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Canopy Survey and Forest Health Assessment

Beaux Arts Village



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Summary

The results of this study indicate that of the 52.2 acres of the Beaux Arts Village, 41 percent (21.3 acres) have tree canopy cover.

The urban forest of the Beaux Arts Village provides a wide range of benefits to its residents such as providing wildlife habitat/nature viewing opportunities, recreation and hiking, clean air, and cooler summer temperatures. These forests also sequester carbon, improve water quality and reduce storm water runoff. Research has suggested increased exposure to green spaces and canopy cover can reduce stress, improve social cohesion, and improve overall health. The purpose of this plan is to maintain and enhance the benefits derived from native forest cover for the long-term.

The majority of the forested areas are in a good health condition. Units 12 and 22 contain trees that demonstrate low vigor. We were not able to access the base of the trees and therefore were not able to determine the cause of the stress to the trees. No significant areas of disease or tree decline were observed. Invasive species such as English holly, English ivy, English laurel, and Himalayan blackberry were observed growing in the understory of some areas which should be addressed in the near future to limit their spread.

The urban forest is primarily comprised of Douglas-fir, western red cedar, and western hemlock with a minor component of bigleaf maple. The oldest trees found here are considered true old growth at more than 500 years of age, however most trees found in the village are approximately 100 years old. We did not observe forest health threats such as root disease pockets in any of the management units. Trees in several management units displayed slightly thin canopies but this is likely a result of development and infrastructure impacts. For each management unit, we provide enhancement recommendations to maintain and support the health of the urban forest in the Village.

The overall canopy coverage has been delineated into management units based on ground conditions, tree species composition, age, level of invasive plant species and other factors. The purpose was to help facilitate future restoration projects to target priority areas for treatment. This report discusses the current condition of those units and provides enhancement recommendations. Once the target areas are identified, a more detailed unit specific prescription can be developed to help implement the restoration work and any necessary follow up management.

Areas with ornamental canopy cover are designated on the attached maps as ORN. These areas make up a very small proportion of the overall canopy cover in the village.

The attached maps contain a unit 29 which designates individual trees. The canopy cover provided by these trees contributes to the overall canopy cover of the village but these areas were not assessed as management units. Additionally, our assessment was limited to publicly accessible areas and these trees were often times located on private property.

Methods

This assessment focuses on the forested areas of the Beaux Arts Village. The total area assessed is approximately 52.22 acres. The assessment was carried out from publically accessible rights-of-way within the community, and a guided tour of the WABA community beach. Areas of continuous canopy coverage were delineated into management units based on aerial imagery and LIDAR tree height data. The management units are general delineations and may contain variation in vegetation and forest cover within each unit.

Data Collection Definitions

The following attributes were collected for each management unit. The assessment was limited to publicly accessible rights-of-way, therefore attributes were visually estimated when access was limited.

Management Unit Number – Areas of continuous tree canopy cover were assigned a number during the mapping process. The WABA units were assigned letters to differentiate them from the Beaux Arts Management Units.

Canopy Cover Type – Based on average DBH observed in the management unit and designated as either A, B, C, or D. A = 0" – 10", B = 11" – 20", C = 21" – 30", and D = 31" and above.

DBH (Avg.) – The average trunk diameter at 4.5 feet above grade for dominant trees in the management unit.

Tree Height (Avg.) – Average tree heights of dominant trees.

Overstory Trees – Species of dominant and codominant trees in order of abundance.

Invasive Shrubs – Invasive shrubs species observed in order of abundance.

Native Shrubs – native shrub species observed in order of abundance.

Invasive Cover – Management units were assigned a value (High, Medium, Low) based on percent of invasive species cover observed in the management unit. High indicates invasive coverage greater than 50 percent. Medium indicates invasive coverage between 5 percent and 50 percent. Low indicates invasive coverage under 5 percent.

Tree Spacing (Avg.) – The average spacing between dominant and codominant trees.

Ground Coverage – Percent of soil surface covered by shrubs and ground species.

Canopy Coverage – Management units were assigned a value (High, Medium, Low) based on percent of canopy cover. High indicates canopy coverage of greater than 50 percent. Medium indicates canopy coverage between 25 percent and 50 percent. Low indicates canopy coverage of less than 25 percent.

Recent Work – Any indication of recent restoration work was recorded.

Regeneration Trees – Tree species less than 20 feet in height in order of abundance.

Management Unit Existing Conditions and Enhancement Recommendations

The attached maps show management unit locations and canopy cover.

Canopy Cover Type C, WABA Management Unit A

Existing Condition

This unit is approximately .81 acre in size, comprised of 28 to 42 inch DBH (diameter at breast height, 4 ½ feet above grade) Douglas-fir, Pacific madrone, and western red cedar with average maximum heights of approximately 115 feet.

Western red cedar and grand fir is regenerating in the understory throughout the unit. Understory shrubs consist primarily of salmon berry, and beaked hazelnut. There are high concentrations of invasive species including Himalayan blackberry, English holly, and English laurel.

Enhancement Recommendations

This unit is near the WABA boat launch. There is a utility vault for which access needs to be maintained in the wooded area. The soils found here are loose and deep with good coverage of leaf litter which is ideal for natural regeneration of desirable native species. Some recent work pulling ivy in the western half of the area and planting near the tennis court is a good start towards more native species coverage in this area.

Invasive ivy (*Hedera spp.*) is listed as a class C weed on the Washington State Noxious Weed List and as a weed of concern in King County. Invasive ivy typically forms fruit when it is allowed to climb trees contributing to the spread of this weed.

When possible, fallen branches and trees should remain on the forest floor. Coarse woody debris stores moisture, contributes habitat for small mammals and amphibians, and provides nutrients for remaining trees.

Canopy Cover Type C, WABA Management Unit C,D,E

Existing Condition

The canopy of this 1.32 acre unit is comprised of 20 to 65 inch DBH Douglas-fir, Pacific madrone, and bigleaf maple at an average height of 120 feet. The understory here is primarily snowberry, Indian plum, and vine maple. We found a few English laurel regenerating on the slope, but the invasive removal and native tree and shrub planting appears to be making good progress toward native species restoration. The overall canopy coverage in this area is relatively low with moderate conifer and deciduous regeneration observed in various areas of the unit. The younger cohort of regenerating trees will develop the structural complexity characteristic of older more complex and resilient forests. This regeneration should be encouraged and protected, as these are the trees that will ultimately fill in the canopy.

Enhancement Recommendations

Many of the new trees in this area were recently planted. The area has a dense understory of shrubs which should be monitored and potentially pruned away from the youngest trees to prevent them from outcompeting them. Excessive coverage by the adjacent underbrush could potentially shade out and kill the conifer trees if no management is carried out. There is good potential for community building restoration projects in the WABA beach property.

Canopy Cover Type B, WABA Management Unit F

Existing Condition

The canopy of this .14 acre unit near the WABA parking area consists primarily of western red cedar, Douglas-fir, and bigleaf maple. Tree diameters range between 10 inches and 42 inches with total average heights of approximately 125 to 135 feet. The trees are spaced approximately 20 to 25 feet apart. Himalayan blackberry and English ivy are spreading in the understory. Beaked hazelnut is the most prolific native understory species. Ash and western red cedar are naturally regenerating. The recently planted grand firs are doing well.

Enhancement Recommendations

The invasive ivy and blackberry should be removed from the unit where feasible and infilled with native shrub species.

Coarse woody debris includes fallen trees, branches, and large pieces of wood. Retaining coarse woody debris when feasible will provide valuable habitat for small mammals, insects, and amphibians in the adjacent wetland area.

Desirable conifer species should be favored. Targeted clearing of the invasive underbrush from the canopies of the conifer species will assist the regeneration of these trees. The conifer species will grow to fill in the canopy in the area.

Canopy Cover Type D, WABA Management Unit G



Existing Condition

This .31 acre open space near the beach is comprised of Douglas-fir and western red cedar. DBH's range between 22 inches to 44 inches with heights of 120 feet. Average tree spacing is 20 feet. Some ornamental and native species planting areas near the beach are doing well. There is not much natural regeneration of native tree species in this unit. The eastern portion of the unit has a high level of invasive ivy, laurel, and holly in the understory. Native plant species include sword fern and Indian plum.

Enhancement Recommendations

Wetlands are highly biodiverse areas that make valuable contributions to the health and resilience of the surrounding forested areas. Maintaining some portion of the shoreline in an undisturbed natural state will help create and preserve habitat required by many species, and provide them with cover while accessing the lake. Consider some native planting projects which incorporate species tolerant of high water tables such as sedges, rushes, or willows near the lake. Wildlife snags and coarse woody debris should be retained and recruited when possible near the beach to support the songbird, small mammal, insect, and amphibian populations.

On-going removal of invasive species and native replanting in the understory will help maintain the biodiversity of the eastern portion of this unit. Underbrush should be cleared from the newly planted trees to prevent them from being outcompeted.

Canopy Cover Type D, WABA Management Unit H



Existing Condition

The canopy of this unit primarily consists of Douglas-fir and western red cedar growing in turfgrass and garden areas in the southwest corner of the WABA property. It is approximately 0.64 acre in size, and extends from WABA into neighboring properties to the east. Dominant tree DBH's range between 30 inches to 46 inches. There is very low coverage of invasive species here. The dominant understory species is snowberry.

Enhancement Recommendations

There are some very high quality trees in this unit and few invasive species, but the overall canopy coverage is low. Consider adding more conifer and native hardwood species here to eventually close the gaps in the existing canopy, as well as native lacustrine species planting closer to the lake.

Canopy Cover Type D, Management Unit 1



Existing Condition

This unit is approximately .46 acres in size, and is comprised of a mix of western red cedar and Douglas-fir. DBH's average 31 inches. The canopy averages overall heights of approximately 115 feet with a spacing of approximately 25 feet.

Understory vegetation density is moderate beneath the larger trees and sparse in some areas along SE 27th St. There is low invasive species coverage. Invasive ivy is creeping into the trees and some large English and Portuguese laurels growing along the road edge landscapes.

Enhancement Recommendations

Some gaps in the canopy are open due to trees which have been limbed up or excessively pruned. If native shrubs and ground covers are planted in the currently open areas, over time the unit will resemble a natural forest with a complex structure and species composition. If open ground is left unplanted, invasive species are likely to germinate.

Canopy Cover Type C, Management Unit 2



Existing Condition

This unit is approximately 1.1 acre in size. The dominant trees consist of primarily Douglas-fir and bigleaf maple with DBH's ranging between 18 and 35 inches. The unit has low coverage of invasive species. The dominant trees are spaced an average of 30 feet apart. Snowberry is the dominant shrub species in the understory.

Enhancement Recommendations

The relatively new landscape on the corner of SE 27th and 104th Ave SE is a good example of a primarily native planting with some ornamental species mixed in for aesthetic interest. The soil is fairly lean here, and could be enhanced with organic mulch. Ideal mulch has a variety of source material and component sizes to encourage diversity in soil microbiology. Tree branches which have been processed by a chipper/shredder known as "arborist chips" are a good source for this. Mulch will aid in moisture retention, weed suppression, nutrient cycling, and overall productive soil tilth.

Canopy Cover Type D, Management Unit 3



Existing Condition

This unit is approximately 0.74 acres in size and comprised of 28 - 34 inch DBH Douglas-fir and western red cedar. Trees are spaced an average of 40 feet apart. Total tree heights average 115 feet or more. Underbrush density in this unit is low. Planted English laurel is found in the landscapes here, but there is very little invasive species coverage. Soils are somewhat compacted.

Enhancement Recommendations

Natural regeneration of native species should be encouraged to support the conifer species which comprise the canopy in this unit. Additional Douglas-fir and cedars could be planted to close in the canopy. Mulch can be distributed on the site to assist in building a healthy soil structure. Retain coarse woody debris on the forest floor for wildlife and forest health. The invasive species should be removed where feasible and infilled with native shrub species.

Canopy Cover Type C, Management Unit 4



Existing Condition

This unit primarily consists of landscaped areas with a canopy of Douglas-fir and western red cedar. It is approximately 1.15 acre in size. The tree spacing averages 20 feet with average heights of approximately 120 feet. There is low regeneration of native species, but some sword ferns appear to be recently planted.

Enhancement Recommendations

Some beds along 105th Ave SE have open ground which could hold more native shrubs and ground cover. There are English and Portuguese laurel planted in the landscapes which could potentially be replaced with ornamental or native species such as camellia or rhododendron that would not self-sow and outcompete native species. Additional conifer species could be planted in the open areas. Invasive ivy growing in the unit should be removed then infilled with native groundcover.

Canopy Cover Type C, Management Unit 5



Existing Condition

The primary feature in this unit is a water tower utility. The unit is .17 acres and is comprised primarily of Douglas-fir with a minor component of western red cedar. Tree diameters range between 21 and 43 inches, with total heights of 120 feet or more. Average tree spacing is 30 feet.

Very little native plant regeneration was observed, but there are several small patches of salal.

Enhancement Recommendations

The inter-planting of western red cedar and Douglas-fir is recommended in larger openings within the unit to maintain canopy cover in the future. Planting native shrubs such as mock orange, vine maple, and snowberry will develop more structural complexity in this unit and help alleviate soil compaction. Coarse woody debris should be left on site for small mammal habitat and nutrient cycling.

Ongoing monitoring and removal of invasive species should continue until the large open gaps can fill in.

Canopy Cover Type C, Management Unit 6



Existing Condition

This area encompasses approximately .39 acres between SE 27th Pl and SE 28th St. The canopy is comprised primarily of western red cedar. The trees are in good condition and there is high canopy coverage. The trees average 32 inches DBH with approximate heights of 105 feet.

There is moderate coverage of invasive species such as English ivy, laurel, and holly. English laurel is used for hedging along the street in this unit.

Enhancement Recommendations

Consider replacing the English laurel used as hedging this with another broadleaf evergreen species such as camellia or photinia. This will limit the spread of invasive English laurel. Another way to limit the spread of English laurel is to aggressively shear it whenever it comes into bloom. This will reduce the chance of berries being spread and germinated by birds.

Canopy Cover Type C, Management Unit 7



Existing Condition

This unit is 1.26 acres in size and is made up of predominantly Douglas-fir and western red cedar. The average DBH of these trees is 25 inches with average overall heights of 80 feet. There are mature landscapes toward the north end of this unit with fairly large ornamental trees growing.

The ground is open with few invasive species encroaching into the area. Bigleaf maples and Douglas-fir are regenerating in the understory.

Enhancement Recommendations

Monitor for encroachment of invasive species and eradicate as appropriate. Monitor the establishment of planted material and replace dead material as necessary. Fill in open areas with more native shrub species.

Canopy Cover Type B, Management Unit 8



Existing Condition

This unit is approximately .47 acres in size. The canopy in this area consists of Douglas fir and western red cedar trees with DBH's of 14 to 26 inches. Heights average approximately 80 feet.

The understory contains a mix of native, ornamental, and invasive vegetation that includes English laurel, English ivy, sword fern, Oregon grape, and vine maple. Some areas in this unit are subject to frequent raking which has removed much of the organic material on the soil surface. This practice can reduce natural nutrient cycling, water holding capacity, and contribute to soil compaction.

Enhancement Recommendations

The regenerating Douglas-fir and Western red cedar in the understory should be encouraged by clearing underbrush from around their canopies. Clearing away brush in close proximity to the regenerating trees will allow them to develop a health canopy structure and prevent them from being shaded out by competing vegetation. In areas which have been previously cleared and frequently raked, soil quality can be improved with proper mulching practices and by planting native understory species of shrubs and groundcover between established trees. Information on proper mulching practice is included in the 'Supplemental Resources' section at the end of this report.

Canopy Cover Type C, Management Unit 9



Existing Condition

This small unit is approximately .05 acre in size. The canopy is comprised of entirely of bigleaf maple. Composition is uniform with tree diameters ranging between 20 to 24 inches DBH, with total heights of 62 feet. There are very few invasive species to be found here as the area primarily consists of well-maintained ornamental landscape.

Enhancement Recommendations

The big leaf maples found here are nearing maturity. A good long term plan would include planting coniferous species so when the deciduous species begin to decline the young conifers in the understory will eventually provide canopy cover in the unit.

The soils in the planting beds along the road are compact and many have been regularly raked which has removed all of the organic material on the surface. Adding an organic mulch layer of composted material will help retain water and increase nutrient cycling.

Canopy Cover Type C, Management Unit 10



Existing Condition

This unit is .3 acres in size. The predominant tree species in this unit is western red cedar. The composition is uniform with DBH's ranging between 22 and 34 inches. Total tree heights are 100 to 120 feet. The trees display normal vigor. Some regeneration of mountain ash was observed. Dense areas of salal were observed as well as small patches of English ivy and planted English laurel.

Enhancement Recommendations

Remove the invasive ivy. The patches observed in this unit could easily be eradicated. Immediately replanting with a native shrub species such as salal or Oregon grape will help to prevent new invasive species in the area.

Canopy Cover Type C, Management Unit 11



Existing Condition

The size of this unit is .17 acres. The dominant tree species is Douglas-fir with DBH's ranging between 18 and 24 inches. Dominant tree heights average approximately 90 feet.

Prevalence of invasive species in this area is high with English ivy, laurel, and holly shrubs growing throughout. Many of the laurels here are sheared into hedge rows. The canopy coverage here is low. Some trees have been topped for overhead utility line clearance.

Enhancement Recommendations

Consider replacing English laurel with lower maintenance native shrubs.

Canopy Cover Type C, Management Unit 12



Existing Condition

This unit is approximately .87 acres in size and comprised of predominantly Douglas-fir and bigleaf maple. DBH's range from 18 to 41 inches with total heights of 100 to 120 feet. The trees have slightly sparse canopies, but displayed no obvious signs or symptoms of disease. The overall canopy cover is high with the trees spaced at an average of 30 feet.

Invasive English ivy, laurel, and Himalayan blackberry were noted in this unit. Native Indian plum and bigleaf maple are regenerating here.

Enhancement Recommendations

It appears recent work was done to remove invasive species and plant small native shrubs and groundcover along the community walking path. These new plants are establishing well. Continuing this work is recommended in the community managed areas.

Canopy Cover Type C, Management Unit 13



Existing Condition

The canopy of this .85 acre area is comprised primarily of Douglas-fir and western red cedar. DBH's range between 20 to 31 inches and overall heights of approximately 120 feet.

Moderate levels of invasive understory species of English ivy and cultivated laurel are mixed with native Indian plum and ferns. Natural regeneration of bigleaf maple and western red cedar were observed in the unit.

Enhancement Recommendations

The conifer regeneration should be encouraged where possible by removing the invasive ivy under the tree canopies. The narrow strip of large Douglas-fir should be monitored for any change in their current condition.

Canopy Cover Type B, Management Unit 14



Existing Condition

This unit is .04 acres in size. DBH's range from 12 to 16 inches and overall heights average 75 feet. The canopy is comprised primarily of western red cedar in the front yard of a residence.

The spacing in this unit is relatively tight with trees averaging 15 feet apart offering high canopy cover. Some natural regeneration of cedar was observed, but the ground is mostly bare. The soil here appears compacted, and there is a lack of organic material at the surface.

Enhancement Recommendations

Planting shade tolerant native understory species such as ferns, salal, or evergreen huckleberry is advised in the open areas to develop species diversity in this unit. This will also help build the soil quality and decrease compaction.

Canopy Cover Type C, Management Unit 15



Existing Condition

This unit is located in the northeast corner of the village, along 108th Ave SE, and is approximately .32 acres in size. The dominant tree species are Douglas-fir and bigleaf maple. The DBH's range from 21 to 35 inches and the average heights are 112 feet.

A paved path runs through a cultivated native landscape along 108th Ave SE.

Enhancement Recommendations

Given the close proximity of the western red cedars planted along the road, these are bound to be problematic in the future. As they mature, they will soon grow into the street and sidewalk. They are still small enough to transplant to west of the path and a smaller growing shrub or ground cover can be planted in the swale.

The regenerating bigleaf maple and western red cedar in the understory should be encouraged by maintaining space around their canopies. Clearing away brush in close proximity to the regenerating trees will allow them to develop a health canopy structure and prevent them from being shaded out by competing vegetation.

Canopy Cover Type C, Management Unit 16



Existing Condition

This unit is .53 acres in size located adjacent to 108th Ave SE. The dominant trees are predominantly Douglas-fir and western red cedar. DBH's range between 24 to 32 inches with total heights averaging approximately 120 feet.

There is English ivy, laurel, and holly covering the slope west of the paved path. There are native sword ferns, bigleaf maple, and ash on the slope, but the ivy is likely to overtake them if it is not eradicated.

Enhancement Recommendations

Favor the regenerating native species and remove the invasive ivy restricting its growth. The deciduous trees are fast growing pioneer species which will help shade out invasive groundcover if given space to grow. When the deciduous species begin to decline the regenerating conifers in the understory will replace them forming an overstory that will provide tree canopy cover in the unit.

Canopy Cover Type C, Management Unit 17



Existing Condition

This unit is 1.9 acres in size. The canopy is comprised of Douglas-fir, western red cedar, and bigleaf maple. Tree diameters range between 17 and 42 inches. Total tree heights are 115 to 125 feet. The trees display normal vigor and displayed no signs or symptoms of disease; however, some of the larger Douglas-fir have low live crown ratio from excessive pruning.

Enhancement Recommendations

The trees in this unit show good diversity of species and age. Planting more shade tolerant native shrubs will contribute to the species diversity here. Mulching with organic material will help build soil quality to further enhance the health of this forest unit.

Canopy Cover Type B, Management Unit 18



Existing Condition

This unit is approximately 0.35 acre in size. The composition is a mix of western hemlock, western red cedar, and Douglas-fir with DBH's ranging from 11 inches to 40 inches. The dominant trees average heights of approximately 105 feet. Spacing averages 20 feet apart. The canopy coverage is high. Minor developments of invasive species were observed in the unit.

The recent restoration work in this area looks excellent, with new plantings flourishing and the installed rain garden with a diverse range of appropriate native species. The use of arborist chips here is ideal for increasing soil quality.

There are a few western hemlocks on the edge of this unit which appear to be in decline.

Enhancement Recommendations

Further enhancement and additional irrigation during the summer months is recommended near the declining hemlocks if possible. On-going maintenance of the newly planted areas is recommended to keep invasive species from proliferating in the open spaces.

Canopy Cover Type C, Management Unit 19



Existing Condition

This unit is 1.68 acres in size. The canopy is comprised of Douglas-fir and bigleaf maple. Composition is diverse with DBH's ranging between 20 to 54 inches. Overall tree heights average approximately 120 feet. There are some invasive shrub species of English holly and English laurel and much of the area consists of ornamental landscape.

Enhancement Recommendations

The recent restoration project near the corner and along the foot path looks good and can be used as a model for future work. There is a stand of oaks along SE 29th, the ground directly below which is fairly compact and lean as a result of frequent raking. Across the street is a bed which has a layer of deposited oak leaves naturally decaying in place. The soil in this bed is much less compact and has higher levels of biological activity and fewer weeds. Maintaining an organic mulch layer of composted material will help retain water and increase nutrient cycling.

Canopy Cover Type B, Management Unit 20



Existing Condition

This unit is found at the southern edge of the Village and is approximately .08 acres in size. The composition is primarily Douglas-fir and western red cedar. DBH's range from 18 to 32 inches, and total heights average approximately 100 feet.

Invasive English ivy, laurel, and holly were observed along the footpath in this unit. Native Indian plum, mahonia, and salal were observed growing here as well.

Enhancement Recommendations

It appears recent work was done to remove invasive species and plant small native shrubs and groundcover along the community walking path in the adjacent unit. Continuing the work along the final segment of trail in this unit is recommended.

Canopy Cover Type B, Management Unit 21



Existing Condition

This unit is 1.14 acres in size and is comprised of predominantly western red cedar and Douglas-fir. DBH's range between 18 and 45 inches, with overall heights of approximately 122 feet.

Trees are spaced an average of 15 feet apart with dense canopy coverage. Western hemlock, ash, and western red cedar are naturally regenerating here. Prevalence of invasive species near the corner of SE 29th and 105th Ave is high with English ivy, laurel, and holly shrubs proliferating.

Enhancement Recommendations

Monitor for and remove invasive species. The slope along 105th Ave has good native shrub and tree coverage, but there is quite a bit of English ivy creeping into their canopies. Removal of this ivy will help these established shrubs quickly fill in to outcompete invasive species.

Canopy Cover Type C, Management Unit 22



Existing Condition

This unit is approximately 0.91 acres in size. The dominant trees are predominantly Douglas-fir and western red cedar. DBH's range from 22 to 32 inches, with total heights of 100 to 120 feet. The trees demonstrate somewhat thin canopies, but displayed no obvious signs or symptoms of disease. The overall canopy cover is rated as high. The trees are spaced at an average of 20 feet.

Few invasive species were noted in this unit consisting primarily of older landscapes. Native salal and bigleaf maple are naturally regenerating here.

Enhancement Recommendations

On-going monitoring and removal of invasive species and planting of small native shrubs and groundcover is recommended in the open areas of this unit.

Canopy Cover Type C, Management Unit 23



Existing Condition

This unit is .81 acres in size. The unit is located along SE 28th Pl and borders WABA to the west. The dominant tree species are predominantly western red cedar, Douglas-fir, and bigleaf maple. The DBH's range from 21 to 38 inches. Overall heights are approximately 110 feet.

The canopy coverage is rated as high and trees are closely spaced. There is very high ground coverage with native Indian plum, mahonia, and sword ferns mixed with invasive English laurel, English holly, and English ivy growing densely throughout the unit. The soils are in excellent condition with a wide range of particle sizes from composted organic material up to large woody debris on the forest floor. This provides a wide range of materials necessary for a diverse habitat.

Enhancement Recommendations

The regenerating bigleaf maple and western red cedar in the understory should be encouraged by maintaining space around their canopies. Clearing away brush in close proximity to the regenerating trees will allow them to develop a strong canopy structure and prevent them from being shaded out by competing vegetation. Removal of invasive species would be effective here as the adjacent shrubs will fill in quickly to help eliminate space for new invasive plants to colonize.

Canopy Cover Type C, Management Unit 24



Existing Condition

This unit is .3 acres in size. The canopy is comprised of Douglas-fir, western hemlock, and western red cedar. Diameters of the trees in this unit range between 25 to 60 inches with overall heights of approximately 90 feet.

Low levels of invasive understory species of English holly and cultivated laurel are growing among salal and ferns. Natural regeneration of bigleaf maple and western red cedar were observed.

Enhancement Recommendations

The dominance of native species should be encouraged where possible by planting native shrubs in the open areas. Encouraging the naturally regenerating native trees by removing invasive species and pruning the adjacent shrubs to allow more light and space to grow is advised.

Canopy Cover Type B, Management Unit 25



Existing Condition

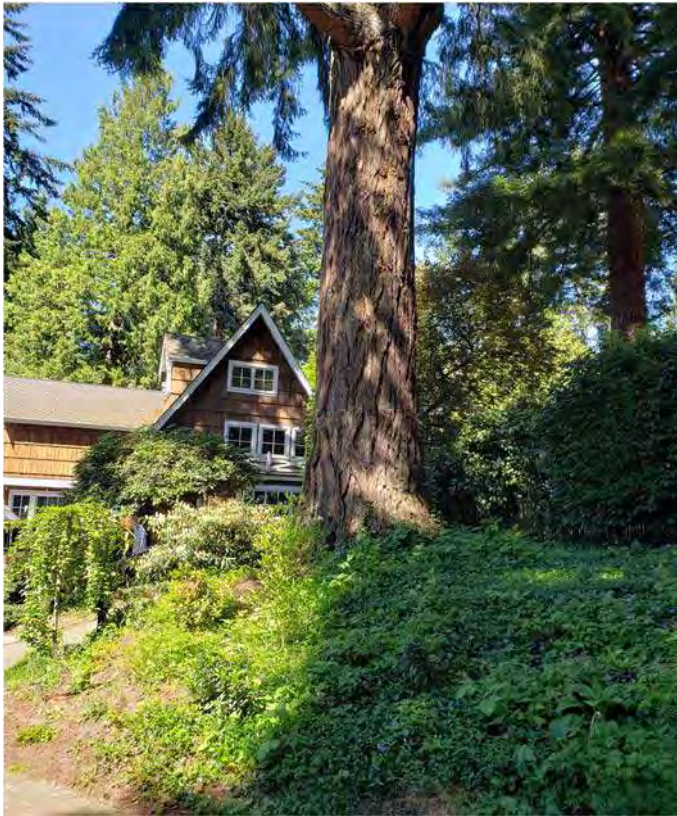
This unit encompasses approximately .64 acres between 103rd and 104th Ave SE along SE 28th. The trees are comprised of western red cedar, Douglas-fir, and bigleaf maple in good condition. Canopy coverage was rated as high. DBH's range between 20 to 35 inches with average heights of 120 feet.

There is low coverage of invasive English ivy, and cultivated laurel.

Enhancement Recommendations

There are several patches of open ground along the streets in this unit. The exposed soils have good coverage of naturally deposited organic material from the trees above. Removing the minor components of English ivy and filling open areas with native shrubs will help native species dominate the area.

Canopy Cover Type C, Management Unit 26



Existing Condition

This unit is located along SE 28th St, west of 103rd Ave SE and is approximately 0.26 acres in size. The canopy here is comprised of Douglas-fir and western red cedar as well as cultivated magnolia, pines, and plums. DBH's range from 20 to over 65 inches DBH, including at least one old growth Douglas fir. Total heights average approximately 115 feet.

Enhancement Recommendations

Likely the oldest tree observed in Beaux Arts Village, known by the neighbors as 'Old Doug' is located in this unit. Vinca minor and St John's wort growing at the base of 'Old Doug'. These are particularly aggressive non-native species which outcompete nearly any other ground cover once established. Removal of these ornamental yet invasive plants is recommended to help support species diversity and nutrient cycling in the root zone of the old growth Douglas-fir. Any work done here should not employ the use of heavy equipment, but hand tools only to reduce the chance of damaging this exceptional tree.

Canopy Cover Type B, Management Unit 27



Existing Condition

This unit is .24 acres in size. The native tree canopy of this unit is comprised primarily of western red cedar and bigleaf maple. DBH's range between 20 and 32 inches, with total heights of approximately 100 feet. The trees display slightly low vigor with thin canopies, but displayed no obvious signs or symptoms of disease. Many areas in this unit are open with nothing growing on the ground. Some native ash trees are naturally regenerating here.

Enhancement Recommendations

There is a high prevalence of invasive English holly and English laurel found in this unit. Removal of the invasive plant species and replacement with native shrub and ground cover species will help prevent future encroachment of invasive plants.

Canopy Cover Type C, Management Unit 28



Existing Condition

This unit is approximately 0.29 acre in size and is found along the south eastern edge of The Village. The dominant trees are primarily western red cedar and Douglas-fir with DBH's ranging from 26 to 32 inches. The tree heights average approximately 120 feet. Tree spacing averages 30 feet apart. There are few invasive species in this unit. English laurel, ivy, and Himalayan blackberry were observed near the corner of SE 30th and 106th Ave SE.

Enhancement Recommendations

Planting more shade tolerant native shrubs will contribute to the species diversity here. Mulching with organic material will help build soil quality to further enhance the health of this forest unit.

Management Unit 29

Management units labeled 29 on the canopy cover map are individual trees with large canopies. These trees represent canopy cover yet were not large enough to be considered management units. We did not assess the areas under the canopies of the individual trees for invasive plant species.

General Recommendations

Forest Health Threats

The overall state of forest health is good. No significant forest health concerns were observed in the village. No substantial areas demonstrating forest health threats such as root disease pockets were observed. We observed slightly low vigor in management units 12 and 22. The observed low vigor is likely the result of disturbance but we were not able to access private property to assess the base of the trees or the area surrounding the trees. Our recommended focus is the removal of invasive plant species, the establishment of native trees and shrubs, and restoring forest floor conditions.

There are no signs or symptoms of significant insect pest infestations in the urban forest. If trees begin to show signs of decline (loss of needles, heavy cone crops, thin crowns, beetle boring holes, etc.) a qualified arborist or forester should be contacted to assess and diagnose insect damage. If there are any reported insect infestations in the vicinity, Washington State Department of Natural Resources forest entomologist should be contacted for advise on the latest techniques, to protect from or treat any outbreak that might affect the trees in the village. After consultation with the WADNR entomologist, appropriate measures to protect water quality and wildlife should be implemented based on the treatment method.

Wildfire Risk

The current wildfire risk in the urban forest is low. Trees are moderately stocked with low levels of ground fuels. Under normal weather conditions, the threat of wildfire spreading through the urban forest is low.

The threat of forest fire in 'West-Side' forests is becoming increasingly higher. Drier than normal conditions over the last several years have dramatically increased this threat. All management activities should consider this risk and precautions taken to minimize the risk of fire.

Desired Future Condition

The goal is to build and maintain a resilient, structurally complex, and biodiverse urban forest. Urban forests are subject to unique stressors that negatively impact forest health and canopy cover. Diversifying native tree and plant species composition, maintaining multiple age classes of trees, and promoting an ecologically complex ecosystem are key factors for maintaining a healthy urban forest. Species diversity will provide greater protection from environmental changes and minimize threats from pests. Maintaining and enforcing a robust tree protection code will prevent unnecessary loss of canopy cover.

Native Tree and Shrub Planting

We recommend planting native trees when possible to increase the diversity of age classes in the urban forest. Mature Douglas-fir is the predominant species with lesser components of western red cedar, bigleaf maple, and western hemlock. Management units that have a tree spacing of greater than approximately 20 feet would be capable of supporting additional native trees. This could be adjusted based on micro-site conditions. Supporting a variety of age classes in the urban forest will be important for maintaining continuous canopy coverage as the forest changes over time. Conifer trees should be kept 15 to 20 feet apart to allow the development of full crowns and good structure. Regenerating trees will eventually grow to fill in gaps created in the canopy by the decline or removal of mature trees.

Shade tolerant species will be most successful in areas with high canopy cover. Native shade tolerant species recommended include western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*) and western yew (*Taxus brevifolia*).

Areas with low to moderate canopy cover will be capable of supporting moderately shade tolerant species such as, Douglas-fir (*Pseudotsuga menziesii*), western white pine (*Pinus monticola*), shore pine (*Pinus contorta var contorta*), and grand fir (*Abies grandis*). These species will be most successful if planted in areas with partial to full sun exposure.

Management units with low canopy coverage would be capable of supporting native deciduous species such as bigleaf maple (*Acer macrophyllum*), cascara (*Rhamnus purshiana*), bitter cherry (*Prunus emarginata*), and western dogwood (*Cornus nutallii*). These species would be successful if planted on the edges of units with moderate to heavy canopy coverage if low canopy cover sites are not available for planting.

When possible, creating connectivity between management units should be prioritized for tree planting.

In areas with bare soil invasive plant species will be more likely to proliferate. Planting native shrubs in management units with less than 50 percent ground coverage should be prioritized.

Large Old Trees

Many of the dominant Douglas-fir trees in the urban forest are over 100 years old and some are likely several hundred years old. Large old trees are critical ecological structures in forests. The distinctive characteristics of these trees provide an ecological role that is difficult to replace. Large cavities, extensive branching structure, complex canopy structure, and deeply fissured bark create unique habitat for wildlife species. The important ecological role played by large old trees warrants extraordinary preservation measures. Trees suspected of displaying hazardous conditions should be assessed by a qualified arborist with knowledge of the tools and techniques available for managing veteran trees such as selective pruning and cabling.

Restoring Forest Floor Conditions

Arborist wood chips should be applied under the drip lines of trees in high use areas. Applying 3 to 4 inches of wood chip mulch will help prevent soil compaction, weed growth, improve soil structure, and help retain moisture in the soil during the dry summer months.

Coarse woody debris consists of large branches and trunks of trees. When possible, coarse woody debris should be retained and recruited. When tree removals take place consider lopping and scattering the coarse debris in forested areas. Large woody debris on the forest floor provides important shelter for birds, amphibians, insects, and animals.

Dumping yard waste in the forested areas should be discouraged. Dumping yard waste on top of the root systems of trees disrupts the natural exchange of air and gases to roots and can smother and kill roots. Yard waste dumped near tree trunks causes decay and increases risk of insect infestations. Ultimately, the dumping of yard waste causes pre-mature decline of trees and native vegetation. It also introduces unwanted plant species into the forested areas.

Biodiversity / Wildlife Enhancement

Biodiversity is the diversity of plant and animal species (including genetic diversity) as well as diversity of ecosystems that support these species and the processes/interactions that take place between them. At this time, the urban forest displays a fair amount of biodiversity. The forested areas contain a wide range of native plants and trees and the areas supports a diversity of wildlife species. The biodiversity could be improved by planting higher value shrub species that enhance wildlife habitat mix and potential. These high value native species might include beaked filbert (hazelnut), Indian plum, thimbleberry, red huckleberry, elderberry, and snowberry. Applying arborist chip mulch to open areas, recruiting snags and coarse woody debris, replacing invasive plant species with native species, and planting under represented native tree species will increase the biodiversity and resilience of the urban forest.

Recommended management practices to enhance wildlife habitat:

- Protect existing snags and residual older trees
- Retain and protect larger downed logs on the forest floor
- Create habitat piles
- Plant wildlife friendly seed mixes on future disturbed areas
- Install nest boxes for cavity nesting birds and small mammals

Invasive Species Control

Nine management units were to assessed to have high invasive plant species coverage, six units were assessed to have medium coverage, and 18 were assessed to have low coverage. The most prevalent invasive species observed are invasive blackberry, English ivy, and English laurel. We observed minor developments of English holly. If feasible, management units containing large infestations of invasive blackberry and English ivy should be prioritized for management activity. Many of the areas with high invasive coverage are located on private property and therefore will require community education and engagement to limit the spread of invasive species in these areas. See the attached additional resources for more specific information on best management practices to control the spread of the invasive plant species observed in the Village.

Actions to Support and Maintain the Character of the Urban Forest

Establish Protection Measures for Existing Trees

The urban forest is comprised of primarily native coniferous species. Many of these trees are large mature trees located in close proximity to residences and infrastructure. Often homeowners and

developers are not aware of negative impacts to tree health caused by development activities. Establishing procedures and protection measures to mitigate tree and infrastructure conflicts will be useful in prioritizing the health and longevity of trees in the village. Consider developing incentives within protection regulations to encourage the retention of mature coniferous trees. Retention of mature trees is recommended because the benefits they provide are difficult to replace and they have become well adapted to their environment. Development activity can have irreversible impacts on tree health and create hazard trees if structural stability is compromised. We recommend establishing robust tree protection measures to help guide decisions regarding tree removals due to infrastructure conflicts and to appropriately replace the ecosystem services provided by removed trees.

Develop a Suggested Tree Species Planting List

Native tree species to the Pacific Northwest are well adapted for our region and will offer the most benefits to the surrounding ecosystem. When possible, we recommend planting native tree species on the private properties in the village to create connectivity between the more densely forested areas. Providing residents with a suggested native tree species planting list will greatly facilitate the selection of appropriate species. As a general guideline, avoid planting more than 30 percent from one family, 20 percent from one genus, and 10 percent of any one species. Greater biodiversity of trees in the urban forest will mitigate the risk of encountering significant losses from over utilizing any one species.

Educate Private Property Owners

The urban forest is comprised of trees on many different properties. Successfully managing the urban forest will require the participation of the private property owners in the village. Educating the residents of the village on the standards of care for trees located on their properties will avoid unnecessarily damaging the trees. Residents should be educated on the best management practices for maintaining tree health as well as the multitude of ecological, economic, social, and physical benefits provided by their urban forest. Workshops or walking tours of exemplary properties in the village is a great method of educating property owners.

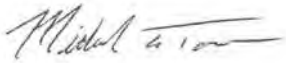
Please call if you have any questions or if we can be of further assistance.

There is no warranty suggested for any of the trees subject to this report. Weather, latent tree conditions, and future man-caused activities could cause physiologic changes and deteriorating tree condition. Over time, deteriorating tree conditions may appear and there may be conditions, which are not now visible which, could cause tree failure. This report or the verbal comments made at the site in no way warrant the structural stability or long term condition of any tree, but represent my opinion based on the observations made.

Nearly all trees in any condition standing within reach of improvements or human use areas may represent hazards that could lead to damage or injury.

September 18th, 2019

Sincerely,

A handwritten signature in black ink that reads "Michael Tomco".

Michael Tomco
ISA Certified Arborist #PN-8432A
ISA Tree Risk Assessment Qualified

A handwritten signature in blue ink that reads "Ben Mark".

Benjamin mark
ISA Certified Arborist #PN-6976A
ISA Qualified Tree Risk Assessor