagated vines dominate. Screen density ranges from opaque and overhanging to absent. Within the service yard are several large trees, both coniferous and deciduous. These are concentrated along the southeast and north perimeter, and further screen this utilitarian area from park and cemetery view. North boundary trees (mostly pines) have suffered from unchecked ivy invasion, implicated in a recent failure that hit cemetery property.

Issues:

- Balancing security with need to screen yard from park users' view.
- Protecting park and cemetery, and their users, from tree failure.
- Controlling invasive species.
- Maintaining minimal-upkeep buffer along yard perimeter.
- Insuring consistent light levels for plants grown and stored in yard.

Objectives:

- Eliminate invasive plants, most notably ivy in trees.
- Minimize tree hazard, especially on north boundary abutting cemetery.
- Maintain semi-continuous evergreen screening along perimeter fence, adjacent to public use park landscape.
- Maintain and replenish north boundary vegetative screen, emphasizing native species.

Actions:

- Mitigate tree hazard, especially along south edge of service yard.
- Sever ivy from trees abutting Lake View Cemetery and keep trunks clear to reduce risk of further failures affecting cemetery property.
- Remove ivy throughout north buffer area and replant with multi-layer native understory; add conifers to fill gaps in screening.
- Remove overgrown, invasive-species hedge shrubs and vines along entire yard perimeter (holly, English laurel, Portugal laurel, blackberry, nightshade, bindweed); where narrow, replace with evergreen vines or informal espalier shrubs trained on fence, elsewhere use these and/or rugged evergreens from Olmsted palette to achieve at least 70% screening.
- Selectively prune retained screening shrubs to limit size and density; do not shear or top.

6.11 Reservoir Slope Management Area

Location & Character:

This MA encompasses the steep slope from the reservoir down to the park loop drive, created through grading for reservoir construction in 1900. The ensuing Olmsted plan

treated this slope with masses of roses and other shrubs and vines, but no view-blocking trees. The entire west side of the reservoir was arrayed with benches situated to capture the panoramic vista of downtown, Puget Sound and mountains. Today the benches are gone, most shrubs have grown tall and been thinned in number and their lower branches raised, and invasive black locust trees are colonizing the slope. Ground-covering vegetation is minimal and erosion evident. The traditional view is almost obscured and positive use of the area now quite limited.

Issues:

- Eliminating erosion and devegetation of park's steepest slope.
- Arresting black locust and other invasive species.
- Re-establishing key park vista and encouraging its enjoyment.

Objectives:

- Reclaim panoramic view from top of slope, traditionally furnished with west-facing benches.
- Reduce social trails and erosion along steep slope.
- Eliminate invasive tree and understory species, especially black locusts.
- Replant slope with low-growing, drought-tolerant species reflecting original plant palette.
- Retain selected silhouette tree(s) at top and ornamental trees below.

Actions:

- Remove self-sown black locusts and other slope trees obstructing panorama traditionally seen from top, west of reservoir.
- Remove from upper slope all shrubs with height potential exceeding seated eye level at top of slope (2 – 3 feet); replant with low-growing, durable barrier plantings of prickly or thorny, drought-tolerant, and preferably evergreen composition.
- Down slope, eliminate tall-growing shrubs and interplant heavily with drought-tolerant, low maintenance plants not exceeding 4 feet height at maturity; use barrier species along edges to discourage cut-through activity and tap Olmsted-specified palette. Fence temporarily and mulch heavily during establishment.
- Retain landmark poplar at south end, monitor, and plant carefully-sited replacement of same or other fastigiate type at least one season before its eventual removal.

Chapter 7 – Management & Maintenance Practices

7.1 About Management & Maintenance Practices

This chapter provides specific direction concerning vegetation management practices recommended in Chapter 6; these two chapters are meant to be used together for VMP implementation. The following sections should provide enough detail to carry out maintenance and project-specific work outlined in this VMP. Protocols have been adapted from previously-adopted park vegetation management plans, *Seattle Parks Landscape, Horticulture and Urban Forestry Best Management Practices Manual* (1999) and *City Among the Trees* (1998), and continue to evolve. These practices include maintaining, improving, and restoring park vegetation, as well as removing, installing and establishing new plants.

7.2 Amending Soils

Volunteer Park's soil is predominantly well-drained, sandy loam adequate to support tree and shrub growth. Organic content varies depending on localized soil management practices. In areas, compaction severely impedes drainage. The primary functions of amendment are to improve soil fertility, structure (pore space), beneficial microfloral environment, and water-holding capacity. Site-adapted plant selection, irrigation and mulch application work in tandem with amendment to insure optimal-quality vegetation.

Soil amendment need not involve active incorporation of material into the ground. For the most part, consistent (ideally annual) application of wood chips, leaf mulch or compost onto the soil surface effectively adds organic content back to the soil and helps reverse compaction. Choice of material depends on formality of planting area, as well as availability and cost of materials. Wood chips should be composted before application, to avoid spreading decay fungi to living, mature and healthy trees.

Incorporating compost amendments is a recommended practice for any new planting project. Amending should be done throughout a planting area, not by adding nutrient-rich soil to each individual plant pits. Generally, the best way to add soil amendments is to clear the area of invasives and unwanted plants, aerate or scarify the soil if necessary, then spread amendment (e.g. compost or equivalent) on the surface throughout the planting area to a typical depth of 3-4 inches.

If possible, tilling should be used to incorporate amendments into existing topsoil layer, avoiding the root zones of mature trees. Surface application or hand-digging near trees and mature shrubs is recommended, rather than leaving soil unimproved. Seasonal timing should be such that bare soils are not exposed to winter rains. Therefore, if done in the fall after summer weed removal, soil should be seeded or covered with wood chips whether or not site is planted at that time.

Special additions to the soil may include, as needed, fertilizers, lime, humic acid or mycorrhizal fungi. Incorporation of these materials should be based on horticultural evaluation and/or soil testing, not routine practice.

7.3 Planting

The basic procedure for plant installation is essentially the same whether in a developed landscape or a more natural area. Site preparation, species selection, and planting layout are site-specific and depend on the goals of the project as well as micro-site conditions. Instructions for planting trees, shrubs, and herbaceous material are given below. Planting should conform to current Park Standards (*http://www.cityofseattle.net/parks/projects/standards/details.asp*) and Best Management Practices, on which procedures described in this section were based. Because these standards and practices are revised periodically, users should refer to and proceed consistent with them.

Appropriate plant selection precedes planting, and is arguably the most critical step in the process. If at all possible, one should resist the seasonal and donor pressures that tend to rush plant selection and procurement. Appendix E – Plants for Volunteer Park contains lists of plants recommended (and not recommended) for use in Volunteer Park; while not comprehensive, these references provide a useful starting point. Park department senior gardener, landscape architect, urban forester and/or horticulturist should be included in all plant selection and placement. In addition, Seattle Landmarks Board may have review responsibilities depending on location and future landmark status.

Trees

The two basic steps in planting are preparing the site, and setting the tree or shrub. Proper preparation will encourage root growth rather than adding to the difficulties already challenging the newly planted trees or shrubs.

- Ideal planting hole is 2-3x the diameter of the root spread or the root ball (depending on existing soil conditions)
- Minimum planting hole is 12" wider than root spread or root ball
- Hole shall be no deeper than the ball and the ball shall sit firmly on the undisturbed subsoil
- Native soil shall be used to backfill the planting hole except in situations where the existing soil is contaminated or filled with rubble or pure clay
- Trees shall not be fertilized at the time of planting
- Balled-and-burlapped trees shall be placed in the hole and plumbed vertically. All rope shall be removed from around the trunk of the tree and the top 1/3 of the burlap shall be folded back down into the hole. Whenever possible complete removal of the top third of burlap by cutting it away with a sharp knife is preferred. Do not remove any B&B packaging material until the tree is placed in the hole and securely plumbed into its final position.
- Trees in wire baskets shall have all of the basket removed, using bolt cutters
- Backfill soil in lifts of 4-6" at a time with compaction of each layer. Do not compact muddy backfill. Water thoroughly after backfilling to settle the soil, eliminate air pockets and re-wet the root system.
- If project scope allows, watering soil rather than compacting is preferred. Backfill ½ the soil in the tree pit and thoroughly drench with water to

settle. Complete backfilling and then thoroughly drench with water again. This method is preferred for removing air pockets and settling soil, but can be impractical on big jobs or jobs using volunteers.

- Trees planted in sandy or loamy soils should have a 3" high berm erected just past the perimeter of the planting hole to funnel water to the root ball and wet the hole/sidewall interface.
- Berms should not be constructed in clay soils or on heavily compacted sites.
- Stake only in situations where normal planting procedures does not provide a stable plant, otherwise, staking is not generally required.
- Staking is sometimes recommended as a vandal deterrent device or to prevent mechanical injury from mowers or trimmers. Ties for stakes should be some biodegradable or flexible fastener that precludes collaring of the trunk if the ties are not removed in a timely fashion.
- Stakes shall be removed at the end of the first year.
- Plant trees at the depth they were growing in the nursery.
- Do not wrap tree trunks.
- Remove tree trunk wrapping materials, tags, and all ties at the time of planting.

Shrubs *(refer to general guidelines for trees, above)*

- If needed, incorporate fertilizer into soil before adding plants.
- Wait until plants are established before adding chemical fertilizer.
- Plant at proper depth taking into consideration room for mulch.
- Plant shrubs with proper spacing to allow for spread at mature size.
- Plant bareroot stock at the same grade as grown in the nursery.

Herbs

- Plant ground cover and floral plantings to provide adequate coverage to compete with weeds.
- In landscaped beds, plant to provide effective display.
- Do not crowd.
- Remove containers prior to placement in the planting pit.
- Tease pot-bound roots with hands or tools prior to final placement in planting pit.
- Protected bare root plants from root drying prior to and immediately after planting.
- Cleanly prune exceptionally long roots to create a uniform root mass.

7.4 Mulching

Mulching is one of the easiest and most important maintenance practices for protecting and nurturing all types of vegetation. Mulching is an essential element of planting projects, as well as ongoing grounds maintenance. Benefits provided by organic mulches include: suppressing weeds and invasives (thereby reducing root competition and pesticide need), conserving soil moisture, keeping soil cooler in summer and warmer in

winter, reducing compaction, preventing erosion and minimizing storm runoff, and adding /replenishing soil organic matter.

In the informal beds and semi-natural areas of Volunteer Park, the most desirable mulch will be 3-4" of composted wood chips. Compost, GroCo, or leaf mulch can be added either on top of or underneath the chip layer if soil amendments are desired. Where large areas of invasives have been removed (e.g. blackberry thickets or blankets of ivy), the entire planting area may be sheet mulched with thick cardboard overlain by 4-6" of wood chips to minimize re-invasion and reduce follow-up maintenance. This technique should not be used in the vicinity of mature trees as it reduces air and water availability to established root zones.

In most cases, wood chips from recycled, clean Parks Department plant material are available at no cost. When tree and shrub removals are done within Volunteer Park, cut material should either be chipped and blown directly into beds or stockpiled on-site for future use. Direct recycling eliminates considerable transport and labor expense. Plastic, landscape fabric or inorganic mulch should be avoided in most cases, except as specified for highly invaded areas, where it may be the most effective strategy to achieve control.

Formal landscape beds should be mulched with a finer material than chips, such as Steerco/Fertilemulch, GroCo or Cedar Grove compost. While better than no mulch whatsoever, bark should be avoided as mulch anywhere in Volunteer Park. Its cultural benefits are questionable, and itscharacter inappropriate to a heritage landscape. Wherever individual plants or groups of plants are to be mulched, use guidelines below.

Trees (newly planted or established)

- Clear weeds and grass from under the tree, in a circle out to the drip line at the tips of the branches.
- Where weeds are very aggressive, use an underlying "sheet mulch" of thick layers of newspaper or cardboard (for new trees only).
- Spread 3-4" deep layer of organic mulch in a circle out to the tree's drip line or in a 3' diameter circle (whichever is greater).
- Keep mulch away from the tree trunk to prevent crown rot or insect damage: avoid piling against stem ("volcano mulching").
- Maintain mulch (annually during 3-year establishment period and beyond, as needed).

Shrubs and Herbs

- Follow similar procedures as for trees, above.
- Spread layer of organic mulch 2-4" deep to shrub dripline; to avoid smothering, depth for sub-shrubs, groundcovers and herbs needs to be less than for taller shrubs.
- Cover entire planting area with mulch where applicable.
- Keep mulch away from contact with crown of plant; this applies even to small herbaceous material and requires hand placement.

7.5 Watering

In Seattle, watering is important for both plant establishment and long-term survival. Although certain plants prosper without summer irrigation once established, many common species used in Volunteer Park (rhodies, azaleas, hydrangeas, etc.) cannot. Non-drought adapted plants that experience either acute or protracted water stress over multiple weeks or seasons, will gradually decline or succumb. Water is becoming an increasingly expensive and limited resource here, likewise staff availability to perform and monitor irrigation.

Reducing watering demand thus is a key part of the equation – through species selection for plant replacement, grouping plants with like water needs, mulching, upgrading and maintaining systems for efficient delivery, and actively monitoring need and use. Irrigation at Volunteer Park will be greatly simplified, and plant condition improved, once system upgrades are completed, although likely never serving the entire park. Absence of automatic irrigation will not pose a problem for areas where the target plant palette is adapted to xeric conditions, and establishment watering can be provided through either hand-watering or a temporary system. The west reservoir slope and northwest park periphery are recommended to become such areas.

Watering is an important factor in establishing new plantings to achieve optimal survival and growth. Seattle receives an average of 39 inches of rain per year, but only 13 of those inches fall during the growing season and almost none falls during times of peak evapotranspiration. Plants grown in a nursery are adapted to exactly the opposite condition: they receive regular watering to facilitate rapid growth. Summer watering for the first three years after planting is critical to help plants acclimate to a radically different moisture regime. They must grow an entire new root system before they can survive in the summer dry season. This is why summer watering for new plants, even drought-tolerant natives, is important.

Water delivery to planting sites not served by irrigation will require good planning and extra labor. The project manager must determine what is most feasible and efficient for the project being planned, and make provisions for required labor and equipment within the budget. Some areas will be close to quick couplers so that hoses can be attached for overhead irrigation. Other areas may be close to a road or a path where a truck can deliver water with a water tank. In these situations, either hand watering from the tank or hook up to an irrigation system may be preferred, depending on the personnel available for the work. In most developed areas, automatic irrigation can provide needed water.

In general:

- Water new trees and shrubs thoroughly at planting, regardless of season or weather.

- Water new trees and shrubs (weekly at least 1") during first two summers, tapering watering (to 1/2" weekly) in the third year or extending watering interval to ten days.
- Begin watering in June to prevent drought stress, but only when natural precipitation is insufficient to supply full weekly need. Water on a weekly basis between at least mid-July and late August.
- Continue watering until, into or through September, until rains return and soil moisture is replenished. Fall drought stress is not uncommon in Seattle, and can compromise plant condition going into winter.

Some vegetation requires routine summer irrigation once established, such as high-use turf, ornamental seasonal plantings, and moisture-demanding trees and shrubs grown where natural soil moisture is insufficient (much of Volunteer Park). Proactive controller setup and scheduling for anticipated hand-watering are key to plant health and survival. As for establishment watering, about 1" per week during peak summer season is needed.

To limit disease, do not direct water spray on tree trunks, and minimize spray on foliage as much as possible. During irrigation season, staff should monitor vegetation frequently for signs of drought stress, or conversely, pooling and over-watering, and make adjustments or repairs immediately. Irrigation should be applied in early morning hours, avoiding mid- and late-day applications which waste water and invite disease.

7.6 Three Year Establishment Care

For a period of three years, all new plantings should have follow-up care that is intensive and frequent. This requirement applies equally to individual replacement trees, renovated beds and reclaimed invasive sites. At a minimum, the components of a three-year care program are mulching, watering, and weeding. A three-year calendar for these actions is shown below. Detailed instructions on how to perform specific maintenance actions can be found in this chapter under the title of each practice involved. Once the three-year period is over and plantings have become well-established, their care should be incorporated into any regular ongoing maintenance that occurs within the management area where they are located.

Weed control should absolutely be done with diligence at any planted site, timed to precede seed production for flowering species. Plant vigor and survival must be monitored yearly and lost material promptly replaced. Training pruning for trees, if needed, should be performed during this period and ties and stakes removed at end of the first growing season.

Adjustments to the calendar, in terms of actions taken, should be made depending on the particular project site conditions. Monitoring plays a crucial role in staying aware of site conditions affecting establishment. Material planted, soil, aspect, slope, shade, competition, and past level of invasive infestation all can affect intensity of establishment

care needed. Although occasionally tempting, planting projects should not be undertaken where provision for adequate after-care cannot be guaranteed.

Figure 7.1 - Three Year Establishment Care Calendar

	Month											
Action	J	F	M	A	M	J	J	A	S	O	N	D
At Time of Installation												
Mulching												
Watering												
Year 1												
Mulching												
Weeding				•	•							
Watering						•	•	•	•	•	•	•
Year 2												
Mulching												
Weeding				•	•							
Watering						•	•	•	•	•	•	•
Year 3												
Mulching												
Weeding					•							
Watering						•	•	•	•	•	•	•
Removing Inorganic Mulch												

▢ Indicates time period when action may be taken, timing and frequency to be determined by site conditions

- Indicates specific time to perform action

7.7 Pruning

Pruning is primarily needed in developed landscape areas of Volunteer Park, for shrub renovation and maintenance and to insure longevity and safety of trees park-wide. Pruning can produce strong, healthy, attractive plants, but only if done well. Pruning of park vegetation must be done under supervision of qualified professionals, either City staff or hired contractors. Technical expertise is required to avoid damaging valuable vegetation.

If plants are grown in appropriate places from the outset, long-term pruning needs will be minimized. In Volunteer Park, future conditions can be improved in this regard, but much of the existing plant material is overcrowded, over-large

and neglected, necessitating extensive pruning over several seasons. In an era of limited labor resource, serious attention to future plant selection for appropriate ultimate size and character will pay dividends in reduced workload.

When pruning always use clean, sharp tools including hand pruners, loppers, handsaws, pole pruners, shears and chainsaws, matched to plant type and size. Volunteers are prohibited from using power tools. Ladder work should be performed from stable orchard-type ladders. Dead, diseased and damaged wood can be removed at any time of year, although visibility may be better in one season than another (in leaf for dead or diseased wood, bare limbs for damage and structure),

All trees must be pruned according to Seattle Parks and Recreation Tree Policy (2001) and conform with ANSI 300 Standards. Except for the purposes of snag creation (appropriate to very few locations in Volunteer Park), Parks policy prohibits 'topping' of trees. Tree pruning is to be undertaken to achieve defined objectives, which may include: removing damaged, dead or diseased parts, training, corrective structural pruning, balancing crown, breakage repair, root pruning, thinning and "windowing" to reclaim important vistas, limb skirting to improve visibility.

Trees

Prune for Safety

- Remove branches that grow too low and could cause injury or property damage.
- Trim branches that interfere with sight lines on streets or driveways.
- Remove branches that grow into utility lines.
- Remove or trim branches that pose a hazard to public safety.

Prune for Health

- Create a strong structure when tree is young.
- Remove dead, diseased or damaged branches to increase strength and longevity of trees.
- Thin crown to increase airflow and reduce pest and disease problems.
- Remove crossing and rubbing branches.
- Do not apply dressing to pruning wounds, as this may invite disease.

Prune for Aesthetics

- Enhance the natural form and character of the tree.
- Never "top" trees.

Shrubs

Prune for Health

- Follow principles of natural target pruning.
- Make cuts as close to the bud as possible.
- Do not make flush cuts.
- Do not leave stubs.

Prune for Aesthetics

- Enhance balanced, natural shape of shrub species.
- Remove crowded and crossing branches.

- Remove terminal bud to stimulate lower branching.
- Remove reverted shoots.
- Enhance flowering and fruiting.

Prune for Restoration

- Cut limbs to base to regenerate plant (appropriate species only)
- Remove one third to one half of plant to ground to regenerate more gradually over multiple seasons.
- Mulch, fertilize and water following "radical renovation" to foster strong regrowth.
- "Arborize" by removing lower limbs from treelike shrubs only where resulting plant size and form are functionally and aesthetically appropriate.
- Confirm pruning objective before starting: plant removal may be more appropriate than pruning where severe crowding and visibility issues exist.

Evergreen shrubs are best pruned in spring as new growth begins to push and frost danger is past. Dormant season is appropriate for most deciduous plant structural and renovation pruning. To avoid stimulating new growth that cannot harden for winter, do not prune too late in growing season (after mid-August), other than deadwooding. Prune spring-flowering plants during or after bloom rather than winter before, which removes flower buds.

Conifers may be pruned in any season; most species cannot break bud from bare interior wood so cut carefully and maintain any sheared plants regularly. Restrict shearing to plants adapted for this type of pruning: groundcovers like heaths, herbs, formal boxwood and conifer hedges, etc. Refer to a comprehensive pruning encyclopedia for species-specific information as needed.

7.8 Removing Plants

Besides control of invasive plants, removals are done for the following reasons: poor tree architecture, summer branch drop, increased exposure, root loss, unstable rooting, girdling roots, severe lean, cracks, cankers, conks, seams, decay, cavities, and root and butt diseases. Unfavorable soil conditions, chronic insect or disease problems, crowding and decline are additional reasons relating also to shrubs and herbaceous plants, the latter a particularly common condition in Volunteer Park.

Trees may present a risk because of old age, storm damage, poor structure, past construction activities or death of the tree. Dead trees in little-used, "low target" areas may be left standing to enrich wildlife habitat, although Volunteer Park has almost entirely moderate- and high-target ratings. If a tree is defective AND has a target, it is considered a hazard.

- Remove hazardous trees that cannot be made safe or functional by corrective pruning.
- Remove trees that constitute a high hazard if no other prescription will eliminate the risk (excluding use, moving target, etc.).
- Alert the community before tree removal begins, to provide opportunity for comment.

At times, trees and shrubs may be removed for landscape renovation, park construction, access or other reasons not related to the plant's viability. Cost and availability of funds for tree-spade work should be weighed against the cost of replacing the tree with a new, smaller caliper tree. Establishment of relocated larger trees is often less successful than planting young replacements. Regarding trees:

- Determine value of specimen to be transplanted, by appraisal, when considering replacement vs. transplanting.
- Transplant high-value trees smaller than 10-12" in diameter with a large tree-spade; small caliper trees (3" or less) may be hand dug then balled-and-burlapped.
- Remove plants for reuse only during appropriate season - generally late fall or early spring, depending on species.
- When large trees are removed, recycle as much of the woody debris on site as possible.

Regarding shrubs:

- Transplant shrubs by carefully digging rootball and placing in pots or balling and burlapping.
- Do not let roots dry out.
- Remove plant material that is too large for the allotted space.
- Remove plant material that is diseased or dead and dispose off site.

Due to the developed character of most of Volunteer Park, locations for wildlife brush piles will be limited; however, it may be possible to incorporate small piles in peripheral areas being reclaimed to native vegetation. Debris not used for brush piles can be chipped for use onsite as mulch. Diseased plant material should not be recycled in the park: Phytophthora, Verticillium and Armillaria root rot, Anthracnose and, potentially, Dutch Elm Disease are among likely pathogens best not spread via mulch or brush.

7.9 Taking Care of Turf

Turf is the term applied to any lawn or grasses grown in developed landscapes within the park and is the traditional "green carpet" many visitors associate with Volunteer Park. Upkeep presents challenges where shaded, over-used or under-irrigated. Where site conditions make sustaining vigorous turf impossible and such conditions cannot be sufficiently altered, suitable vegetation or coarse organic mulch should replace it. Lawns contribute fundamental landscape character to Volunteer Park, but turf locations within this mature plant environment must be reassessed and adjusted periodically.

Maintenance

Mowing

Frequency

- Mow weekly from MARCH through OCTOBER; bi-weekly in FEBRUARY and NOVEMBER; and at least monthly in DECEMBER and JANUARY.

Cutting Height

- Mow to a height of 2 to 2.5 inches (avoid removing more than 1/3 leaf blade height at any one time). Care should be taken in areas where tree roots protrude above the ground surface, and mower height should be raised whenever possible to avoid excessive root damage.

Mulch Mowing

- Do not remove grass clippings from mowed turf areas.
- Alternate mowing patterns to avoid ruts and compaction from the wheels.
- Avoid driving on frozen turf.
- Avoid driving on wet ground where ruts will remain.

Trimming

- Use walk- behind mowers and line trimmers where site cannot be accessed by riding mowers, and around trees to avoid trunk damage from riding mowers.

Edging

- Edge 2 to 4 times per year, depending on the maintenance standard for the area. At Volunteer Park, most lawn areas require regular edging to minimize grass infestation of shrub beds.

Cultural Care

Fertilization

- Soil test routinely fertilized turf on a 4-year cycle.
- Provide turf fertilizer 5-1-4 NPK unless otherwise indicated by soil tests.
- Apply approximately 1 lb. of N per 1000 square feet.
- Fertilizers N should be approx. 50% water insoluble N preferable with some organic sources.
- Avoid applications during heavy rainfall to avoid runoff.
- Avoid applications in very hot weather.
- Irrigation systems should be operational before growing season applications.
- Mark sprinkler heads to avoid damaging them during truck applications.
- Add micronutrients and lime as soil tests indicate.

Use site-specific fertilizers, and organic formulations wherever possible for extended release and reduced toxicity and migration to streams via runoff and groundwater.

Irrigation

- Apply approximately one inch of water per week.
- Monitor automatic irrigation effectiveness on a weekly basis.

Aeration

- 2 to 3 times per year using .75 inch hollow tines.
- Best periods: March/April, late June, late August.
- Make two passes at 90 degree angles.

Top Dressing

- Use 80% coarse sand and 20% composted organic material.
- Most effective when done lightly and frequently.

- Apply ¼ inch, each application.
- Monthly applications in heavy wear areas during peak seasons.

Overseeding

- Overseed entire area at least once per year.
- Overseed in fall and slicer seed in spring.
- Overseed 5 lb. / 1000 square feet.
- Site characteristics, usage, and maintenance practices guide seed selection. Ideal sites (full sun, good drainage, reasonable fertility) are suited for perennial ryegrass blends. Lawns that are in partial shade or on poorly drained sites should be seeded with mixes of perennial rye and fescues. Avoid Kentucky Bluegrass.

Site Standards

Prominent Irrigated Lawn Areas:

These are high visibility or high use landscapes and include the majority of Volunteer Park's lawns.
Fertilization: 5-1-4 NPK ratio at 2 to 6 lb. N per year applied in 3 to 4 applications.
Aeration: 2 to 3 times per year with conventional 0.75" hollow tines.
Overseeding: Once per year at 5 lb. per 1000 sq. Monthly applications in heavy wear areas.

General Irrigated Lawn Areas:

Fertilization: apply 5-1-4 NPK ratio at 1 to 2 lb. N per year applied in 1 to 2 applications.
Aeration: 1 to 2 times per year with conventional 0.75" hollow tines.
Overseeding: as needed, in April/May and October.

Non-Irrigated Lawn Areas:

Fertilization: apply 5-1-4 NPK ratio once October/November.
Overseeding: as needed, in October.

Steep Slopes:

Replace existing slope lawn with "low grow" turf cultivars or vigorous woody and herbacious groundcovers requiring little regular irrigation or pruning.

Design and Construction Issues:

Construct turf areas with a minimum slope of 2% to promote surface drainage and a maximum of 25% to allow riding mowers to safely access the areas.

7.10 Weeding and Invasive Plant Control

Weeding and controlling invasives are necessary as an ongoing maintenance action throughout Volunteer Park. Many planting projects will include initial removal and ongoing control of invasives as a major component of the project. Invasive control is also an important part of 3-year establishment care for all newly planted areas. The most

commonly occurring and problematic non-native invasive species in Volunteer Park are listed below with a brief description of their characteristics, some information about where each species is typically found, and some recommended eradication and control methods for that particular species.
Recommendations and protocols (including herbicide use) are intended to be used in accordance with current Parks' Landscape, Horticulture, and Urban Forestry BMPs. These "best management practices" focus on using an integrated pest management approach (IPM) characterized by establishing goals, determining thresholds for control, selecting from a combination of control and removal methods, implementing one or more of these methods, monitoring results, and evaluating outcomes.

Generally, the most effective long-term control of invasive species is achieved by using a combination of control methods, reducing site disturbance, and establishing healthy plant communities. Weedy species and infestations that pose the greatest threat to healthy, desirable plant communities should be targeted. In addition, to keep weed control workload at the most reasonable level possible, new infestations should be targeted for control before they become widespread or well established, and the extent of current invasion should be controlled at or below existing levels for those species that threaten to spread. Thus, invasive control should focus on those species and specific infestations that are: 1) the fastest growing, 2) the most potentially threatening but least established, 3) the most functionally and aesthetically disruptive, and 4) listed noxious weeds with mandated control (none thought to grow in Volunteer Park at this time).

Non-native invasive species that are not covered in the tables below can be removed as needed and appropriate. All work with pesticides must be done by landscape professionals, under direct supervision of individuals licensed to apply pesticides by the Washington State Department of Agriculture. In accordance with state law, records of all chemical applications must be kept by the applicator. By reducing seed-source populations, hand removing plants before they mature, and maintaining weed-suppressing mulch, herbicide usage will decline significantly as control is regained. In Volunteer Park, this turn-around time will depend directly on resources available.

Tree Species

Sycamore maple *(Acer pseudoplatanus)*
Norway maple *(Acer platanoides)*
Black Locust *(Robinia pseudoacacia)*
Horsechestnut (*Aesculus hippocastanum*)

Sycamore maple, horse chestnut, and Norway maple are known for their ability to establish in a variety of conditions from wet to dry soils, and from full sun to deep shade. In forests of the Eastern U.S., invasive maples, particularly Norway maple, have naturalized readily into urban woodlands with great success due to their shade-tolerance and adaptability. Black locust is less shade tolerant, but becomes invasive in any highly-disturbed or dry environment, such as neglected open slopes.

Removal of existing seedlings throughout the park is a high priority. Seedlings smaller than 2" caliper can be removed roots and all using a weed wrench. Maples

and black locust resprout if cut, so removals of trees >2" caliper may include the use of an herbicide if IPM protocols warrant this action. Cutting alone may be sufficient to eliminate the plant in heavy shade conditions.

The recommended method for treatment of trees >2" caliper is using a low volume-high concentration basal application of Garlon 3A mixed in mineral oil or diesel. The mineral oil or diesel will draw the herbicide into the bark. The herbicide mixture should be applied directly to the tree trunk 2-3 feet up from the base, around the entire circumference of the tree using a sponge applicator or squirt bottle. Squirt bottles must have oil-resistant o-rings or gaskets. This process requires careful material handling and patience and should only be done by licensed pesticide applicators' direct supervision (never volunteers). All treated trees should be painted or flagged to indicate herbicide use, and to allow follow-up monitoring of treatment effectiveness 2-8 months after treatment.

Golden Chain (*Laburnum anagyroides*)
Hawthorn *(Crataegus sp.)*
Cherry *(Prunus sp.)*
European Mountain Ash *(Sorbus aucuparia)*
Non-native fruiting cherries, hawthorn and mountain ash are trees or large shrubs that spread by prolific fruit production that is excellent bird forage. Golden chain is a shrubby tree which prolifically self-seeds and is a legume related to Black locust. All are distributed irregularly throughout Volunteer Park, as both saplings and maturing trees. Most prevalent is cherry; in addition, dense populations of native bitter cherry (*Prunus emarginata*) are overtaking previously landscaped beds, for which selective removal is recommended using methods described in this section. Remove all seedlings by hand-pulling or weed-wrenching rather than cutting.

Because hawthorn is a suckering species, the most effective removal technique is to remove the entire plant with the roots intact. On larger plants, an IPM approach may include the use of an herbicide if IPM protocols warrant this action. Individual shrubs would be cut and herbicide would be applied directly to the cut surface to prevent re-sprouting. A 25% solution of Garlon 3A is recommended in upland areas away from aquatic resources e.g. shoreline, wetlands. Within 100' of aquatic resources (lily ponds, reservoir), a 50% solution of Rodeo in a water base (no surfactant) is recommended. Herbicide should be mixed with a water-soluble dye. Several cut and paint methods can be used. Any of these requires careful material handling and patience and should only be done under direct supervision of licensed pesticide applicators.

1) Cut shrub to a stump at or near ground level and paint entire cut surface immediately with herbicide.
   OR
2) Cut shrub to a stump at or near chest level and with a portable drill, make 1/8" diameter holes 1" deep into the stump from the outer sides all the way around the circumference of the stump every 2" or one hole for every 1"

dbh. Holes should be drilled at a slight downward angle. Then inject herbicide with syringe directly into each hole. If standing dead brush is desired, this method can be used without thereafter cutting the plant to a stump.

OR

3) Girdle the standing plant by making a series of downward overlapping cuts all the way around the trunk (also called frilling), leaving the chips attached to the trunk at the base of the cut. Then paint herbicide onto fresh cuts. This technique should be used before fruit production so that standing dead plant does not have fruit on it.

Treated cut stumps should be checked for re-sprouts every 2 to 6 months for the first year after cutting and re-treated if necessary. If no herbicide is used, repeated cutting will be required to weaken and eventually kill the plant over time. This is a more labor-intensive method and will require diligent follow-up visits over a period of at least several years to remove suckering growth resulting from initial cutting.

Shrub Species

English Laurel *(Prunus laurocerasus*
Portugal Laurel *(Prunus lusitanica)*
English holly *(Ilex aquifolium)*

Laurel and holly are broad-leaved evergreen shrubs spread readily by birds due to their prolific and tasty (to birds) fruit. They also sucker and re-sprout vigorously. Holly and laurels prefer at least partial shade but tolerate and prosper in full sun as well, and are adapted to a broad range of soil moisture. These species are found throughout Volunteer Park, as both ornamental and self-sown plants, individually and in masses. Among them, holly appears most numerous, but English laurel perhaps most extensive in terms of vegetative volume. All species have seriously compromised ornamental shrub plantings, tree groves, and outlying vegetation. Largely uncontrolled, impacts are escalating dramatically in the park and will require timely, concerted attention to arrest.

Young plants that are small enough can be hand-pulled or weed-wrenched. Larger plants that cannot be removed with the roots intact are probably eradicated most effectively by an IPM strategy that includes a combination of mechanical means and herbicide. A 25% solution of Garlon 3A is recommended in areas away from aquatic resources. Within 100' of aquatic resources (ponds, reservoir), a 50% solution of Rodeo in a water base (no surfactant) is recommended. Herbicide should be mixed with a water-soluble dye. Several cut-and-paint methods can be used. All require careful material handling and patience and should only be done under direct supervision of licensed pesticide applicators.

1. Cut shrub to a stump at or near ground level and paint entire cut surface immediately with herbicide.
   OR

2. Cut shrub to a stump at or near chest level and with a portable drill, make 1/8" diameter holes 1" deep into the stump from the outer sides all the way around the circumference of the stump every 2". Then inject herbicide with syringe directly into each hole. If standing dead brush is desired, this method can be used without cutting the plant to a stump.
   OR
3. Girdle the standing plant by making a series of downward overlapping cuts all the way around the trunk (also called frilling), leaving the chips attached to the trunk at the base of the cut. Then paint herbicide onto fresh cuts. This technique should be used before fruit production so that standing dead plant does not have fruit on it.
   OR
4. For larger plants >2" caliper, use a low volume high concentration basal application of Garlon 3A mixed with mineral oil or diesel fuel and apply it to the bark of the plant 2-3' up the trunk from the base around its entire circumference. Use a sponge applicator or squirt bottle to apply herbicide mixture. Squirt bottles must have oil-resistant o-rings or gaskets.

Treated cut stumps should be checked for resprouts every 2 to 6 months for the first year after cutting and re-treated if necessary. If no herbicide is used, repeated cutting will be required to weaken and eventually kill the plant over time. This is a more labor-intensive method and will require diligent follow-up visits over a period of at least several years to remove suckering growth resulting from initial cutting. However, IPM protocols may favor this method in certain situations.

Before removing large plants, a determination should be made of landscape function. If clearly intentionally-planted rather than self-sown, appropriate substitute species should be planted as soon as possible to re-create the intended design effect unless safety or other important criteria dictate otherwise. Public education concerning invasive ornamental species is recommended as an adjunct to plant removal, via site signage, park tours, brochures and media. A potential added benefit will be long-term reduction in seed source from private landscapes nearby.

Himalayan blackberry *(Rubus procerus)*

Non-native blackberries are found in pure stands on open, neglected hillsides in Volunteer Park, and as limited infestations in buffer planting beds. Eradication and control methods for these two species are the same. Blackberry is found in large thickets where there is low canopy closure – along hillside edges and interior areas where there is available sunlight caused by development or canopy gaps. Blackberry is shade-intolerant and opportunistic on disturbed sites, so long-term control is linked to successful establishment of healthy native plant communities that will create undesirable conditions for this species.

IPM control methods may include hand grubbing with root removal, repeated cutting, mowing, or grazing, cutting and dabbing stubs with herbicide (cut and dab), or combinations of two or more of these techniques with monitoring between

treatments. Hand-grubbing is generally only a reasonable method for small areas, or for maintenance around trees or shrubs. If herbicide is used, a glyphosate herbicide is recommended – Roundup for upland areas and Rodeo for areas within 100' of an aquatic resource. The method(s) chosen depend mainly on how extensive the infestation is and the available labor resources. Grazing by goats is a method being used in trials, and may be promising as a method where blackberry is monotypic in thickets without native vegetation (such as the lower tennis court hillside).

Removal, other than in areas with sparse occurrences and relatively intact healthy vegetation, should not be done unless subsequent replacement planting is planned. In many cases, re-planting of a site may not be done until control of re-sprouts over 2-3 years is complete. In other instances, planting in the fall immediately after summer removal work may be desirable. This will be site dependent, and must be determined at the time of project planning. During the subsequent three growing seasons, regeneration of invasive species must be carefully weeded from the desirable vegetation. This takes a discerning eye and a sensitive touch. However, this is an ideal strategy for "adopt-an-area" sites.

On slopes greater than 15 percent, high-density planting and intensive maintenance should be provided so that 100% foliar coverage is achieved within three years. In addition, facines, wattles or woody debris should be fastened perpendicular to the fall line to intercept surface water flow and prevent erosion on slopes between 15 and 40 percent. On slopes greater than 40 percent, immediate replanting and broadcast mulching are recommended to guarantee adequate foliar coverage under critical slope conditions.

For sparse occurrences, hand-grubbing is recommended. In general if herbicide is used, timing of its application should coincide with the time of year that the target plant is most actively growing and trans-locating resources to its roots to maximize herbicide effectiveness. For Himalayan blackberry, this is generally considered to be mid-summer during flowering. For removal of denser stands or thickets the following methods are recommended: Any herbicide application requires careful material handling and patience and should only be done by licensed pesticide applicators.

1) Mow, graze, or cut the plants to the ground repeatedly during the growing season (May-Oct) to reduce plant vigor. If combining with an herbicide treatment, do a late summer (July) cut and dab (herbicide) treatment on re-sprouts. Herbicide should be applied to fresh cuts immediately (within 30 min.) for most effective treatment. In fall, after final mowing, plant and apply double layer of cardboard sheet mulch covered with 4-6" of mulch.

   OR

2) Mow, graze, or cut to the ground late in the growing season (after July 31st), and immediately cover entire area with heavy weed fabric firmly stapled to the ground. In fall, cut slits in the fabric to install plants. After

2-3 years, remove fabric, hand-pull any re-sprouts, and apply double layer of cardboard sheet mulch covered with 4-6" of wood chips.

OR

3) Mow, graze, or cut to the ground late in the growing season (after July 1st) and either dab cut ends at that time, or cut and dab resprouts late in the summer when they appear.

Vine Species

English ivy *(Hedera helix)*

English ivy is a non-native, broad-leaved evergreen invasive vine found in discontinuous areas throughout Volunteer Park, in beds amongst ornamentals, blanketing uncultivated ground, and climbing trunks of large trees. It is one of the biggest threats to tree health and safety. Ivy has no natural predators or pests, is shade-tolerant, and forms dense mats on the ground. In addition it climbs trees, weighs down limbs, reduces air and nutrient flow, and creates a heavy canopy "sail" that increases the wind resistance of already weakened trees, making them susceptible to wind throw. English ivy does not provide beneficial habitat for native wildlife, reduces native plant diversity, and generally out-competes ornamental vegetation. Some of Volunteer Park's ivy predates the Olmsted era.

Hand-pulling appears to be the most effective removal method for this plant. Any efforts to control ivy should initially target vines climbing into trees. Vines should be cut at shoulder-height, and again at the base of the tree all the way around the circumference of the tree. For safety reasons, cut vines should not be pulled down from trees; they will degrade on their own over 2-3 seasons. A radius of at least five feet from the base of a tree should be cleared of ivy, as well – called a "tree lifesaver" or "survival ring."

Patches of ivy on the ground are best removed by hand-pulling and rolling the vines into a mat or ball. Removal of ground layer ivy where there is still a fairly intact shrub layer can be done without replacement planting. Removal of dense mats where the ground layer otherwise lacks vegetation should be mulched immediately, and replanted as soon as possible with suitable plant material. During the following three growing seasons, regeneration of invasive species must be carefully weeded from planted or regenerating native vegetation. This takes a discerning eye and a sensitive touch. However, this is an ideal strategy for "adopt-an-area" sites.

Reclaimed planting areas should have ten foot wide strips maintained around their perimeter to protect them from reinvasion. More extensive instructions for manual ivy removal can be found at http://ivyout.org/ivyremove.html. If adaptive management and IPM protocols warrant, ivy may also be controlled by glyphosate herbicide with added surfactant selectively applied to new leaf growth in June by wiper applicator. This process requires careful material handling and patience and should only be done by licensed pesticide applicators. However, it may be a preferred strategy on steep slopes where ground disturbance is undesirable.

Clematis *(Clematis vitalba)*
Wild clematis (Traveler's Joy) is a deciduous woody, non-native vine that climbs trees and smothers understory plants where well-established. Its current extent is limited in Volunteer Park, but nearby greenspaces (St. Mark's Greenbelt, Louisa Boren Viewpoint and Interlaken Park) contain large infestations and abundant seed source. This species, and possibly domestic grape, can be anticipated to reach the park in the future. Early control is relatively easy; large vines develop extensive, deep root systems very hard to pull loose from the ground.

Clematis control involves pulling vines free of understory plants, and cutting vines near their base in early summer before seed production occurs. For trees, cut vines at approximately 5' height as well, to discourage "ladder" reinvasion. Follow cutting by grubbing out roots if feasible without extensively disturbing or damaging tree roots, or by applying herbicide (Roundup with water soluble dye) directly onto the surface of the cut stump. Choice of method will determined by IPM protocols. Any herbicide application requires careful material handling and patience and should only be done under direct supervision of licensed pesticide applicators. Dead top growth can be removed carefully in fall or winter when vines have become brittle. Cut vines should be flagged for follow up monitoring, as several treatments may be necessary; this plant is tenacious.

Field bindweed *(Convolvulus arvensis)*
Bindweed is a pervasive and very invasive perennial vine that winds around and overtops woody vegetation, and forms strangling mats over the top of low shrubs and understory. It thrives in disturbed sites, especially in sunny locations with moderately dry soils. It can be a particular problem in areas that have been newly cleared of other invasives (e.g. Himalayan blackberry) and replanted. In Volunteer Park, it also seasonally invades neglected shrub beds and weakens woody plants competing for light and moisture. Control of this species will mostly be required in the course of carrying out 3-year maintenance care for newly planted sites. IPM strategies may involve a combination of regular hand-pulling, spot treatment with Roundup, and/or deep mulching with wood chips during the 3-year establishment period to suppress this weed adequately. Less frequent follow-up weeding may also be needed after the three-year period. Root fragments left in the ground are capable of regenerating extensive vines, making suppression techniques an important adjunct to hand removal.

Listed Noxious Weed Species

Plants listed as Class A weeds are defined as follows by King County: "*Class A weeds are non-native species which have a limited distribution in Washington. Because the infestations of these plants are small in number and limited in density, preventing new infestations and eradicating existing infestations is the highest priority. Control and eventual eradication of Class A weeds is required by law in all of King County and Washington State."* Any qualifying noxious weeds found in Volunteer Park must be controlled as required by County regulations and in

accordance with Park Department BMP's. Although now listed as noxious, English ivy is not a Class A weed.

Chapter 8 – Implementation

8.1 Implementation Priorities

Achieving the goal "To sustain through time Volunteer Park's vegetation, consistent with contemporary park conditions and resources as well as its Olmsted Brothers design heritage" will require significant capital and labor, strategically applied over time. By establishing and following clear implementation priorities, investments will produce cumulative, positive results. In an era of constrained resources, it is particularly important that all contributions to be carefully and thoughtfully used.

This chapter describes priority projects and activities that address the broad spectrum of identified vegetation management needs. It is impossible to establish a definitive agenda spanning the next twenty years; therefore near-term actions are emphasized in this document. The most urgent priorities, and projects with the greatest benefit-to-investment potential, are included here. Figure 8.1 – Implementation Matrix, lists and ranks recommended actions by management area. As shown in this matrix, implementation tasks vary both in overall priority and among park Management Areas.

Criteria for ranking implementation tasks follow, the most important first: tree hazard mitigation, canopy health and longevity, invasive plant control, canopy replenishment, user safety, public view preservation, reinforcing the Olmsted plan, improving sustainability (reducing maintenance labor and resources), aesthetics, wildlife enhancement. Such rankings are only approximate, acknowledging that all constitute important drivers for vegetation management, and that several address multiple priorities at once.

Within recommended actions, high priority has been assigned to MA's where the action is most acutely needed, or results can most easily be achieved if addressed promptly. In some cases, implementation may be organized most efficiently on a project basis, completing all actions needed in a particular area together. This approach fits CIP-, long-term volunteer- and donor-driven initiatives. However, it is important to focus first on overall priorities, to avoid spot improvements at the expense of broad and urgent needs. For example, hazard tree mitigation, urgent tree care, invasive species eradication and irrigation improvements need to occur throughout Volunteer Park, to reverse decline and improve overall landscape condition. Once done, these actions should require only minor, periodic follow-up.

It is particularly important not to create un-funded maintenance obligations in wake of restoration work. If results will not be self-sustaining after an establishment care period, advance arrangements for upkeep must be made between initiators and the Parks resource manager, by securing funded labor increment, endowment, or long-term volunteer commitment. Implementation activities that are by nature ongoing should be included: tree condition monitoring, canopy replenishment, invasive plant monitoring and control, maintaining mulch, updating commemorative tree map and records, etc. Cyclic maintenance needs not listed as implementation activities also should be considered, as these apply: pruning, watering, turf care, fertilization, seasonal cleanup.

While gifts of single trees are welcome, few "ready-to-go" sites exist within Volunteer Park. More often, related work needs to precede or accompany tree planting to insure long-term success, such as: sod or tree removal, tree or shrub pruning, invasive plant control, irrigation installation, soil preparation. A list of specific implementation projects follows, in many cases linked to priority tree planting locations. These are provided to help guide both capital project planners and interested private donors. Multiple donors should be encouraged to contribute to projects according to their interests, with implementation then occurring at a larger scale than typical individual tree plantings. Listed projects are diverse in both type and park location. Priorities have been suggested, but no ranking within high, medium and low groups is implied; for convenience, the list is sorted by MA. When detailed project scope and cost estimates are developed, a donor "menu" should also be established; this planning can be initiated by Parks staff or community representatives, in close communication.

Recommended Implementation Projects

Management Area	Project Description	Location	Priority
Greensward	Bed-to-Greensward Conversion	Large beds north of amphitheater lawn	High
Greensward	North of SAAM Landscaping	From service drive to large north lawn	High
Greensward	Olmsted Planting Bed Extension	North periphery of large east lawn	High
Reservoir Slope	Viewpoint Slope Restoration	West edge of Reservoir	High
Service Yard	Perimeter Screen Plantings	Fence line abutting park [& cemetery]	High
Street Buffer	Entry Enhancements	15th & Prospect	High
Street Buffer	Entry Enhancements	15th & Highland	High
Street Buffer	Landscape Renovation	Beds adjacent to 15th Avenue E	High
Tennis Court	Reforestation	Slopes N, E & S of northwest courts	High
Active Play	Path & Landscape Improvements	East of play area to 15th & Galer	Medium
Glade	Lily Pond Periphery Landscapes	Groves to W, N & S of lily ponds	Medium
Greensward	Museum Buffer Landscape	East & SE sides, SAAM building	Medium
Residential Buffer	Entry Reforestation	Galer Street end, east of Federal Ave.	Medium
Street Buffer	Entry Enhancements	11th & Prospect	Medium
Active Play	Cemetery Screen Plantings	Edge and understory along boundary	Low
Formal Landscape	Water Tower Landscaping	Base of Water Tower	Low

At the five year mark, and at similar intervals thereafter, implementation accomplishments should be measured against specific VMP objectives and then-current landscape conditions. Course corrections may be needed, by reordering priorities, assignments, funding and volunteer contributions to most effectively move the agenda forward. Sector resource staff and Urban Forestry staff should collaborate in this assessment, using an "adaptive management" model. Monitoring, which is discussed in the final chapter, provides a means to cumulatively, quantitatively track progress, a key tool for evaluating implementation success.

Figure 8.1 – Implementation Matrix

ACTION	MANAGEMENT AREA									Parkwide Priority
	Formal Landscape	Greensward	Active Play	Street Buffer	Residential Buffer	Glade	Reservoir Slope	Tennis Court	Service Yard	
CANOPY										
Abate Tree Hazards (removal, pruning, diagnosis)	++	++	+	++	+	+	+	+	+	Urgent
Diagnose and provide special care for identified declining, high-value trees	++	+	-	-	-	++	-	-	-	Urgent
Replant trees removed for hazard	+	+	+	+	+	+	-	-	+	High
Selectively prune and remove trees for health, light, view & safety	+	++	+	+	+	++	+	+	-	High
Remove invasive, self-sown saplings & trees (Black locust, Norway maple, Horsechestnut, Holly, Cherry, Hawthorn)	-	+	++	++	+	+	++	+	-	High
Monitor Trees for decline & hazard	++	++	++	++	+	+	+	+	+	High
Establish & maintain mulch rings under lawn trees	-	++	+	+	-	-	-	-	-	Moderate
Develop complete Commemorative tree database & map for public use; maintain.	+	+	+	+	-	-	-	-	-	Moderate
Plant trees in priority locations	-	++	+	++	-	-	-	+	-	Secondary
Plant trees to fulfill area VMP objectives	-	+	++	++	+	+	-	++	+	Secondary
UNDERSTORY										
Remove English & Portugal laurel	+	++	++	++	+	-	-	++	++	High
Eradicate English Ivy/Blackberry	-	+	++	-	+	++	-	++	++	High
Selectively remove and renovation-prune overgrown shrubs	+	++	+	*	+	++	++	-	-	High
Monitor invasives & remove while small	+	++	+	+	+	+	++	++	+	High
Repair and/or provide adequate irrigation	++	+	++	++	+	+	+	+	+	High
Selectively replace laurel & holly with noninvasive species	+	+	+	++	+	-	-	++	++	Moderate
Eradicate other invasive/weedy plants	+	+	+	+	+	+	+	++	+	Moderate
Mulch beds & bare soil	++	++	++	+	+	++	++	+	+	Moderate
Add appropriate shrubs & groundcovers	+	+	+	++	+	+	++	++	+	Moderate
Remedy poor lawn drainage	-	++	-	-	-	-	-	-	-	Moderate
Remove toxic soils & replant beds	++	-	-	-	-	-	-	-	-	Secondary
Eliminate or add shrub beds to improve consistency with Olmsted plan	-	++	++	++	+	+	++	-	-	Secondary

8.2 Implementation Strategies

The intent is that VMP implementation will come from multiple sources, working in complementary ways. Currently-available sources and strategies are discussed below. All will require follow-up attention to bring enhanced resources to bear on Volunteer Park's landscape needs; the status quo can be expected to produce limited progress, at best.

Seattle Parks' district (Central East), Horticulture and Urban Forestry staff can accomplish part of what needs to be done through ongoing maintenance and small projects, in some cases redirecting efforts to better meet vegetation management objectives. The ability of the Department to fund enhanced maintenance at Volunteer Park exists, but at the possible expense of other park landscapes. While tradeoffs might fruitfully be explored, this approach is problematic within the overarching context of constrained appropriations for vegetation upkeep. Few would dispute that on multiple counts Volunteer Park deserves the best care the City can provide; insuring that optimal support is in place needs to be an early step in VMP implementation, and one that should be revisited often.

Parks' Major Maintenance Fund (MMF) is a second anticipated avenue for implementation, although competition among projects is intense and lag-time from proposal to secured appropriation is considerable. A compounding challenge is that landscapes compete with Park buildings and infrastructure for MMF funds, and historically have not fared particularly well. One project relating to vegetation management currently is funded, $390,000 to renovate the park's irrigation system. Other projects identified for potential funding include paving, restoration of several park structures, mechanical system work, and far down the list (near 400th), turf restoration and two small landscape areas. Without tapping other implementation approaches, the quality, safety and public enjoyment of Volunteer Park's landscape likely will decline still further.

Because public resources are limited, community collaboration will be key to successful VMP implementation. Seattle Parks greatly values - and depends upon - the citizens it serves; the department maintains a strong commitment to partnership. Volunteer Park has the particular advantage of enormous popularity and visibility, and both natural and historical significance on which to build support for needed vegetation management actions. Public engagement through volunteer activities, donations and grant partnering constitute core implementation tools.

In the past, and waiting in the wings, are individuals and organizations anxious to support long-term care for Volunteer Park. Such commitment is manifest in recent Seattle Parks Foundation donations earmarked for restoration projects, in multiple past tree donations by Capitol Hill Lions Club, in neighborhood-sponsored playground renovation and water tower Olmsted interpretive exhibit projects, and in continuing park involvement of Puget Sound Dahlia Society and Friends of the Conservatory. An informal Friends of Volunteer Park provided active park stewardship during the 1990's; prospects for organizing a new Friends group appear excellent. Nearby schools can be encouraged to

invest community service hours in the park. With proper planning and oversight, Volunteer Park can accommodate individual, ongoing group and single-event volunteer activities to help fulfill the VMP.

If appropriately matched, supervised and trained, volunteers are well-suited to plant removal, renovation (radical) pruning, planting, weeding and mulching; in addition, skilled volunteers could take on special tasks like small tree and shrub pruning, tracking tree donations, monitoring tree condition, planning and installing seasonal color displays, and volunteer event promotion and leadership. To effectively use volunteers to this extent, staff management and recruitment time far above current levels would be needed.

Grants to Volunteer Park for vegetation management needs could flow from multiple sources, at a variety of scales. Community partners could seek Department of Neighborhoods major project funds for up to $50,000. King County and Washington State have urban forestry-related grant programs in the range of $3,000 – 30,000 per project. Starflower Foundation could be approached regarding wildlife enhancements, and numerous other private non-profits and foundations with environmental, educational or heritage preservation agendas could provide implementation support.

Both local and national organizations exist that are good potential fits; grant specialists, agency clearinghouses and foundation administrators can provide helpful direction to maximize success procuring grant funding. Any monies secured should be carefully spent, well-documented, and publicized to pave the way for future grant funding; accountability and partner appreciation attract further support. Success breeds success.

Finally, Volunteer Park has institutional "tenants" and neighbors with whom the potential exists to forge partnerships fulfilling VMP objectives: Seattle Asian Art Museum, Seattle Public Utilities (Water Division), Metro Transit, Lake View Cemetery. Each has longstanding, continuing interests in those specific areas of the park its facilities abut or occupy. Partnership opportunities include both near-term and long-range projects. Shared objectives need to be identified, project scopes and schedules developed, and ongoing communication maintained. While much of such coordination exists outside the realm of urban forestry and landscape management, its effects can have direct, positive bearing.

8.3 Budget Estimate

VMP implementation will involve multiple types and phases of work, of necessity undertaken over a protracted period. Costs will vary according to methods and materials used to accomplish tasks, and the extent of volunteer involvement in projects and ongoing maintenance. Budget estimates exclude volunteers from treework and pesticide application, but little else; however, the extent to which the community can be expected to supplement Department-funded implementation remains to be seen. Given the complexities and yet-unknown specifics regarding VMP implementation, most elements of this budget estimate are broad and preliminary.

8.4 Implementation References

Detailed information relating to tree management and future planting is included in Appendices D, E, F and G. These appendices also address Olmsted heritage and understory planting subjects. Assembled references are designed to support plan implementation and are an integral part of this VMP, not simply accessory information. The appendices and Chapter 10 - References flesh out Chapters 3, 4, 6, 7, 8 & 9 findings and recommendations.

During implementation, VMP users should make extensive use of the comprehensive tree work map and database, outstanding trees map and list (with some of commemorative trees), priority tree planting location map, list and photo gallery, plant palettes for future tree and understory additions, map showing intended long-term vegetation types based on Volunteer Park's original Olmsted Brothers' design, and park management area map. Some of the above will need updating as work is completed or conditions are re-evaluated. Electronic maps and spreadsheets will facilitate their easy revision.

Tree Lists

Trees for future planting include all known Seattle Olmsted taxa considered to be consistent with achieving sustainable, high-quality canopy in time. A list of Olmsted species to continue planting is found in Appendix E, also a list of trees not suitable for future use, with suggested alternate species. Olmsted taxa are incorporated into a master Recommended Trees database that gives specifics about size, type, site requirements and special characteristics helpful to plant selection.

This list has been expanded from a framework of heritage trees, adding offerings in areas of particular need. These include: broadleaf evergreens for screening, non-Prunus (cherry, plum) flowering trees, drought-tolerant and native species, summer interest and fall color taxa, and conifers with compact character and moderate height. These tree lists are intended not only for use filling identified gaps, but also for ongoing canopy replenishment and understory enrichment.

A priority planting site map and database indicate locations and types of tree plantings most urgently needed in the park at this time, to help address donor interest. Work that must precede or accompany tree planting at a site, if any, is noted. At some point, donations may need to be channeled from single trees to area restoration projects, as limited sites make sense for planting independent of other actions.

Understory Plant List

For future understory alterations, renovation and plant installations, a list of recommended taxa has been included in Appendix E. While detailed design and project development lie in the future, this list should be used regularly to guide plant selection for all incremental maintenance needs. In editing the Olmsted 1909 Volunteer Park plant list, most archaic, invasive, over-abundant, and pest- or disease-prone selections were eliminated. Other taxa need to be carefully evaluated for consistency with traditional Olmstedian character before use, particularly as regards non-green and variegated foliage.

The recommended understory species list focuses on plants that fill gaps in existing park vegetation, while incorporating historic species and genera as much as possible. Included are at least 70 Olmsted-used, 25 native, 15 barrier and 30 fragrant plants. Seasonal interest can be expanded by incorporating any of the 26 winter-, 50 summer- and 37 fall-feature options; even among 72 spring-feature entries, only three are rhododendron, azalea and camellia. Also included in the understory list are 18 treelike- and 50+ low shrub/groundcover plants, to address the need to increase tall and low understory while reducing view-blocking mid-height vegetation.

The plant list from a Seattle estate garden designed by Olmsted Brothers (the Krauss Garden) has been included to give additional authentic options, particularly for herbaceous species little emphasized in the Volunteer Park palette but originally envisioned as a component of landscape shrubberies.

Monitoring forms

Monitoring forms of several types are discussed in Chapter 9 and found in Appendix F.

Chapter 9 – Monitoring

Monitoring will be key to fulfilling vegetation management objectives for Volunteer Park. Periodic monitoring of restored and yet-to-be restored landscape areas serves to document progress as well as identify course corrections needed along the way. Monitoring also helps insure that projects receive timely, appropriate follow-up care. Even without implementation activity, measuring change in "status quo" condition may be useful to build support and confirm priorities as resources become available.

Vegetation data presented in Chapter 4 and Appendix D provide a general baseline against which to measure future change in the park landscape. Specific implementation projects, when undertaken, should have more detailed existing vegetation data recorded for purposes of long-term comparison. In Volunteer Park, implementation will involve both identified treework throughout the park, and a series of targeted actions in specific areas. It will also involve intensified or adjusted routine maintenance activity. Respective monitoring needs are discussed in the following sections.

9.1 Treework Monitoring

Treework monitoring needs to include two main components:

- New and replacement tree plantings, both as part of establishment care and at 2- to 5-year intervals thereafter, to gauge success of species and location. Monitoring should be performed by horticulturally-knowledgeable individuals, either staff or volunteers.
- Monitoring for concerns noted in Recommended Treework, and for condition of identified Outstanding and Hazard Trees. Not all of the latter will require near-term removal, but should be checked annually in winter and after major storm events. Such monitoring must be done by individuals trained in hazard tree evaluation and arboriculture, using established protocols.

Forms suitable for these respective uses are included in Appendix F. Tree pruning and removal work, once completed, needs to be recorded in the consolidated database on park trees (see Appendix D), but not monitored afterward except for future need along with entire park tree population. If cables are installed, these should be inspected annually and maintained as needed.

9.2 Project Monitoring

Monitoring of specific projects has to do with evaluating 1) the success of the project's design; and 2) the success of the project's implementation. A monitoring plan should be developed concurrent with site restoration planning, whether volunteer-, donor- or capital appropriation-driven. A sample form is included in Appendix F, as a starting point for specific sites.

Individual VMP implementation projects need to be monitored as an integral aspect of establishment care, at least annually for three years. Monitoring thereafter should be repeated at five years, and continued periodically within routine grounds management.

Monitoring is best done by a qualified person who is uninvolved with project management at the site. Independent monitoring provides valuable peer feedback for

both project manager and Parks' staff. Open discussion of findings should be used to refine management techniques. The additional benefit is to help shape and improve subsequent, related implementation projects.

9.3 Maintenance Monitoring

Monitoring of regular maintenance has to do with making sure that: 1) work is being performed where, when, and how it is supposed to be done; 2) the work being done is having the desired results; and 3) any necessary adjustments are made to the maintenance action(s) in the future if intended goals and objectives are not being met. Monitoring to evaluate the effectiveness of ongoing maintenance in meeting VMP objectives should be done every two years, by qualified individuals not themselves responsible for the park's landscape care.

Completed checklists should be reviewed with District staff to identify progress, problems, and the effectiveness of maintenance actions. Information assembled is meant to inform and refine routine maintenance procedures and allocation of resources thereto. The intent of monitoring is fulfilled to the extent that results are incorporated into ongoing management actions in the Park. At minimum, monitoring documents landscape condition and composition over time, and forms a valuable resource in itself. A checklist for routine maintenance monitoring is included in Appendix F.

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