City of Capitola
Commission on the Environment Regular Meeting Agenda
Wednesday, May 17, 2023 – 6:00 PM

Capitola City Hall, Community Room
420 Capitola Avenue, Capitola, CA 95010

Chair: Michelle Beritzhoff-Law
Vice-Chair: Jason Shepardson
Council Member: Mayor Margaux Keiser
Commissioners: Anthony Lacenere, Peter Wilk

PLEASE NOTE THIS IS AN IN-PERSON MEETING
NO REMOTE ACCESS WILL BE PROVIDED

1. Call to Order and Roll Call

Commissioners: Chair Michelle Beritzhoff-Law, Anthony Lacenere, Mayor Margaux Keiser, Jason Shepardson, Peter Wilk

2. Oral and Written Communications

The Chair may announce and set time limits at the beginning of each agenda item. The Committee Members may not discuss Oral Communications to any significant degree but may request issues raised be placed on a future agenda.

3. Consider the minutes from the April 19, 2023, Regular Commission Meeting

Recommended Action: Approve minutes.

4. General Business

A. Use of Green Building Funds
Recommended Action: Continue discussion on potential uses for Green Building Funds (e.g., Capitola membership in the Green Business Network Program)

B. Capitola Beach Cleanups
Recommended Action: Discuss options for scheduling regular beach cleanups

C. Rispin Riparian Invasive Plant Species Removal
Recommended Action: Review and discuss proposal prepared by George McMenamin for removing and controlling invasive plant species in Rispin Riparian Areas

5. Items for Future Agenda

6. Adjournment

Next regular Commission meeting is scheduled for June 21, 2023

Agenda and Agenda Packet Materials: The Commission on the Environment Agenda is available on the City's website: *www.cityofcapitola.org/* on Friday prior to the Wednesday meeting. If you need additional information, please contact the Public Works Department at (831) 475-7300.

Americans with Disabilities Act: Disability-related aids or services are available to enable persons with a disability to participate in this meeting consistent with the Federal Americans with Disabilities Act of 1990. Assisted listening devices are available for individuals with hearing impairments at the meeting in the City Council Chambers. Should you require special accommodations to participate in the meeting due to a disability, please contact the City Clerk's office at least 24-hours in advance of the meeting at 831-475-7300. In an effort to accommodate individuals with environmental sensitivities, attendees are requested to refrain from wearing perfumes and other scented products.

City of Capitola
Commission on the Environment Meeting Minutes
Wednesday, April 19, 2023– 6:00 PM

Capitola City Hall, Community Room
420 Capitola Avenue, Capitola, CA 95010

Chair: Michelle Beritzhoff-Law
Vice-Chair: Jason Shepardson
Council Member: Mayor Margaux Keiser
Commissioners: Anthony Lacenere, Peter Wilk

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1. Call to Order and Roll Call

Commissioners Present: Michelle Beritzhoff-Law, Anthony Lacenere, Jason Shepardson, Peter Wilk
Council member Keiser was absent from the meeting.
City Staff Present: Erika Senyk, Jessica Kahn

Chair Beritzhoff-Law called the meeting to order at 6:01 pm.

2. Oral and Written Communications - None

3. Consider the minutes from the March 15, 2023, Commission on the Environment Meeting

Motion to approve the minutes: Commissioner Wilk
Seconded: Chair Beritzhoff-Law.
Motion passed 4-0-1 (Mayor Keiser Absent)

4. General Business

A. The Commission discussed outreach opportunities to eligible parcels for participation in the Environmentally Sensitive Habitat Area (ESHA) Riparian Vegetation Planting Reimbursement Program. Vice-Chair Shepardson is to prepare a leaflet with ESHA program information to be approved and printed by City Staff. Commissioners will distribute the leaflets to property owners of eligible parcels using a list of addresses prepared by City Staff.

B. The Commission requested to move the additional uses of Green Building Funds discussion to the May Commission meeting.

C. City Staff gave an update to the Commission on current contracts supporting regularly scheduled Capitola beach cleanups, including a contract beginning June 15, 2023 with Hope Services for debris abatement along Capitola Beach and Esplanade. City Staff also informed the Commission of an upcoming meeting with Save Our Shores to discuss a potential contract for regular beach cleanups that would be available for public participation. The Commission requested that these beach cleanup efforts be advertised through the City's social media outlets to promote public awareness and education.

D. The Commission discussed opportunities for incentivizing residents to nominate and maintain heritage trees. The Commission gave the following considerations to the City's and Commission's involvement in heritage tree designation, maintenance, and protection:

1. The definition of heritage tree is not clearly defined in the City's municipal code (Section 12.12.100) and could potentially be updated or re-written by the City's Planning Department. Commissioner Wilk will contact the City's Planning Department.
2. It is unclear if projects that include labor services could be funded using the Green Building Funds, as currently written in the City's municipal code (Section 15.18.080).
3. A portion of the Green Building Funds could potentially be used to support a heritage tree program, if labor is included as one of the approved uses for projects financially supported by Green Building Funds.

The Commission requested that City Staff determine how many heritage trees are currently designated within the City of Capitola, the current amount of funds available in the community tree and forest management account, if there are additional state funding opportunities to support heritage trees, and to clarify the legal implications and limitations of including "labor" as an approved use for projects supported by Green Building Funds.

5. Items for Future Agenda

The Commission requested that the following items be agendized for a future meeting:

- Use of Green Building Funds
- Scheduling regular beach cleanups prior to summer months
- Review of proposal for removing and controlling invasive plant species in Rispin Riparian Areas prepared by George McMenamin (City Staff to email out copies of proposal prior to May Commission meeting for Commissioners to review)

6. Adjournment

The meeting was adjourned at 7:25 pm to the next Regular Meeting of the Commission on the Environment on May 17, 2023.

Evaluation and Discussion of the Rispin Riparian Areas Relating to Invasive Plant Species Control and Benefits

March 2021

By George McMenamin

Table of contents

Introduction

This evaluation is for 3 areas directly west of Soquel Creek and east of Wharf Road, in Capitola. The evaluation is to evaluate the benefits of removing invasive plant species and discuss applicable methods for removal, within these areas. All 3 areas are designated as within the Soquel Creek Riparian Corridor and Area 2 is designated as within the Soquel Creek Monarch Butterfly Grove. These areas have been prioritized by the City of Capitola, with the highest priority for Area 1, Area 2 and Area 3 respectively. Due to these designations and other legal requirements, there are limitations and restrictions on which invasive plant species are affected and the invasive plant control methods utilized.

Description of Rispin Riparian Areas

All three areas are riparian habitat with a dense tree canopy. During the rainy season, the creek bank and sections with stream terraces or bankful benches are regularly inundated with a high-water mark of approximately 2-4 meters. In years of high precipitation, the water can exceed the mean high-water mark by several meters or more.

There is a large amount of trash and large debris on the slopes, particularly in Area 1 and Area 3. Additionally, there is at least 1 large ground level culvert running down the slope, what appears to be a collapsed septic tank and several other smaller holes. There are potentially an additional number of infrastructure obstacles hidden under the vegetation on the banks.

Area 1 runs along the west bank of Soquel Creek from the foot bridge south to the southern end of Rispin Mansion. This includes the area between the pathway and the creek, and Rispin Mansion and the creek. Area 1 is approximately 152 meters (500') by 34 meters (110'). The majority of Area 1 is sloped from 3:1 (18^0) to 1:1 (45^0). Along much of the creek edge is a stream terrace 7-10 meters wide subject to regular flooding during the rainy season.
Area 2 runs along the west bank of Soquel Creek from the southern end of the Rispin Mansion to the City' southern property line. This includes the area from the top of the slope to the toe of the streambank. Area 2 is approximately 76 meters (250') by 34 meters (110'). Most of Area 2 is sloped from 3:1 (18^0) to 2:1 (27^0). Along most of the creek edge is a stream terrace 7-10 meters wide subject to regular flooding during the rainy season.
Area 3 runs along the west bank of Soquel Creek from the foot bridge north to the City northern property line. This includes all the area from Wharf Road to the toe of streambank. Area 3 is approximately 92 meters (300') by 61 meters (200'). The slopes in this area range from sheer cliffs at the creek edge to a practically level area and finally to slopes from 3:1 (18^0) to 2:1 (27^0). Approximately 15-20% of Area 3 was previously subject to restoration efforts, in the mid-2000s'. Remnants of that restoration effort are still present, at this time. These remnants include surviving small to moderate sized native trees, some native shrubs, several understory native plant species and reduced levels of invasive plant cover.

Plant Species

In **Area 1 and Area 2**, the dominant tree species are Acacia sp. and Eucalyptus sp. Both of these are non-native trees. Additionally, there are smaller non-native Prunus sp. and shrubs such as Cotoneaster sp. and Pyracantha augustifolia. All of these trees and shrubs are highly invasive. The native trees species found in Areas 1 and 2 were almost exclusively mature, except down at the stream edge. The native trees down by the stream edge include Salix sp. (willow), Alnus rubra (Red alder), Cornus sp. (dogwood). Sequoia sempervirens (coast redwood), Quercus sp. (oaks), Aesculus californica (buckeye) and possibly a few young Populus trichocarpa (black cottonwood) are found higher up on the banks and at the cliff edge.
The dominant non-native understory plant species in these areas are Hedera helix (English ivy) Delairea odorata

(Cape ivy) and Vinca major (periwinkle). All are highly invasive. English ivy dominates the understory throughout both of these areas to 80%+ ground coverage. Vinca can be found mixed in with the English ivy for much of the areas. Cape ivy was found in 2 large patches and numerous early, small patches through these areas. Cape ivy is not as widely spread as the English ivy, at this time. However, Cape ivy is very aggressive, spreads rapidly and is extremely difficult to eradicate. Additional non-native plant species of concern include Cortaderia jubata (Jubata grass), Ehrharta erecta (panic veldt grass), Ageratina adenophora (crofton weed), Solanum sp., Genista monspessulana (French broom) and Cirsium vulgare (bull thistle). Although the Ehrharta, Ageratina infestations are limited, these species are extremely invasive and likely to spread rapidly and dominate habitat outside this area. At this time, the Cortaderia infestation is only 4-6 plants of moderate size, and the Solanum sp., Cirsium and Genista infestations are limited in scope.
Due to the dominate understory of English ivy, Vinca and Cape ivy, observed native shrubs and understory species were limited to mostly remnant or decreasing populations. The only natives found as a significant percentage of understory was Toxicodendron diversilobum (poison oak) and in some areas Rubus ursinus (California blackberry). Other key native plants include mature Sambucus nigra (blue elderberry), mature Ribes sp. (currant/gooseberry), Stachys sp. (hedge nettle), Scrophularia californica (beeplant), Woodwardia fimbriata (chain fern) and Pteridium aquilinum (Bracken fern).
In **Area 3**, the non-native trees are not dominant. Those present are mostly Prunus sp. and acacia with a dbh (diameter breast height) of less than 6". However, there are a number of large Cotoneaster sp. and several Pyracantha. Although English ivy is the dominant understory species in Area 3, its' percent coverage varies from a low percent cover (less than 20%) in some areas, to 60-80% coverage in other areas. This is likely due to the previous restoration that took place in the mid-2000s. The other key invasive plant species is Cape ivy. Along the southern border and on the cliff face, Cape ivy is the dominant species. A moderate patch of French broom is found on the western banks, above the unofficial footpath. Low levels of Vinca are present in some areas and 2 small patches of Panic veldt grass were found on top of the cliff face.
In Area 3, the dominant tree species are native Sequoia sempervirens (coast redwood) and Quercus sp. (oaks). Additionally, there are several Aesculus (buckeye), a number of Frangula californica (coffeeberry) and a few Ribes sp. (gooseberry). Some young native trees had managed to survive to heights of 4-6'+. Other significant native species include Rubus parviflorus (thimbleberry), Stachys sp. (hedge nettle), Toxicodendron diversilobum (poison oak), Scrophularia californica (beeplant), Woodwardia fimbriata (chain fern) and Rubus ursinus (california blackberry).

Invasive Plant Species and their Effects on Riparian Habitat at Soquel Creek

In general, invasive plant species reduce diversity of plant and animal species, change water and soil conditions, increase erosion and reduce the ability of habitat to survive stochastic processes and events. These negative effects can be particularly significant in riparian zones due to the slopes and proximity to water. This section discusses some of the potential effects from the key invasive plants found in the Soquel Creek Riparian corridor. Parts of this discussion are for informational purposes only, as some of the invasive plant species cannot be treated due to environmental and/or legal restrictions.

- Eucalyptus sp. - The majority of the Eucalyptus trees in these 3 areas are found in the Soquel Creek Monarch Butterfly Grove and directly adjacent to the Grove. These Eucalyptus trees provide habitat for Monarch butterflies during periods of the year. For the purpose of this document, it is my understanding that there are still protections in place for the Monarch Butterfly and other legal restrictions that preclude cutting or disturbing the Eucalyptus trees in and around the Grove. Therefore, the discussion on Eucalyptus trees is for informational purposes only. However, a November ruling by a Sacramento Superior Court prevented California from listing the Monarch Butterflies as endangered and the USDFW recently put on hold the listing the Monarch Butterfly as endangered, due to higher priority species. Therefore, due to these issues, Monarch Butterfly protections may change in the future.
  Eucalyptus trees negatively affect riparian habitats in several ways. They are fast growing, large trees that

utilize significant resources and shade out many other plant species. Eucalyptus trees have allelopathic properties that prevent or inhibit the growth of most native riparian understory species and native tree seedlings. These allelopathic properties include, but are not limited to, Eucalyptus litter (bark and leaves) leaching allelopathic chemicals into the soil and water. Additionally, the dense litter itself inhibits the growth of other tree seedlings and understory species. These properties lead to greatly reduced diversity for both plant species and animal species, including insects. Additionally, Eucalyptus trees increase fire danger with their dense litter and the highly flammable oils found in the tree.

- Acacia sp. – At the time this document was created no cutting of trees is permitted in any of the evaluated areas. Therefore, the discussion on Acacia trees is for informational purposes only. Acacia trees negatively affect riparian habitats in many ways similar to Eucalyptus trees. Acacias may shade out other species. Acacia plant parts and litter have extreme allelopathic properties that greatly inhibit the growth of almost all other species, particularly native species. These properties lead to greatly reduced diversity for both plant species and animal species, including insects. Like Eucalyptus trees, Acacia trees increase fire danger with their litter and the oils found in the tree. Finally, Acacias are a nitrogen fixing species that changes the soils nutrient levels and chemistry.
- Pittosporum sp. – Although this species is not usually considered invasive in this region, it appears to be spreading at this location from planted trees at the Mansion. There are now a significant number of various ages competing for resources on the streambank.
- Prunus sp. - Most of these have a dbh under 3", at this time. Due to the dense ivy understory and the smaller size of the Prunus there is limited potential opportunity for new seedlings to grow. If the ivy is removed it is likely that seeds will create numerous new prunus seedlings.
- Cotoneaster sp. and Pyracantha sp. - Both of these create large numbers of berries that are eaten and spread by birds and other animals. Over time this can create a significant number of new plants throughout the riparian habitat.
- Genista monspessulana - French broom creates large quantities of seed pods that are released over a large area. Genista seed remains viable for decades. Over time this can result in large monocultured patches of Genista where nothing else will grow. Genista is another nitrogen fixing species that changes the soil nutrient levels and chemistry.
- Hedera helix - English ivy is the dominant understory species in most of these areas. Growth surrounding tree trunks leads to root rot and weakens the trees. English ivy has grown into the canopy of approximately 350 trees in the 3 evaluated areas. This canopy growth weakens the trees, causes tree branches to break from the weight and the dense English ivy canopy growth acts like a sail in high winds, breaking branches and causing trees to topple. The understory growth has created a density that prevents almost all native species seedlings from propagating or surviving, due to a lack of sunlight and nutrients. In most areas, English ivy has created a monoculture with no young tree seedlings and drastically reduced understory diversity. Additionally, English ivy is mildly toxic to many animals and insects leading to a reduction in fauna species within the areas affected. However, some bird species eat the berries and spread the seeds over distance created large numbers of new seedlings and increasing the infected area.
- Delairea odorata - Cape ivy is an extremely rapidly spreading vine that can grow at rates of over 6 meters (20') a year in all directions. It rapidly grows up into tree canopies where it adds weight breaking branches and acting like a sail in the wind. The above ground vines easily break into pieces, which allow it to spread vegetatively. A piece as small as 1/2" with 1 node can re-root. Due to the high-water content of Cape ivy, pieces can remain in trees or on the ground and survive through the entire dry season. As soon as it rains each small piece that has contact with the ground will begin to root. Additionally, the underground rhizomes and stolons can grow long distances before emerging above ground. The easily broken vines, stolons, rhizomes, roots, aggressive vegetative growth, and high-water content make eradicating Cape ivy is difficult. Cape ivy is mildly toxic to most animals and insects, leading to a reduction in fauna species within the areas affected.

- Vinca major - Vinca spreads vegetatively. Its stems grow along the ground and re-roots at its many nodes. Vinca creates a dense monoculture in the understory preventing the propagation of most native plant seedlings, greatly reducing herbaceous diversity. Additionally, Vinca is highly toxic to eat. It contains highly poisonous alkaloids.
- Cortaderia jubata - Jubata grass grows seed plumes up to 3+ meters in height and releases large quantities of wind born seed. At this time, it is a limited threat due to the small number of plants, but potentially could become a significant problem if left to spread.
- Ageratina Adenophora - There are only a few small patches of a Ageratina found within the evaluated area. However, each plant creates thousands of windborne seed that can readily propagate in riparian areas and there by spread rapidly. In spite of its low number of small patches, it has already appeared across the creek upstream. If it is left to spread, it will become a common and dominant plant species throughout the areas both upstream and downstream.
- Ehrharta erecta – Ehrharta was only observed in 2 limited patches within the evaluated areas. However, this species can go to seed 3 times a year and grows very well in both sunlight and in full shade. It is one of the most rapidly spreading invasive grasses in the Central Coast region. If left it will likely become one of the most dominant grasses in the Perry Park, Rispin Mansion area.
- Cirsium vulgare – Bull thistle was observed at only 1 location in Area 1. It will spread throughout the immediate area and beyond if left unchecked. At this time, it is a limited threat due to the low number of plants.

IPM's (Integrated Pest Management Practices)

There are a number of IPM's (Integrated Pest Management Practices) for invasive plant species. Some of them will not be appropriate for this area, due to restrictions and or environmental conditions. The document will briefly provide general information on some of the IPM's. Some of these methods are mentioned only for informational purposes.

- Hand grubbing – This method consists of removing invasive plants by hand and/or utilizing hand tools only. Some of the advantages include: this method can be used on almost all invasive species, it allows the greatest access to targeted areas, these methods create greater awareness of desirable plants and conditions in the area leading to low levels of damage to desirable plants. In addition, hand work can allow a reduction in areas of disturbance, has the ability to remove all of a plant including the roots, often causes less environmental damage to the habitat, requires lower levels of training, and hand removal methods can be easily adjusted based on targeted species and conditions. Finally, hand removal often allows for a more rapid recovery of the habitat with greater native species diversity.
  Disadvantages include: some level of desirable plant damage from trampling, higher costs per unit treated (if paid labor is used), hand removal often takes longer to complete a treatment and a higher cost of green waste movement and disposal. Hand removal sometimes creates a level of soil disturbance, depending on targeted species, although this can be a desirable feature, depending on future management plans.
- Individual Mechanical removal – These methods usually involve the use of individual gas/battery power tools such as: mowers, brush cutters, string trimmers, hedge trimmers, augers and chainsaws. When appropriate, the advantages include: lower costs and greater speed than hand grubbing, little soil disturbance, individual equipment allows a high level of access to areas and a moderate level of control over unintended damage to desirable plants.
  The disadvantages include: these methods are only effective for specific species, careful timing is often needed to achieve effective results, a level of training is required, cost may be higher per labor unit and there are potential safety issues. Other disadvantages include noise, the potential for damage to desirable plant species, the potential to spread invasive plant species into greater areas. Finally, these methods often do not kill the plant, leading to regrowth and the need for multiple treatments a year.

- Mechanized equipment - These methods involve equipment such as tractors, mulchers, bull dozers, excavators, skid steerers and loaders. It is usually used for larger areas or monocultured sites. When appropriate, the advantages include: rapid removal of invasive plants on a large scale, relatively low cost for removal on a large scale, removal of some root systems, the ability to remove large, undesirable plants such as trees quickly, and rapid movement of green waste materials.
  Disadvantages include: high per unit hour costs, work must be done by trained personnel, there is little control over micro to moderate scale environmental damage, equipment often causes significant soil disturbance, noise, and often requires habitat modification for access, leading to greater areas of disturbance (access road building).
- Biocontrol – Although there are bio-controls agents approved or in final trials in California for some of the invasive plant species, none are likely to be useful, at these locations. These sites are either not appropriate for their use or not acceptable for final trails. Also, most of the related bio-control agents do not eradicate the targeted species and will not result in any effective reduction in total invasive plant species.
- Animal grazing – Animal grazing (goats only) may be appropriate for some sections of Area 1 and 2. However, there are factors which may exclude their use. These include the small scale of the areas, the steep banks and the fact that the 3 dominant understory species range from mildly toxic to highly toxic to most livestock. Goats could prove effective in some sections for the English and Cape ivy surface mass, as they can eat both plants. However, they would not work in areas with Vinca. Another concern is that goats will also eat desirable plants and can girdle smaller trees and shrubs.
- Herbicide – This discussion is for general information only. All herbicide application must be done by or under the direction of a licensed applicator, by trained professionals. As I understand it, at this time, only 1 application method (cut and paint) for a specific purpose may be allowed, at these sites. However, the method and timing of herbicide application is often as important as the herbicide itself. Therefore, a brief discussion is provided for 3 methods. I have been informed that the third method is not allowed.
    - The first method is the Cut and Paint (cut- stump) application. This is the method I would recommend for treatment of the English ivy growing up the trees. The cut and paint method usually requires no surfactant and is applied directly to the cut stump of the vine, utilizing applicators that allow for precise treatment. It can be applied carefully with no appreciable risk of herbicide transfer to the soil, water or onto desirable plant species. Cut and paint application practically eliminates any risk to animals and humans. It allows a greatly reduced amount of herbicide to be applied and is highly effective. It is a cost-effective treatment that prevents damage to trees and shrubs by English ivy.
    - The second method is called Basal bark application. This method would be applicable for trees and woody stemmed species. The herbicide is applied to the bark of the woody species. This method kills the plant over a period of time. I would not recommend this method in these 3 areas.
    - The third method is spot spray application using a backpack sprayer. It can be carefully targeted into specific areas. It must be applied following rigid standards to avoid damage to the habitat, water and animals. It would require the use of a surfactant, for the understory species in this area. I would not recommend this method for initial efforts in most of the 3 areas. Herbicides would have only low to moderately effectiveness on the mature stands of English ivy or the Cape ivy and Vinca without multiple applications over several years. If the areas were first cleared of these species, spot spray could be effective for early resprouts.

Benefits of Invasive Plant Species Removal

In these 3 areas, the specific benefits from the removal of invasive plant species would be dependent on the species removed, the removal level of the invasive plant species, the native plant species present and the existing

native seed bank. As tree removal is not allowed, at the time of this document, discussion of the benefits of reductions or removal of invasive tree removal are for informational purposes.
In Areas 1 and 2, the invasive Eucalyptus and Acacia trees have the greatest negative effects on the riparian habitat. Removing some of them would open up the areas to increased sunlight. Reductions in the number of Eucalyptus and Acacia would decrease the allelopathic effects of the bark and leaf litter. Additionally, reductions would increase the water and nutrients available for native tree/shrub seedlings and increase the availability of these resources for native herbaceous species. This would lead to greater plant and animal diversity both on land and in Soquel Creek. However, a reduction in the invasive tree canopy without associated understory invasive removal work, could also lead to an increase in the growth of existing invasive plant species and shrubs.
For the understory of Areas 1 and 2, reductions in or the removal of specific toxic plants such as English ivy, Cape ivy and Vinca would greatly increase plant diversity and populations by allowing greater propagation of native plant seeds and population growth vegetatively. This would improve the habitat for insects, birds, fish and other animals, leading to an increase in both animal species and populations on land and in the creek.
In Area 3, non-native trees are a lesser issue, so the associated allelopathic issues are not a significant concern. However, non-native shrubs represent a moderate threat. Removing the Cotoneaster, Pyracantha and French broom would help prevent a further increase in the population size and density of these 3 species and would allow maintenance to begin depleting the associated seed banks. This would reduce competition to the existing native shrubs. The removal of English ivy and Cape ivy in this area would lead to a further increase in native tree/shrub seedlings and result in the rapid establishment of the sustainable native understory created by the previous unfinished restoration effort. Removal of the English ivy and Cape ivy from the cliff face oaks and redwood trees would increase their health and reduce the possibility of them falling and further eroding the cliff, as has happened in the past.

Area Specific Initial Invasive Plant Species Removal Methods and Related Issues

Notes:
The methods discussed here are general with limited detail provided. Details of the particulars for each method or alternative are available, but are not necessary for this evaluation.
There is a timing element to each of the invasive plant methods. In some cases, it will be possible to coordinate the use of multiple methods simultaneously. However, there will be cases where a single method must be completed before other methods can begin.

In each area, removal methods will be presented, followed by a discussion of potential issues.
After the sections on methods and issues for all 3 areas, there will be a section on possible solutions or alternatives related the issues, if available.

For all 3 areas, the first step would to kill the Cape ivy and English ivy in the trees. Cape ivy should be pulled out of the trees and shrubs to the greatest practical extent possible. This requires little training and only a few hand tools. Removed mass should be contained for disposal. English ivy vines should be cut and the stumps painted with herbicide. This would kill all the English ivy above the cut and the herbicide would damage and kills the roots.

Area 1

There are 4 additional treatment methods that could prove useful to fully accomplish the removal of key invasive plants in Area 1.
After the ivy in the trees is removed, the understory invasive plant species would need to be worked. This could be accomplished with Hand grubbing, Individual mechanical, Mechanized equipment and goats. In sections where goats are appropriate and if they can be utilized, they would be placed to eat much of the English ivy and Cape ivy.

In the northern most section and in the stream terrace area, only 2 removal methods would be appropriate; Individual mechanical methods and Hand grubbing. This is due to the species involved, degree of the slope, large amount of low growing or dead woody debris and potential for sedimentation.

In some sections, Mechanized equipment is the key to the initial work due to the scale of the area, the density of the understory, the significant level of woody debris mixed in the understory and the heavy layer of Eucalyptus bark and leaf litter. This equipment would be used to clear much of the area. Additionally, this equipment would be used to move the green waste. Individual mechanical methods could be used to clear woody debris and make paths for access and fencing. Throughout the entire process, Hand removal methods would take place in areas unavailable to mechanized equipment, in areas with a significant percentage of desirable native plants, when working in the stream bench areas, after the Mechanized equipment did the main mass removal and as a follow up to goats.

Issues

- The use of Mechanized equipment may be restricted. Use of this equipment would require the removal of some small to moderate Eucalyptus trees and many Acacia trees to create temporary roads and paths for equipment access and allow removal of green waste. The temporary access roads would need to be graded to slope which could require additional permits. Finally, Mechanized equipment treads results in some level of soil compaction where it is used. This compaction may adversely affect the health of the trees.
- The use of Goats will not be practical for the northern section of Area 1. The scale of this project may be too small for most goat herders. If possible, the use of goats may be possible for the southern section, adjacent to Area 2. Containing them within this area may not be practical or effective due to the terrain and trees.
- Without the use of Mechanized equipment and/or goats, all work would need to be done with Hand grubbing. The dense mature understory is mixed with dense Eucalyptus litter down brush and branches. This increases the time and effort required for removal significantly. The steepness of the slopes exacerbates the time and effort required for removal.
- No matter what method is used, a large amount of green waste will be created. Moving and removing the mass will be costly.
- Erosion and sediment flow potential are a significant environmental and legal concern. No matter what method is used, most of the slopes would need to be cleared to bare soil. This would create a large area that would require erosion control. Due to the steepness and length of the slopes, there is potential for significant movement of sediment into Soquel Creek. Basic erosion control practices (wattles, straw, seed and blanket) may not be sufficient for steeper slopes and long slopes. Additionally, the stream terrace area that floods regularly during the winter represents even a greater area of potential sediment flow and erosion. Correct erosion control practices for these conditions likely will require specialized knowledge and may require an engineered solution in sections.
- Hand grubbing has 2 potential risk beside those associated with physical work in a riparian area. These include the presence of poison oak throughout the areas and the likelihood of numerous Yellow Jacket nests, during all work periods.

Area 2

There are 4 additional treatment methods that could prove useful to fully accomplish the removal of key invasive plants in Area 2.

After the ivy in the trees is removed, the understory invasive plant species would need to be worked. This could be accomplished with Hand grubbing, Individual mechanical, Mechanized equipment and goats.

This is the Area where goats have the most potential. Goats may be allowed within the Monarch Butterfly Grove. They could remove invasive plant understory and limit green waste. They would also increase accessibility within this Area, reducing the need for mechanized equipment. This could greatly reduce the potential disturbance to the Monarch Butterfly and the habitat. If goats could be used in this area, the need for Mechanized equipment may be reduced significantly. Potentially, the equipment would be needed only to create initial access for clearing some

invasive plant root systems and for the removal of green waste. Individual mechanical methods could be restricted to clearing woody debris and making paths for access and fencing. Throughout the entire process, Hand removal would take place in areas unavailable to mechanized equipment, in areas with a significant percentage of desirable native plants, when working in the stream bench areas, after any Mechanized equipment removal and as a follow up to goats.

Issues

- The use of Mechanized equipment may be restricted. Use of this equipment would require the removal of some small to moderate Eucalyptus trees and many Acacia trees to create temporary roads and paths for equipment access and allow removal of green waste. The temporary access roads would need to be graded to slope which could require additional permits. Finally, Mechanized equipment treads results in some level of soil compaction where it is used. This compaction may adversely affect the health of the trees.
- Without the use of Mechanized equipment and/or goats, all work would need to be done with Hand grubbing. The dense mature understory is mixed with Eucalyptus litter down brush and branches. This increases the time and effort required for removal significantly. The steepness of the slopes exacerbates the time and effort required for removal.
- No matter what method is used, a large amount of green waste will be created. Moving and removing the mass will be costly.
- Erosion and sediment flow potential are a significant environmental and legal concern. No matter what method is used, most of the slopes would need to be cleared to bare soil. This would create a large area that would require erosion control. Due to the steepness and length of the slopes, there is potential for significant movement of sediment into Soquel Creek. Basic erosion control practices (wattles, straw, seed and blanket) may not be sufficient for steeper slopes and long slopes. Additionally, the stream terrace area that floods regularly during the winter represents even a greater area of potential sediment flow and erosion. Correct erosion control practices for these conditions may require specialized knowledge and may require an engineered solution in sections, particularly in the stream terrace area.
- Hand grubbing has 2 potential risk beside those associated with physical work in a riparian area. These include the presence of poison oak throughout the areas and the likelihood of numerous Yellow Jacket nests, during all work periods.

Area 3

There are 3 additional treatment methods that could prove useful to fully accomplish the removal of key invasive plants in Area 1.

After the ivy in the trees is removed, the understory invasive plant species would need to be worked. This could be accomplished with Hand grubbing, Individual mechanical, Mechanized equipment.

It is unlikely that goats are appropriate for use in this area. This area is fragmented into smaller sections, there are sheer cliffs, a long 1;1 slope and significant levels of native species.

This is an area well outside the Monarch Butterfly Grove, so it is likely Mechanized equipment could be used on the upper western slopes, northern border section and for movement of green waste.

Individual mechanical equipment use would be limited, although it could be used for some access and upper mass removal, in some sections. In Area 3, the majority of the work should require Hand grubbing methods, due to the increased native plant coverage, previous restoration work and long steep slopes and cliffs.

Issues

- Mechanized equipment treads results in some level of soil compaction. This compaction may adversely affect the health of the native trees.
- The steepness and length of the slopes exacerbates the time and effort required for removal.

- A large amount of green waste will be created. Moving and removing the mass will be costly.
- Erosion and sediment flow potential are a significant environmental and legal concern. No matter what method is used, most of the slopes in the southern section would need to be cleared to bare soil. This would create a large area that would require erosion control. Due to the steepness and length of the slopes, there is potential for significant movement of sediment into Soquel Creek. Basic erosion control practices (wattles, straw, seed and blanket) may not be sufficient for steeper slopes and long slopes. Correct erosion control practices for conditions in the southern half of Area 3 may require specialized knowledge and may require an engineered solution.
- Hand grubbing has 2 potential risk beside those associated with physical work in a riparian area. These include the presence of poison oak throughout the areas and the likelihood of numerous Yellow Jacket nests, during all work periods.

Solutions or Alternatives Related to Specific Issues with the Invasive Plant control Methods

Some of the issues with specific invasive plant removal methods are the same or similar for all 3 areas. This section will explore potential solution or alternatives, if no real solution is available.

Goats – This assumes that the use of goats in some areas is allowed. The key issues with goats are: the small scale of the appropriate areas for them, the problem with containment, the potential issue with poisonous Vinca and damage to desirable plants and trees.

- To have goatherders bring goats into this area, the City would have to agree to a significantly higher per acre charge with a minimum fee.
- Methods and requirements for containment must be built into the contract, with clear guidelines for loss of containment. Methods and requirements for containment must be built into the contract.
- In most cases, goats will not eat Vinca, However, there are exceptions, such as when it is mixed in with more desirable species. These areas could be placed outside the goat containment fenced areas or monitored carefully.
- Some initial loss of desirable natives is likely. However, trees could be wrapped and large patches or sensitive native plant species could be placed outside the goat containment fenced areas.

Mechanized equipment – The main issues with Mechanized equipment are: potentially the equipment is not allowed, some trees must be trimmed or removed, access roads will need to be graded and soil compaction concerns.

- If Mechanized equipment is not allowed, the related 3 issues have no relevance. The only alternatives would be some combination of goats, Individual mechanical equipment and Hand grubbing to remove invasive plant species and green waste.
- If no trees can be trimmed or removed, there would be no access roads or the associated soil compaction.
- If access roads were permitted, it is likely additional permits will be required for grading and earth movement.
- Soil compaction would be greatly reduced with the use of specific rubber tracked equipment with lower ground pressure.

Individual mechanical equipment – In the hands of trained personnel, the only practical issue might be noise. For some applications, this could be greatly reduced with the use of battery-operated equipment.

Hand grubbing – Poison oak will be unavoidable in some sections of each area. Some crews are used to performing work around poison oak and usually have little problem with the species. Selecting crews with experience working around poison oak is the solution. Treatment medications and soap and water should be made available. Yellow jacket nests can either be avoided, or eradicated if necessary.

Green waste – This is one of the 3 biggest cost concerns. There would be an enormous amount of green waste associated with the 3 areas for the understory invasive plant species. The cost of moving and disposing of this material will be substantial. One partial solution would be the goats. Goats eat almost all above ground understory plant material (excluding Vinca). This could significantly lower the amount of green waste in sections of Area 1 and Area 2. The second alternative would be to leave the material onsite, in large piles to rot.

Trash, Large Debris and Hidden Infrastructure – Much of the debris could be removed by hand. However, some of the large debris would need to be either broken down or pulled up the slope with equipment or winches. In some cases, the best solution would be to leave it in place. Prior to the beginning of work, a careful walk through could identify and flag any infrastructure elements.

Erosion and Sediment Control – It is strongly recommended that input is acquired from a CESCP (Certified Erosion and Sediment Control Professional) and possibly a civil engineer. The long steep slopes and stream terrace areas have potential for a tremendous movement of sediment into Soquel Creek and a significant increase in erosion, particularly on a seasonally hydrologically active waterway, like Soquel Creek.
Although I could estimate the placement of basic erosion control materials such as wattles, blankets, straw and seed, these may not be sufficient for the long, steep sections of bank, with slopes exceeding 2:1. The stream terrace areas are beyond my knowledge base, unless careful supervised hand removal to retain native tree and plant roots would be sufficient. I do have some suggestions that would likely work for the steep banks, although they may not be practical administratively.

- A vegetated buffer zone could be left down by creek edge to filter any sediment moving from the slopes. This buffer zone could be removed in a later year, after the slopes above had stabilized with vegetation. The banks would likely take 1 or 2 years to stabilize.
- The 3 areas could be done in sections over a period of years. This would limit the potential increase of sediment or erosion, in any one time period.

Maintenance Work after the Initial Invasive Removal

Initial invasive plant species removal will not eradicate most of the species found in these areas. Once a plant species become established it creates a seedbank. Many of these invasive species have seed viability of 3-5 years or greater. Invasive species that spread vegetatively often can resprout from small broken pieces with a node attached. Additionally, there are continuing vectors of infestation from factors such as human disturbance, animal movements and movement from infestations upstream. Due to these factors, monitoring and maintenance will be required for at least 5 years.
If the initial invasive plant removal was done with the correct timing and methods, maintenance costs will drop significantly the first year and should continue to drop yearly, until they reach a sustainable level. If all the initial work is done correctly, methods such as Mechanized equipment and goats would likely no longer be required, in year 1. Green waste removal cost and efforts will drop substantially each year, after the initial removal. The methods required after the first year should be Hand grubbing and some Individual mechanical work. Additionally, there should be a substantial reduction in the effort and cost for Hand grubbing work, by year 2. Although it is not allowed at this time, in year 1 or 2, a single, carefully timed, limited spot spraying with herbicide could prove highly effective for certain understory species, such as Vinca, to reduce costs and accelerate the process.

If long term success and/or sustainable restoration are the goals, some level of sustainable invasive plant maintenance will be required into perpetuity, due to the continuing vectors of human disturbance, animal movements and plant material movement from upstream.

Monitoring

After the initial removal, the 3 areas will need to be monitored regularly for erosion control, during the rainy season, and twice a year for invasive plant species and general environmental conditions. The monitoring of

erosion control materials for damage or failure will need to continue until the stream banks have stabilized (1 or 2 years). The monitoring for invasive plant regrowth and general environmental conditions will need to continue for at least 5 years, assuming regular yearly maintenance is provided utilizing effective established removal methods. If plausible, once a year monitoring should continue into perpetuity due to the continued vectors of human disturbance and invasive plant materials moving from upstream in Soquel Creek.

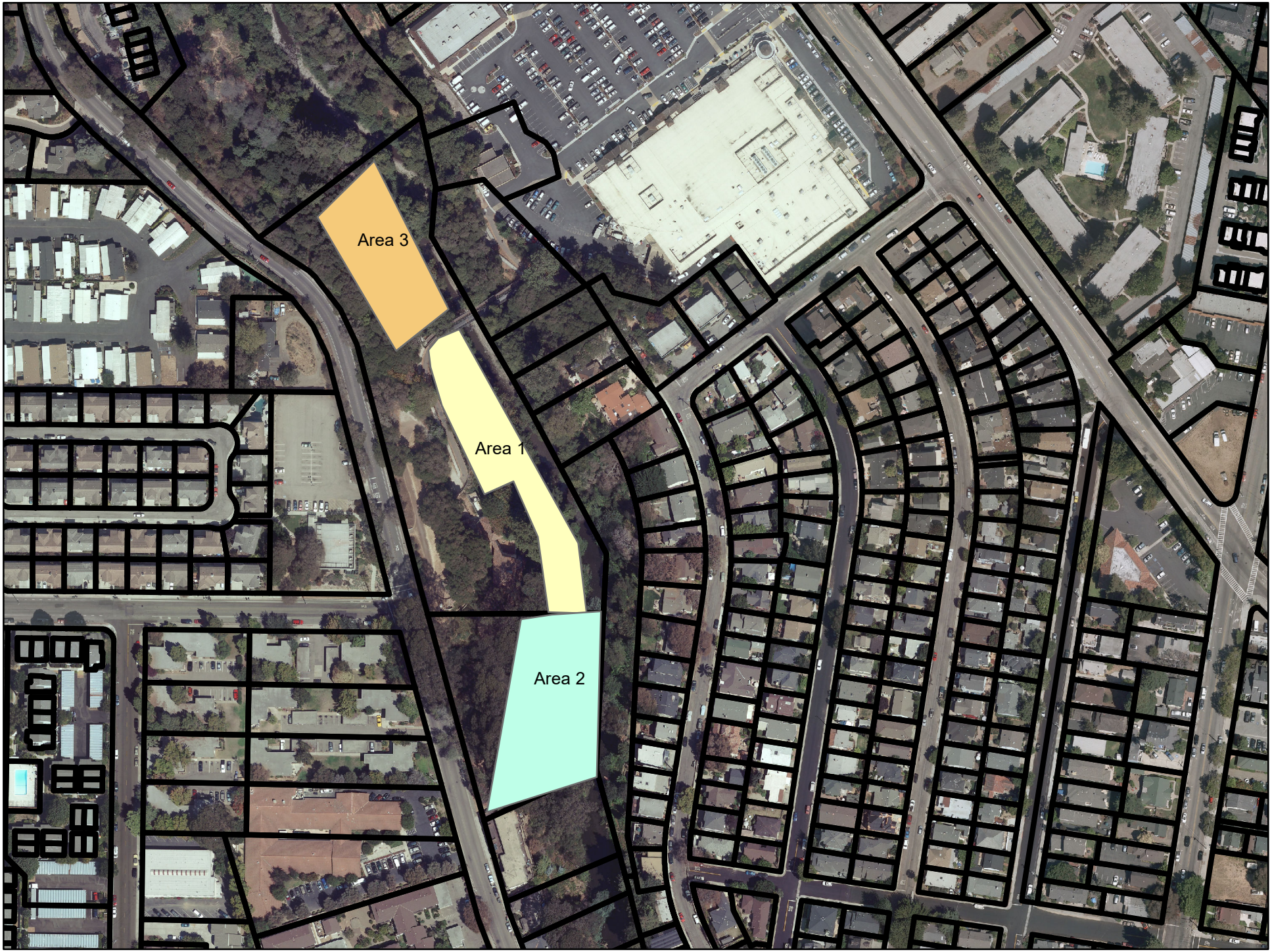
Suggestions and Discussion

There are areas where many or all of the issues would not apply. One area is between the 2 pathways above the bridge, at the border of Area 1 and Area 3. This area has excellent access and little sediment or erosion potential. This would allow for mechanized equipment and require limited basic erosion control. Additionally, there is a significant patch of native plant in the area.

A second area is most of the northern half of Area 3. This section has lower sediment and erosion potential and should require only basic erosion control practices. It is in the best environmental condition, partially due to the previous restoration work. It would be lowest cost and fastest area per unit to remove invasive plants or restore.

Finally, there are many patches of native plant species throughout the 3 areas. Some are located on less steep banks away from the creek where there is little potential for erosion and access is available. The invasive plant understory could be cleared from these patches, as well as a buffer zone around them (The Bradley Method). This would allow these patches to increase in size and potential spread.

Rispin Property - Riparian Areas



CITY OF CAPITOLA

BASEMAP

General Budget Estimates for the Rispin Riparian Areas Relating to Invasive Plant Species Control and Benefits

March 2021

By George McMenamin

To remove all of the key invasive plant understory species in the 3 target areas would require a commitment of 10 years or more for the initial removal and recovery. This timeframe would be required to practically eradicate these species without major environmental concerns, such as substantial erosion and sedimentation issues. It would also require a large revegetation effort with the associated water and maintenance issues. Additionally, the stream bench areas cannot realistically and practically be cleared of invasive plant species.
Therefore, these general budget estimates will be for 2 options, in each area. The numbers are based on work that could be done safely under limiting restrictions, within 3 years (an initial removal and 2 years after).

I have included what I estimate would be the minimum basic erosion requirement, as a cost. This basically consists of placing wattles at strategic locations. If some erosion costs were removed, the total cost for option 1 could be reduced by as much as $46,000 and the reduction for Option 2 could be as much as $33,000. These are not optimal solutions or likely sufficient steps for some areas but would be enough in other areas. As the stream terraces are practically off-limits for treatment, they represent the best existing option as a buffer zone for erosion and sediment prevention. The use of additional buffer zones may be an option. However, that would likely expand the work and cost beyond 3 years.

Option 1 assumes that all methods and sections that can be practically done within 1-3 years, will be done.
Option 2 assumes that only work that can be done under full restrictions and with limits on erosion and sediment potential.
I have provided the combined cost for treating the English Ivy growing in the trees, both separating (directly below) and within the estimates. This first step is the most critical. In the actual budget estimates, the $47,000 cost has been divided between the 3 areas.

The cost for treating the English Ivy growing in all the trees, in the 3 areas, would be $47,000.00. That would include $10,000 for a 2nd pass at the English ivy regrowth, in 100 trees, after 2 years.

Budget Estimates per Area- Option 1

Option 1 - Area 1

Estimated Total cost $232,000

Option 1 - Area 2

Estimated Total cost $120,000

Option 1 - Area 3

Estimated Total cost $179.000

Option 1 - Total costs for all 3 areas ~$540,000

Budget Estimates per Area- Option 2

Option 2 - Area 1

Estimated Total cost $91,000

Option 2 - Area 2

Estimated Total cost $106,000

Option 2 - Area 3

Estimated Total cost $85,000

Option 2 - Total costs for all 3 areas ~$290,000