SF Forest Alliance's ASKS on SNRAMP's EIR Certification February 16, 2017

Reject the certification of the EIR by the Planning Commission. Instruct the Planning Department to revise the EIR to address the insufficient and incorrect information. Require that Planning add the following mitigation measures to the EIR:

1. that the location(GPS coordinates), size, species, date and reason for removal be recorded for each tree removed in San Francisco. A public log of this data shall be available to compare tree removals approved under the Plan with actual removals. (According to RPD, there will only be about 14 tree removals per month.)

2. that additional mitigation measures be required to address the Plan's impact on greenhouse gas (GHG) emissions relative to San Francisco's 2008 Greenhouse Gas Ordinance and AB 32, California Global Warming Solutions Act of 2006. Planning will need to sort that out.

3. assuming the GHG mitigation requires replacement tree planting, that the location (GPS coordinates), size, species and date of replacement trees planted be recorded. Further, that the ongoing survival and growth of those trees be tracked. The data should be available to the public.

4. that the impact of parkland closures be studied and mitigation measures added to address these losses. Residents in S.E. San Francisco are particularly dependent on parks that are primarily Natural Areas.

5. that trail additions and trail closures be tracked in relation to the original trail system documented in the SNRAMP and that public maps documenting this be maintained.

6. that metrics for the success of the Project be defined and progress be systematically evaluated. If the Plan results in sustainable improvements to our Natural Areas, capital landscape renovations, maintenance costs and herbicide use will decline. Forest health will improve. Restored areas will survive on their own without substantial human intervention. If not, the program should be scaled back to reduce the environmental damage and shift the spending to programs that benefit the public.

7. that measures be devised to mitigate the reduction in off-leash dog play areas under the SNRAMP. The EIR recognizes the reductions in dog play areas at GGNRA and under the SNRAMP would result in a significant cumulative impact to recreational use. RPD and the drafters of the EIR have failed to define mitigation measures.

Require that the Recreation and Parks Department halt further implementation of the SNRAMP until the EIR is certified and necessary mitigation measures are documented and adopted.

To: San Francisco Board of Supervisors 2/13/17

From: San Francisco Forest Alliance
Dee Seligman, Interim President
Rupa Bose, Vice President
Tom Borden, Director

Subject: Appeal of the Certification of the EIR for the Significant Natural Resource Areas Management Plan
SF Planning Case number 2005.1912E

This document and its 8 appendices (A through H) comprise our full set of arguments and supporting evidence.

This appeal is not about whether you prefer trees or grass, whether you want to preserve and expand our historic native habitat or accept the changes caused by humans and nature. This appeal is about accountability and transparency. Does the EIR correctly identify the significant environmental impacts of the SNRAMP and have mitigation measures been put in place to minimize or eliminate those impacts?

The EIR for the SNRAMP is inaccurate and inadequate and biased. The poor quality information it provides is not sufficient to enable informed decisions about the Plan. The process used to bring the DEIR to certification violated CEQA and local regulations. Here are the issues.

1 Public access restrictions: The SNRAMP calls for us to surrender public access to 28% of our parkland. The Project applies to one third of our parkland. Public access will be restricted to on-trail only, or less than 5% of current access. Comments on the DEIR asked that this be addressed. The FEIR fails to respond to this.

2 Greenhouse gas release: The FEIR claims implementing the SNRAMP will result in reduced emissions of greenhouse gasses (GHG). Actually, the GHG releases that would result from Plan implementation are a Significant Environmental Effect that is hidden by the EIR. Carbon sequestration is dramatically miscalculated, equipment emissions are not included and methane and carbon dioxide emissions from decay of the destroyed trees are ignored.

3 Increase in herbicides: The SNRAMP is dependent on the use of herbicides. However, the FEIR claims there will be no increase in herbicide use with SNRAMP implementation. In other words, the SNRAMP does not require the use of herbicides. It is impossible for this to be correct. The "no increase in herbicide use" is an entirely new conclusion the DEIR did not present.

4 CEQA process violations: The process utilized by Planning violated CEQA, thereby preventing proper vetting of the EIR. External agencies and the public were never allowed to challenge major changes made to the DEIR, such as the nonsensical greenhouse gas analysis; the assertion of no increase in pesticide use; and the mitigation of acidic soils at Laguna Salada.

In addition, the Certification hearing involved multiple violations of the San Francisco Administrative Code.

5 Trail closures: The SNRAMP plans closure of 26% of our trails. In parks where the NAP has already implemented its "Trail Improvement Projects" over 50% of the trails have been closed. The EIR does not address this significant impact on public recreation.

6 Tree replacement: The EIR analysis of the Project's impacts on air quality, greenhouse gas emissions, aesthetics, wind and hydrology hinge on a false premise, that every tree removed in the project area would be replaced with a new tree somewhere in the Project area.

7 Implementation before Certification: The EIR claims the SNRAMP has not been implemented ahead of the EIR certification. This is false.

8 Cycling prohibition: The EIR claims, "The SNRAMP does not single out bicyclists as a concern and does not include actions directed specifically at bicycle use." This is false. The Plan prohibits bicycles in the program areas. This is contrary to our Transit First, Green Connections, ROSE, Children's Outdoor Bill of Rights and other policies.

9 Impact of fencing ignored: The NAP's implementation of the SNRAMP in advance of the EIR demonstrates that their use of fences will be much more extensive than what is disclosed in the SNRAMP. The EIR does not address this significant impact on public recreation and aesthetics.

10 Bias: Bias in the EIR is demonstrated by the inclusion of "alternate facts", such as the Mt Davidson bench removal and the Glen Canyon Miraloma trail closure.

1 Public Access Restrictions, On-Trail Use Only

The intent of the SNRAMP is to restrict public access to designated trails only. Not only does this mean closing social trails and other trails the planners find undesirable, it also means access will be limited to **on-trail use only**. Multiple commenters raised this issue. The Response To Comments (RTC) recognizes the comments, but it fails to address them. The fact that the Plan will deny public access to more than 95% of the Project area must be addressed.

The SNRAMP is a bit vague in expressing its intent. The drafters knew direct statements would draw direct fire from the public. Here is what is in the SNRAMP.

Recommendation GR-11C in the SNRAMP says, "Public use in all Natural Areas, unless otherwise specified, should encourage on-trail use." It goes on to say, "interpretive and park signs should be installed or modified as appropriate to include "Please Stay on Trails" and then, "If off-trail use continues in a particularly sensitive habitat (e.g., wetlands), permanent fencing shall be considered as a last resort once all other options, including enforcement, have failed."

Page 1-6 of the SNRAMP makes it clear that public use of MA-2 areas will be on-trail only.

"Relatively fewer use restrictions will be implemented within the MA-2 areas. In general, all passive recreational uses will be allowed in these areas as long as they include **on-trail use only** and leashed pets"

In the preceding paragraph on the same page it discusses MA-1 areas but does not mention on trail use only. Clearly, if the less sensitive MA-2 areas are on-trail only, the MA-1 areas will be on-trail only as well.

The SNRAMP does not call for on-trail use only in MA-3 areas, but only talks about closing social tails.

Action by the NAP since the SNRAMP was written confirms the actual intent is to restrict the public to on-trail use only in all Natural Areas, including MA-3. In early 2015, the NAP installed signs in virtually all of its Natural Areas requiring that users, "Stay on Designated Trails" threatening $100 fines via Park Code 3.02.

Please note, the installation of these signs is a clear violation of CEQA. The NAP is instituting new public access restrictions which are part of the SNRAMP in advance of its EIR certification.

The impact on the public is huge. Consider the Plan covers 836 acres of land in San Francisco. (SNRAMP page 43) Prior to the NAP's access restrictions, all of that was freely available to the public. Once the Plan is implemented, the public will be restricted

to 30.6 miles of trails. (SNRAMP page 52) Assuming the average usable width of a trail is 10 feet, the acreage available to the public under the Plan will be just 37 acres, or 4.5 percent of what we had.

Multiple commenters raised this issue and are quoted in Response To Comments (RTC). In one section after another, the RTC ducks this issue.

Response PD-6 "Opposition to the proposed public access restrictions" page 4-145
"The proposed project is a management plan for the current program area and does not create new Natural Areas **or restrict access to the existing Natural Areas,** *but instead focuses on enhancing native communities within existing Natural Areas."* This statement is incorrect. Clearly they are restricting access to existing Natural Areas.

Response G-5 "Impacts of Natural Areas access restrictions on social fabric of San Francisco" page 4-31 "These comments express concern that the SNRAMP would prohibit access to the Natural Areas" The response only talks about trails and ignores the fact the SNRAMP would restrict use to on-trail only.

Response RE-8 "Impacts resulting from restrictions on recreational access" page 4-323
This response is supposed to address denial of access. Commenters say that,
"A majority of land under NAP control citywide (57%) will have significant restrictions to access by all people (not just people with dogs); that is the amount of land designated as MA-1 and MA-2."

The response talks about on-leash dog walking and a designated trail system and then suddenly concludes,
"Therefore, the proposed project would not result in large-scale restrictions on recreational access."
Again, the drafters completely refuse to recognize the issue that the Plan will convert our parks from free use to on-trail use only.

RE-10 "Recreational analysis related to trails" page 4-330
This is supposed to address comments that call for the EIR to analyze the impacts of **confining recreation activities to trails**, as well as the closure of trails in Natural Areas. The response proceeds to discuss trails at length but never addresses the issue in bold above. They duck the question again. The response does not acknowledge the vast acreage that would be closed to the public due to on-trail use only.

The NAP controls the entire park in over half of the parks with natural areas (18 of 32 parks). In an additional 10 parks, NAP controls over 50% of the park. Only 4 of 32 parks with natural areas have less than 50% of their land controlled by NAP. So when NAP confines access to trails only, in 18 parks, that closure affects the entire park, not just a small portion of each park. People are losing access to their neighborhood parks.

It is important to note that parks in the underserved neighborhoods of S.E. San Francisco contain large percentages of Natural Areas. This is because we never spent money to develop those parks and just left the land as-is. Now this Plan intends to close those undeveloped parklands to public use. Half of McLaren Park, most of Bayview Hill and most of India Basin are Natural Areas. The residents can ill afford to lose the limited park resources available to them. **Implementing the access restrictions of the plan is a form of environmental racism, forcing already disadvantaged neighborhoods to carry a disproportionate burden of these access closures.**

The Children's Outdoor Bill of Rights adopted by the BOS in October 2013 http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/resolutions15/r0081-15.pdf includes the promise that our children will be able to, "Explore all the wild places in the City". Restricting children to on-trail use only in our natural areas flies in the face of this.

The EIR completely fails to address the issue of on-trail access only. The EIR claims Recreation is an Effect not found to be significant. (DEIR page 442) **This is an incorrect conclusion, reducing public access to only 5% of the Program area is a Significant Environmental Effect.**

2 Greenhouse Gas Release, an inconvenient truth

The EIR grossly miscalculates the greenhouse gas (GHG) releases that would be caused by implementation of the SNRAMP. Implementing the Plan would result in a significant release of GHGs, not a reduction as the EIR claims. In total, the vegetation change contemplated by the Plan would release 44,035 metric tons of CO2 and prevent the capture of 28,600 metric tons of CO2 that would otherwise occur. This is a net release of 72,635 metric tons of CO2. Actually, the situation is much worse since much of the carbon in the felled trees would actually be released as methane, a GHG with 34 times the Global Warming Potential of carbon dioxide.

Therefore the project conflicts with:

> San Francisco's 2008 Greenhouse Gas Ordinance, SF Environment Code Chapter 9, sections 900 to 908

and with

> California's goal of reducing GHG emissions set forth by the timetable established in AB 32 California Global Warming Solutions Act of 2006

The GHG release is automatically Significant since it conflicts with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The error in the IER comes from a variety of sources:

2.1 The EIR ignores that the Plan allows and does not count the cutting of 11,920 existing "saplings" in San Francisco.

2.2 The EIR assumes trees removed will be replaced on a 1 to 1 basis in the project area. This 1 to 1 replacement is not part of the SNRAMP.

2.3 The EIR claims to use an accepted calculation methodology, but instead makes up its own to reach a false conclusion.

2.4 The EIR misstates the forest management objectives of the SNRAMP.

2.5 The EIR assumes any replacement trees planted will be trees. Actually, shrubs and "grassland species" are suggested when replacing trees is discussed in the SNRAMP.

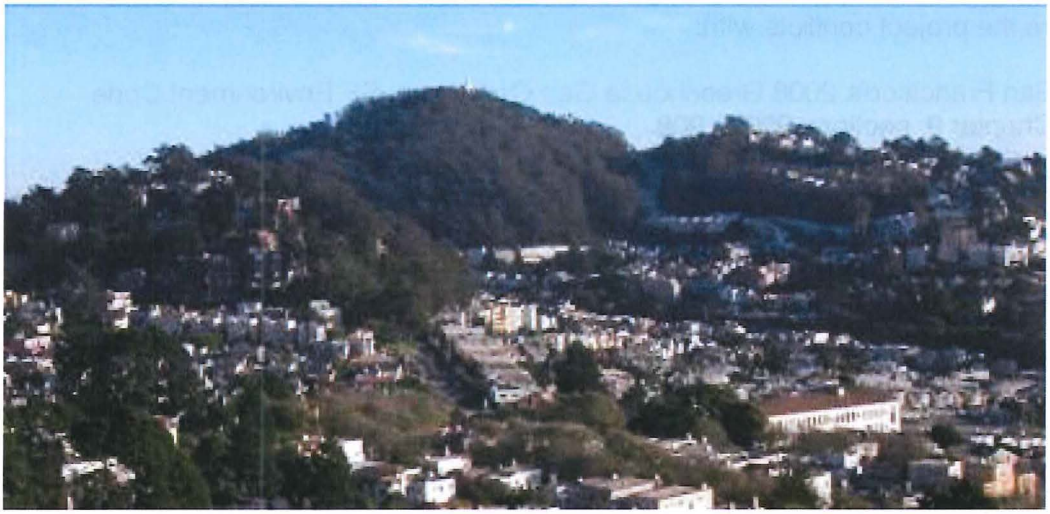
2.6 The EIR fails to account for the GHG emissions from vehicles and equipment used for the project.

2.7 The EIR does not account for the GHG releases that will result from the 60,000 cubic yards of organic material dredged from Laguna Salada to convert it from marshland to open water.

2.8 The EIR does not even mention methane. As the trees cut down under this plan decay, the carbon in them will be released in the form of carbon dioxide and as methane. Methane is much more damaging for our environment than carbon dioxide.

The San Francisco Forest Alliance engaged the services of the Quercus Group to provide expert opinion on the EIR GHG analysis. Please see Appendix A. That testimony validates our analysis and reveals additional shortcomings of the EIR analysis.

The idea that the landscapes envisioned in the SNRAMP will sequester more carbon than today's landscapes defies common sense. Compare early pictures of San Francisco with those of today. Where is all the carbon in those historical landscapes? You can see it in the large trees we have now. The SNRAMP is not taking the landscape back to 1790, but it is moving in that direction. Yet the RTC states, "the proposed project is expected to result in a net increase in carbon sequestration capacity within the Natural Areas in San Francisco. " (page 4-285) The land use conversion in Sharp Park, where 15,000 trees are to be cut down and replanted with grasses, is claimed to increase carbon sequestration. (page 4-301) This is crazy talk. Obviously the science cited in the EIR is being used incorrectly.

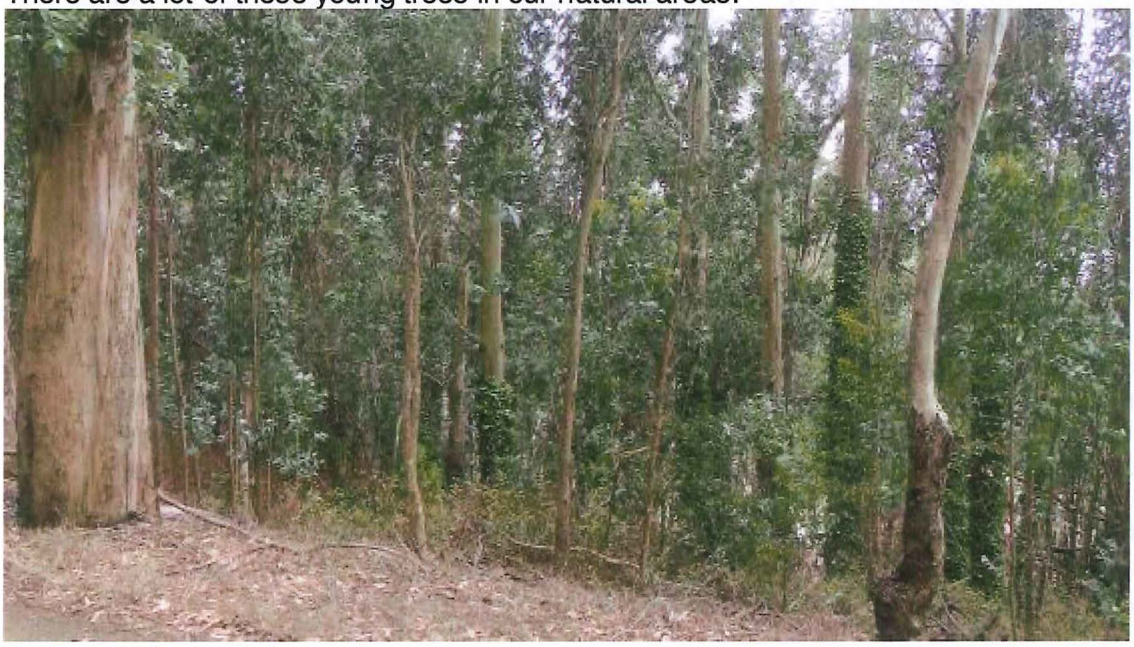


Mt Davidson today

Mt Davidson tomorrow?.... Which landscape holds more carbon?

2.1 Saplings

The SNRAMP defines a Tree as a tree having a dominant vertical trunk greater than 15 feet tall. Smaller trees are considered "Saplings". (DEIR page 92) The SNRAMP allows Saplings to be cut without any limitations or accounting. These small trees are what would normally regenerate our forests, replacing trees as they fall to age or disease. There are a lot of these young trees in our natural areas.



Forest in McLaren Park

A US Forest Service survey of San Francisco's urban forest cited in the EIR reports that 31.4% of trees in the City are 1 to 3 inches in diameter at breast height (DBH) and that

51.4% of trees are less than 6 inches DBH.[1] Monterey Pine and Monterey Cypress trees less than 3" DBH are typically short enough to qualify as saplings. Eucalyptus tend to be taller for the same trunk diameter. Perhaps an average Sapling cutoff would be 2.5" DBH. To get an idea of the scale of this issue, let's make a conservative assumption that half of trees 1" to 3" DBH are Saplings.

This means 15.7% of the trees are Saplings and 84.3% are Trees in terms of the SNRAMP.

Since the San Francisco Natural Areas contain 64000 Trees larger than Saplings, that means there are 75,920 total trees. Of this 15.7%, or 11,920 are saplings and 35.7%, or 27,100 are Trees less than 6" DBH.

The EIR talks of removing 3,448 non-native trees in San Francisco and replacing them with 3448 Coast live Oak or similar plantings. The additional 11,920 saplings they can remove are already established successful trees. These Monterey Pine, Monterey Cypress and Blue Gum Eucalyptus saplings would grow into much larger trees than the oaks.

The EIR is inadequate because it fails to address the allowed destruction of 11,290 young trees. The significance of these Saplings vastly outstrips that of the replacement trees the EIR says would be planted under the Plan.

It must also be pointed out NAP staff is allowed to cut Trees smaller than 6" diameter at breast height without involving the RPD arborist. There is no 30 day preposting requirement for these trees and no record of the cutting is required. This is a major accountability issue that puts 27,100 trees at risk. This must be addressed. **There must be a mitigation measure that requires record keeping of all tree cutting.** This should also include trees killed by girdling or by chemical means such as Drilling, Frilling, & Basal Bark treatments. Given the plan calls for cutting 3,448 trees over a 20 year period in San Francisco, this would not be an onerous task. It is about 14 trees per month.

2.2 Trees 1:1 Replacement

The DEIR states the SNRAMP institutes a 1:1 tree replacement policy, that every tree removed in the project area would be replaced with a new tree somewhere in the project area. This is a false premise. No such commitment appears in the SNRAMP. Nor is there any section of San Francisco Code that would require the RPD Natural Areas Program to plant a new tree for every one they remove. The EIR cites no documented public policy to support this assertion, yet it makes the claim over and over again:

The DEIR (pages 92, 456, 484, 514) states that, "Trees removed in the Natural Areas in San Francisco would be replaced at a one-to-one ratio, although not necessarily in the same location." This commitment does not appear in the SNRAMP.

The DEIR (page 408) says, "The total number of trees would not change within the Natural Areas of San Francisco". This does not appear in the SNRAMP.

---

[1] Nowak "Assessing urban forest effects and values, San Francisco's urban forest" U.S. Department of Agriculture, Forest Service Northern Research Station 2007

The DEIR (page 92) says, "Invasive trees removed in San Francisco would be replaced with native tree species at a ratio of roughly one-to-one, although not necessarily at the same location or within the same Natural Area." This does not appear in the SNRAMP.

The CEQA process for the Beach Chalet Fields, Planning Case 2010.0016E revealed that SFRPD has no policy or ordinance requiring 1:1 tree replacement. See the RTC Page X.L-41. As a result, a mitigation measure was added to that EIR.

Mitigation Measure M-BI-3
The San Francisco Recreation and Park Department (SFRPD) shall replace the trees removed within SFRPD-managed lands with trees of equivalent ecological value (i.e., similar species providing the same general microhabitat characteristics for wildlife species) to the trees removed. If trees of equivalent ecological value are not feasible or available, removed trees shall be replaced at a ratio of 1 inch for 1 inch of the diameter at breast height of the removed tree. SFRPD shall monitor tree replacement plantings annually for a minimum of three years after completion of construction to ensure establishment of the plantings and, if necessary, shall replant to ensure the success of the replacement plantings.

Why would the SNRAMP EIR, where the scale of tree removal dwarfs that of the Beach Chalet Fields, be considered adequate when it does not include a mitigation measure to insure tree replacements are carried out?

The Plan cannot be properly executed unless an accounting system is put in place to track these things. RPD tree removal and planting records are almost non-existent. Only the Urban Forestry group within RPD operations keeps any records at all. They do not know what they cut or where and they do not know what they planted or where. The NAP keeps no records of tree cutting or tree planting. The following was asked of RPD as a Sunshine request, "RPD must have a record keeping system to track trees that have been removed and trees that have been planted. I would like RPD to provide a copy of tree removal and tree planting records for the past 5 years." The only record provided is shown below.

Tree count July 2015 to Dec 2015

Pruned	Removed	Planted	Vandalized or Stolen	
27	10	27	1	July 15
12	12	17	6	August 15
45	18	24	0	September 15
22	18	30	0	October 15
27	21	15	0	November 15
49	11	21	0	December 15
Total- 182	Total- 90	Total- 134	Total-7	

RPD has no system to track the survival of trees planted. This is true of the Urban Forestry group and the NAP.

A requirement to plant replacement trees in the Natural Areas must be added as a mitigation measure in the EIR. The measure needs to include a recording system to

track the size, type, location, date and health of trees removed. At the same time it should track the size, type, location and date of trees planted. Planted trees should be monitored annually to assess survival/growth versus species and location. Failed trees must be replaced.

Even if the SNRAMP contained language requiring 1:1 tree replacement within the Project area, the Project area is so large that concentrated tree removal in one area with its trees replaced in another area across town, could produce severe results. The southeast part of the City contains a concentration of disadvantaged neighborhoods. It also contains parks with large Natural Areas like McLaren and Bayview Hill. Removing a large quantity of trees from these parks will reduce air quality. **This is an environmental justice issue which should have been considered under CEQA. It was not.**

2.3 Calculation Methodology

The RTC purports to use the calculation methodology incorporated into the "California Emission Estimator Model" (CalEEMod). However, this is not the case. Instead, the authors have made up their own method based on carbon accumulation rates that fails to account for the carbon released from the trees destroyed. At the December 15 Certification hearing, Planning staff explained this debate over the calculation method as a "disagreement of experts". This is not a scientific debate, this is grade school math. The RTC says 2+2= -1. The CalEEMod calculation says 2+2=4. The numbers in the EIR are intentionally miscalculated.

Please note. There is a troubling lack of transparency in the RTC figures. Final numbers are presented, but not the calculations. For this section of the RTC to be credible, the basis for the numbers should have been revealed. A copy of a February 19, 2013 technical memorandum, "Sequestration Study of Greenhouse Gases for SNRAMP" prepared by Chris Sanchez of Environmental Science Associates was obtained from the Planning Department. This document is clearly the source of the misleading calculations but it is not referenced in the RTC. See Appendix B.

The CalEEMod program the EIR refers to was developed to address this situation. Unfortunately, it is an outdated program. The methodology it uses is out of touch with current scientific thought. It assumes all carbon in the removed trees will be released as carbon dioxide. It does not account for the methane release from decomposing trees. Further, it assumes trees stop sequestering carbon at age 20. Actually, trees continue to grow and sequester carbon for 100 years or more. See the Quercus Group document, Appendix A.

CalEEMod grossly underestimates the environmental damage from cutting down trees. However, even using the output for CalEEMod was not enough to produce positive results for the SNRAMP. Let's look more closely for the sleight of hand. A copy of the "CalEEMod User Guide, Calculation Details" is attached as Appendix C. It clearly shows how land use changes, such as those proposed by the SNRAMP, should be evaluated. The EIR refers to the method, but does not follow it.

RTC Response GG-1 "Greenhouse Gas Emissions" page 4-297
The EIR makes the argument that once trees reach the age of 20 years they cease to sequester more net carbon. The EIR stops here and uses this, and a HortScience report that 90% of the trees in our natural areas are over 20 years old, to say that 90% of the

trees can be removed without any effect on GHG calculations. (see Appendix B) Rather than look at the net release of GHG caused by the project (as is the accepted practice used in CalEEMod), they look at carbon sequestration rate, MT/yr, that would occur in year 20 of the plan. On page 4-298, they say, "CalEEMod calculates GHG emissions based solely on sequestration rates and not based on release of stored carbon". This is completely incorrect. CalEEMod, calculates the total change in stored carbon in converting one landscape type to another. The carbon released from destroyed vegetation is a main factor. See the user guide in Appendix C.

The tree age cited by HortScience is far out of step with reality. For instance, in McLaren Park there are many young trees regenerating the forest. This looks more like the distribution of tree sizes described in the Nowak report cited in footnote 1. See additional forest images in D.

As an example, consider Table 19B on RTC page 4-301. This relates to plans to clear cut 56 acres of forest in Sharp Park and replace it with grassland and scrub. For Grassland plantings it presents "annual sequestration gain (year 20) of 241 MT CO2/yr. Where does that come from? The EIR says, "Replacement vegetation was assigned a grassland sequestration rate as provided by CalEEMod." That CalEEMod "rate" is not a rate as in MT/yr. It is the amount of CO2 storage in an acre of mature grassland, 4.31MT CO2/acre. See page 46 of the CalEEMod user guide in Appendix C. The EIR multiplies this times 56 acres. This should give a value of 241 MT of CO2 but instead they declare it to be an ongoing capture rate 241 MT of CO2 per year. This is wrong. They are mixing apples and oranges.

Going back to the accepted methodology contained in CalEEMod. It assumes trees increase in stored carbon for 20 years and then hold a fixed amount of carbon from then on. Fast growing trees have a higher sequestration rate and end up with more carbon at the end of the 20 year growing period. Existing forest land could be 500 years old and still sequester the same amount of carbon per acre because new trees grow to replace the old ones that die. Similarly, grasslands are assumed to reach a static amount of stored carbon per acre. See the explanatory pages from the CalEEMod User Guide, Calculation Details attached as Appendix C.

The CalEEMod calculation is very straightforward. The calculation is simply to compare the carbon stored in the current landscape to how much the new landscape will accumulate in 20 years.

Consider the 56 acres of forest in Sharp Park that is to be converted from forest into grassland. The values used in the CalEEMod calculation are 111 MT CO2/ acre for forest and 4.31 MT CO2/ acre for grassland. The net emission of GHG due to this part of the SNRAMP would be:

Forest removed		new grassland	
56 x 111	-	56 x 4.31	
6,216	- 241	=	5,975 metric tons of CO2 released

This is a number for an average forest. It is based on trees with a sequestration rate of 0.035 MT CO2/year and a tree density of about 158 trees /acre. However blue gum eucalyptus is not average. According to the SNRAMP (page 3-11), blue gum eucalyptus "is one of the fastest growing trees in the world". A growth rate for eucalyptus is not published in the CalEEMod. Fortunately, the ESA technical memorandum prepared for the EIR, "Sequestration Study of Greenhouse Gases for SNRAMP" does provide a value, 0.12 MT/year/tree. (see page 5 of the memo) Note this sequestration rate is 3.4 times higher than the average CalEEMod tree species.

We can redo the calculation using the information specific to eucalyptus. 15,000 trees will be removed from the 56 acres in Sharp Park, that essentially all are Eucalyptus and (supposedly) most at least 20 years old.(see page 5 of the memo) So, the stored carbon in the trees that would be removed is:

15,000 X 0.12 X 20 = 36,000 MT

This means that the SNRAMP activity in Sharp Park would produce a net release of 36,000 – 241 = 35760 MT of CO2. This does not even include the emissions from the vehicles and equipment used for the logging and for the replanting. Nor does it include the emissions from the wetlands restoration part of the project.

Consider the 3448 Trees the Plan contemplates removing in San Francisco. (RTC page 5-44) According to the RTC these are predominantly blue gum eucalyptus. Over the standardized 20 year growth period, the trees would have stored

3,448 x 20 x 0.12 = 8,275 MT CO2

All of this would be released under the SNRAMP.

Finally, consider the existing 11,920 saplings the SNRAMP would allow to be removed in San Francisco. Were they allowed to grow, they would sequester:

11,920 x 20 x 0.12 = 28,600 MT CO2

In total, the vegetation change contemplated by the Plan would release 44,035 metric tons of CO2 and prevent the capture of 28,600 metric tons of CO2 that would otherwise occur. This is a net loss of 72,635 metric tons of CO2

sequestration. In reality, the situation is much worse because a large portion of the carbon in the trees will actually be released as methane.

If a mitigation measure is added to require 1:1 tree replacement and the replacement trees are coast live oaks we can calculate the outcome. No growth rate is published in the CalEEMod for these trees either. The EIR chooses to classify them as having a medium growth rate. Using the average accumulation rate from CalEEMod, 0.0354 MT CO2/yr replacement trees, if actually planted, would hold:

3,448 x 20 x .0354 = 2,441 MT CO2

The net loss of carbon sequestration caused by the plan, even if there were replacement trees, would be 70,195 MT of CO2. This is a Significant Environmental Effect the EIR fails to reveal. Please keep in mind, this is a very understated analysis. It assumes trees only capture carbon for 20 years and only release carbon dioxide as they decompose.

2.4 Forest Management Objectives

The RTC misstates the forest management objectives of the SNRAMP. Pages 4-284 to 4-285 say,
"because the proposed project would replace primarily dead, dying, and diseased trees that have limited capability to sequester carbon or other pollutants for that matter, with young saplings that have long-term carbon sequestration capabilities, the proposed project is expected to result in a net increase in carbon sequestration capacity within the Natural Areas in San Francisco."

This is not true, trees to be removed under the SNRAMP are not selected based on health, but rather to remove trees in specific areas to open up those areas to promote grasslands. This is a fundamental intent of the SNRAMP. The DEIR page 456 states,

"Further, most of the trees within the Natural Areas are nonnative and most are also invasive. The invasive forests within the Natural Areas are predominantly eucalyptus, although cypress, pine, and acacia also occur (SFRPD 2006). The long term goal in MA1 and MA2 is to slowly convert those areas to native scrub, grassland habitats, or oak woodlands."

For another example, consider the map of central McLaren Park below. Additional maps are presented in Appendix D. These maps were obtained from the Natural Areas Program by Sunshine requests. They show specific locations for tree removal under the SNRAMP and were the basis for the tree removal numbers presented in the Plan. You can see this is not about culling unhealthy trees. It is about clearing trees from specific areas.

These trees are not selected because they are unhealthy or unsafe. In fact, the Program has a strong incentive to remove the largest healthiest trees to get the most bang for the buck from the allowed number of tree removals. Dead, dying and diseased trees can be removed later on the basis of public safety without being counted under the Program. This public safety excuse has been well used by the NAP to justify tree fellings to date.

The forest management statement in the EIR is not only incorrect, it is a purposeful misstatement of fact.

EIP ASSOCIATES

Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1 Foot Resolution - 2001: City of San Francisco Department of Public Works, San Francisco; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 30, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science (SFSUIGIS).

N

2.5 Tree Definition for Replacement

For what tree replacement does take place, the SNRAMP makes no commitment what will be planted. The SNRAMP and the EIR suggest the new trees to be planted will be coast live oak, California laurel, California wax myrtle and dwarf California buckeye. (RTC page 4-464) Many of the NAP areas did not historically sustain these trees. Even in favorable locations, only a small percentage may ever grow tall enough to escape Sapling status. If we apply the same definition for tree replacement as for tree removal, they may not even qualify as Trees.

The DEIR page189-190 shows that any replacement trees contemplated would not necessarily be trees at all:
"Although the removal of invasive trees would be noticeable, the trees in the San Francisco Natural Areas would be replaced with either native trees or other native vegetation, such as native scrub or grassland species....in some locations, trees would be replaced by native scrub or grassland species..."

Will this "tree"

replace this tree killed by NAP supporters?

Again, a mitigation measure similar to the one put in place for the Beach Chalet Fields should be required. Obviously, the intent of the SNRAMP is to remove certain types of trees. Any replacements would be native trees of a different ecological value. However, the latter two requirements should still apply, that the size of the trees be comparable and that the establishment of the plantings be monitored. Unfortunately, given the restriction imposed by the SNRAMP, that new trees be native trees, the new trees will never grow to comparable size. This can be compensated for by planting multiple native trees for each tree removed. A 3:1 ratio should be required. Such requirements are much more critical for this EIR given the vast quantity of trees at stake.

2.6 Equipment Emissions

The EIR fails to account for the GHG emissions from vehicles and equipment used for tree felling, limbing, chipping, hauling, fence installation, watering, grading etc. associated with implementation. Neither does it account for transportation and equipment emissions associated with ongoing maintenance operations such as weeding, pesticide application, sapling cutting and replanting. Given the number of trees to be removed and the 32 far-flung worksites, these emissions would be significant. The only equipment GHG emissions accounted for by the EIR is for the Sharp Park Wetland Restoration Project. The equipment emissions for all of the other program operations would vastly outstrip this and are not accounted for. See page 4-302 of the RTC.

2.7 Wetland Dredging

The SNRAMP calls for dredging 60,000 cubic yards of mixed mineral/organic material from wetlands at Sharp Park. The EIR does not account for the GHG that will be released when this material is brought to the surface and allowed to decompose.

2.8 Methane

The EIR does not even mention methane. As the trees cut down under this plan decay, the carbon in them will be released in the form of carbon dioxide and as methane. Methane is much more damaging to our environment than carbon dioxide. It has 34 times the Global Warming Potential of carbon dioxide. This EIR cannot be considered adequate when methane release is completely unquantified.

3 Herbicide Use

The RTC page 4-538 says,
"The amount and frequency of pesticide applications as a result of implementation of the SNRAMP would be similar to what currently occurs within the NAP areas and what has occurred over the past 10 years." In other words, implementation of the Plan will not require pesticide use beyond what is already occurring.

Please note, herbicides are considered a type of pesticide.

Supposedly, the Plan has not commenced. The November 2, 2016 report by the Department of Environment Integrated Pest Management Group, "City and County of San Francisco Agency Responses to the 2016 Request for Information on Future Herbicide Reduction" shows the NAP is the largest user of Tier 1, Most Hazardous, herbicides in RPD.

The Plan calls for a large number of Trees to be cut down. The stumps of all of those will be treated with Tier 1 herbicide to prevent resprouting. This is a new activity requiring pesticide use. When the SNRAMP commences, a large number of Saplings are to be removed during forest thinning, forest removal and in less forested MA-1 and MA-2 areas. All of these stumps will be treated with herbicide to prevent resprouting. This is a new activity requiring pesticide use. When the SNRAMP commences, grasslands will be expanded by removing non-native scrub. This is a new activity that will require herbicide use. All of these new activities will clearly increase pesticide use. The statement in the EIR above cannot be correct.

4 CEQA process violations

In addition to failings of the EIR itself, the process for EIR certification was unlawful. The SF Planning Department and Commission violated sections of the California Environmental Quality Act and of the San Francisco Administrative Code. This regards the process used to move the EIR for the RPD Significant Natural Resource Areas Management Plan from its draft form to certification by the Planning Commission. The most egregious violation is the failure of Planning to recirculate the EIR for comments and responses (Consultation) following the addition of significant new information to the EIR after the close of public comment on the DEIR. This is required by CEQA:

CEQA § 21092.1. ADDITION OF NEW INFORMATION; NOTICE AND CONSULTATION

When significant new information is added to an environmental impact report after notice has been given pursuant to Section 21092 and consultation has occurred pursuant to Sections 21104 and 21153, but prior to certification, the public agency shall give notice again pursuant to Section 21092, and consult again pursuant to Sections 21104 and 21153 before certifying the environmental impact report.

The August 2011 DEIR contained no quantitative analysis of greenhouse gas (GHG) emissions that would result from SNRAMP implementation, other than equipment emissions from the Sharp Park wetlands project. Otherwise, it contained nothing but hand waving arguments. (Grasslands reflect more sunlight than forests in regions where there is snow on the ground for many months of the year.) This was roundly criticized during the comment period for the DEIR.

The November 2016 Response to Comments contains entirely new information regarding GHG emissions. (pages 5-41 to 5-45) Most of the old DEIR arguments were removed. Completely new analysis was added based on newly cited practices and newly generated data. The new information purports to demonstrate that Plan implementation will result in a net reduction in GHG emissions. It is important to vet this seemingly impossible outcome since Plan implementation will obviouosly produce extensive GHG emissions resulting in a Significant Environmental Impact.

After adding this new information to the EIR, Planning did not circulate the EIR for Consultation as required by 21092.1 above. Done correctly, Planning would have made the amended EIR available for public review. They would have accepted public and agency comments and then created a new Response To Comments (RTC). The new RTC would have addressed concerns over the validity of the new information.

Other significant new information was added to the EIR following the close of consultation. One was the new conclusion that Plan implementation will not require an increase in pesticide use over current levels. See RTC page 5-40 A huge new section was added regarding mitigation measures to deal with acidic soils at Laguna Salada in Sharp Park. See RTC pages 5-4 to 5-8.

Other code violations by Planning in the execution of this process include:

San Francisco 67.15 (b) Every agenda for special meetings at which action is proposed to be taken on an item shall provide an opportunity for each member of the public to directly address the body concerning that item prior to action thereupon.

The certification hearing for the RPD SNRAMP EIR was held on December 15, 2016. The agenda for the hearing can also be found at:
http://sf-planning.org/meeting/planning-commission-december-15-2016-agenda

The Planning Commission combined its certification hearing of the EIR with the Rec and Park Commission hearing on adoption of the SNRAMP. The hearing contained two agenda items, strangely noted as 1a and 1b. These are two entirely different decisions, made by two different commissions based on two different sets of input information. The Planning Commission action is to assess the technical conformance of the EIR to CEQA regulations and if it is acceptable, to certify it. The Rec and Park Commission is to consider the information contained in the certified EIR and decide whether or not to adopt the Plan in light of its environmental impacts. Despite this, they held the meeting as if only one item was on the agenda. All testimony by Planning and RPD was given, followed by all public testimony on both decisions. When all that was completed, the Planning Commission voted to certify the EIR and the Rec Park Commission voted to adopt the plan. All of the public testimony was mixed together randomly. It lasted for about 5 hours. About 10% of the comments were directed to EIR certification. Members of the public were only allowed to testify once.

There are two 67.15 (b) issues here.

1) This way of conducting the hearing is legalistically in compliance with 67.17 (b). However, it circumvents the intent of the Code. The Planning Commission should have heard testimony on the EIR and made their decision on certification. Then the Rec Park Commission should have heard testimony on the SNRAMP and made their decision on adoption of the SNRAMP. We asked the Planning Commission if they would at least separate the testimonies on the EIR from testimonies on the SNRAMP. They said they chose not to. The effect was to fragment and dilute public testimony on the EIR. The public's ability to convey information to the Planning Commission was stifled as a result.

2) Members of the public were only allowed to speak once. There were two distinct agenda items at the hearing. Numbering them as 1a and 1b does not erase that fact. If you choose to speak on the EIR and then you could not speak on the SNRAMP. They will say people could have split their time in half and spoke a little bit about both. Doing that would have diluted their messages and made them less intelligible.

San Francisco 31.15 (d) When the final EIR has been prepared and in the judgment of the Planning Commission it is adequate, accurate and objective, reflecting the independent judgment and analysis of the Planning Commission, the Planning Commission shall certify its completion in compliance with CEQA. The notice of the Planning Commission hearing on the certification of the final EIR shall inform the public of its appeal rights to the Board of Supervisors with respect to the final EIR within the time frame specified in Section 31.16 of this Chapter. The certification of completion shall contain a finding as to whether the project as proposed will, or will not, have a significant effect on the environment.

The certification of the EIR is supposed to be an unbiased technical decision by the Planning Commission. Is the EIR "adequate, accurate and objective, sufficient as an informational document, correct in its conclusions, and reflects the independent judgment and analysis of the Planning Commission". The Planning Commission chose to structure the hearing to immerse themselves in testimony for and against the SNRAMP before making their certification decision. 90% of the testimony they heard

was of this sort. Why would this be relevant if they are trying to make an unbiased decision on the technical merits of the EIR? Clearly, they see the certification decision as a political one, biased by other factors than those they are supposed to be considering.

San Francisco 31.15 (d) ...The notice of the Planning Commission hearing on the certification of the final EIR shall inform the public of its appeal rights to the Board of Supervisors with respect to the final EIR within the time frame specified in Section 31.16 of this Chapter....

The Administrative Code requires that the hearing notice inform the public of its rights to appeal the certification. The notice did not contain the required information.

San Francisco 67.7 (g) Each policy body shall ensure that notices and agendas for regular and special meetings shall include the following notice: KNOW YOUR RIGHTS UNDER THE SUNSHINE ORDINANCE
(Chapter 67 of the San Francisco Administrative Code)
The notice for the hearing did not include this required information.

Based on these procedural issues alone, the certification of the EIR should be rescinded and Planning required to recirculate the EIR for Consultation. Once the new RTC is completed, the Planning Commission must conduct the certification process in compliance with CEQA and our local ordinances.

5 The SNRAMP does not disclose the full extent of planned trail closures and so the EIR is not evaluating the correct Plan.

The SNRAMP does not accurately reflect the extent of trail closures actually planned by the NAP. In most of the parks where the NAP has violated CEQA and moved forward with implementation of the SNRAMP, trail closures have been more extensive than disclosed in the SNRAMP. The table below compares the footage of trails to be closed under the SNRAMP versus what has actually been closed.

	Trails Existing per SNRAMP	Trails to be closed per SNRAMP	Trails additional actually closed	Trails actually remaining	Trails Percent closure per SNRAMP	Trails percent closure actual
Glen Canyon	23251	3173	5515	14563	14%	37%
Bayview	4610	1752	1607	1251	38%	73%
Twin Peaks	9400	2779	3736	2885	30%	69%
Billy Goat Hill	2660	598	1412	650	22%	76%
Hawk Hill	1639	702	937	0	43%	100%
Grandview	1893	239	627	1027	13%	46%
Corona Heights	6230	1589	1896	2745	26%	56%
total	49683	10832	15730	23121	22%	**53%**

Note, there is a discrepancy in the Bayview Hill numbers. The SNRAMP includes the length of the road. This is not in the Plan area. It has been removed from the numbers above.

So, the Natural Areas Program has been closing about 2.5 times the amount of trails than what is disclosed in the SNRAMP. The EIR cannot be valid because it is not evaluating the actual plan of the Natural Areas Program.

See Appendix F for more detailed information on the trail closures to date.

6 Tree Replacement

We noted in section 2.2 the DEIR and the RTC make the unwarranted assumption that removed trees will be replaced, that the replacement will be on a 1:1 basis, that the replacements will be trees and that the replacement trees will be planted in the project area. These assertions are not supported by any language in the SNRAMP.

This is not just a critical issue for greenhouse gas emissions. A reduction in the number and size of trees in the project area also impacts air quality, aesthetics, wind and hydrology. All of the following sections of the DEIR and RTC hinge on the tree replacement premise.

DEIR

III.E.5	Management Practices
Impact LU-7:	Implementation of programmatic projects under the SNRAMP would not have a substantial impact upon the existing character of the vicinity. (Less than Significant)
Impact AE-1:	Implementation of programmatic projects under the SNRAMP would not have a substantial adverse effect on a scenic vista. (Less than Significant)
Impact WS-1:	Implementation of the programmatic projects under the SNRAMP would not result in significant ground-level wind hazards and windthrow risks. (Less than Significant)
Impact BI-2:	The SNRAMP and implementation of programmatic projects under the SNRAMP would have a substantial adverse effect on special status bird species. (Less than Significant with Mitigation)
Impact AF-4:	Implementation of the programmatic projects under the SNRAMP would not have a substantial adverse effect on the loss or conversion of farmland or forest land. (Less than Significant)
VII.B.2 Impacts	Wind and Shadow
VII.B.2 Impacts	Hydrology and Water Quality
VII.D.2 Impacts	Wind and Shadow

RTC

Response PD-3	General opposition to the project
Response PD-34	Elimination of 18,000 trees
Response LU-4	Applicability of San Francisco Urban Forestry and Landmark Tree Ordinances
Response AE-1	Aesthetics [AE]
Response CP-8	Impacts of tree removal on historic Mount Davidson Area
Response CP-9	Inadequate/Incomplete HRER for Mount Davidson

Response AQ-1	Increased pollution from tree removal activities
Response BI-12	Tree removal at Mount Davidson
Response BI-30	Impacts related to the removal of nonnative trees and invasive vegetation
Response BI-33	SNRAMP proposals for tree replacement
5.A.3 Chapter III:	Project Description
5.A.12 Chapter VI:	Other CEQA Issues
5.B.3 Section V.B:	Project Description

A mitigation measure must be put in place to record data on the trees removed, trees planted and the survival of the planted trees.

7 Implementation before Certification

The NAP has been flagrantly violating CEQA, moving forward with the Program before EIR certification. The EIR denies this, despite the many examples.

RTC Response G-3 page 4-20 With respect to bond monies spent in various parks says,
"It is possible that some of these monies could be used for management actions and improvements proposed under the SNRAMP, but no physical improvements could be accomplished unless and until this EIR is certified by the Planning Commission."
It goes on to say the NAP "provided fencing for public safety" as part of the Glen Canyon Restoration Project. In fact, only a small percentage of the fence installed on that project was for public safety. The remainder was for public access control. The EIR does not mention the extensive trail closures implemented under that project.

In 2002 the Board of Supervisors issued resolution 653-02 requiring the RPD halt implementation of the Natural Areas Plan until a final plan was approved. That plan is the subject of the EIR before you. The resolution clearly defines the difference between implementing the plan versus a holding pattern for the Natural Areas Program.
FURTHER RESOLVED, That until the Natural Areas Management Plan is completed and approved by the Board of Supervisors, the Natural Areas Program may continue to preserve and maintain genuine remnants of San Francisco's native flora and fauna so long as those activities do not include:
Removal of healthy trees that pose no safety hazards
Trail closures, or restrictions on access and recreation
Trapping and removal of wild or feral animals currently inhabiting parks and lakes
Expansion of activities into areas that no longer support predominantly native flora and fauna

We have clear information from CEQA and additional guidance from the Board of Supervisors about what amounts to plan implementation prior to EIR certification. **RPD has been violating CEQA and the BOS resolution**. Violations include the following:

-Closure of trails
-Installation of public access control fences
-Installation of signs restricting the public to "designated" trails making it illegal for park goers to use "un-designated" trails and making off-trail use illegal.
-Installation of signs prohibiting people from riding bicycles, or even walking bicycles into Plan management areas.
-Removal of healthy trees.

-Establishing new native plant gardens in areas that no longer supported predominantly native flora.

Below is a detailed listing of these violations:

Citywide

- Signs have been placed in almost all parkland managed by the NAP that say, "Stay on Designated Trails. No Bicycles."

Glen Canyon Park

- The NAP closed 8,688 feet of trails since 2006.
- Extensive fencing intended to discourage public access was erected at many locations in the park. The SNRAMP EIR claims RPD "provided fencing for public safety" when in fact only about 153 feet of fence was installed for public safety. The remaining 680 feet of split rail fence was installed purely for public access control.
- a fenced native plant garden was added in SNRAMP zone MA-3b that did not previously support predominantly native flora. The SNRAMP criteria for MA-3 areas includes the "absence (current or historic) of sensitive plants"

Mt. Davidson

- As part of the Mt. Davidson Seismic Tank upgrade by the SFPUC in 2008, the NAP insisted that the water pipeline from the Stanford Heights Reservoir to the tank on Mt. Davidson be relocated from its existing location among shrubs and grass to the forested area. This required clear cutting a swath of healthy trees up the face of the mountain.
- In about January 2014 the trail below the lower saddle viewing area on the east side of the park was blocked off with felled trees and limbs. More trees and limbs have been added since.
- In October 2015 the trail that runs north from the cross down to the open plateau and rocky knoll was blocked off with felled trees and limbs. This is a historic WPA trail with extensive stone work. One staircase was stuffed full of tree limbs. In the summer of 2016, in the same area, two staircases constructed with wood treads were ripped out. The steel spikes that had held the treads were left protruding from the ground.

McLaren Park

- Multiple trails have been closed in the area south of Mansell and west of Visitacion.
- Fencing was installed at the Visitacion overlook parking area to prevent people from walking out onto the knoll above Visitacion Valley.
- The trail that runs along twin water tanks fence line was closed.
- Native plantings were extended into areas that did not support predominantly native flora and fauna under the McLaren Park Connector Trail Project. Plantings were established at the Persia, Campbell and Visitacion entrances. The Persia and Campbell sites are classed MA-3, "absence (current or historic) of sensitive plants". The project plan for the Persia site indicates a large healthy tree at the south end of the project site is to remain. That tree has disappeared. The fencing for the Campbell site blocked the trail running north from the sidewalk intersection. That was subsequently removed by the public. The Visitacion site is classed MA-2, still not an area that "supports predominantly native flora". The project plan for the Visitacion site indicates 2 healthy trees at the SW corner of the project. One of them went missing.
- Based on numbered stumps, one hundred trees were cut in the summer of 2014 in conjunction with the Visitacion trail restoration project. The 2012 HortScience McLaren Park Tree Risk Assessment report only identified 26 trees in the project area that should have been removed.

Pine Lake
- Fencing has been erected around the lake to limit public access.

Twin Peaks
- The NAP has active plans to close trails on Twin Peaks under the Figure 8 project.

These trail closures, in conjunction with the "stay on designated trails" signage, will effectively close the two southern lobes of Twin Peaks to the public.
See: http://sfrecpark.org/wp-content/uploads/TwinPeaksMeeting2_11.02.11.pdf
Trail closures are faintly marked on pages 33 and 34. The trail that runs down the South lobe was closed in August/September 2016.

India Basin Shoreline Park
- The coastline of the SE parcel of the park at the foot of Arelious Walker Street has been made off limits to the public. Permanent fences were erected and signs posted that say "Wildlife Area No Access."

Bayview Hill
- Split rail fencing has been installed under the Bayview Trail Improvement Project that closes off the north-west quadrant of the park. The gate in the steel fence has been locked, closing off the south-west quadrant of the park to the public.

Bernal Hill
- The trail on the NE end of the park just east of Folsom St has been blocked. It is the easiest, most sustainable route up onto the hill along the entire north face. The NAP has active plans to close additional trails under the Bernal Heights Park Trails Improvement Project.

Also see Appendix F. It shows the trail closures planned under the SNRAMP and also shows which trails have been closed by the NAP since work was started on the EIR in 2005. The footage of access control fencing installed in each area is given. These trail closures and fence installations are all CEQA violations.

The Recreation and Parks Department should be admonished for violating CEQA. Where practical, these violations should be cured. No further violations should be allowed until this EIR is corrected, certified and the Plan adopted by the Recreation and Parks Commission.

8 Bicycle Prohibition

The SNRAMP hints that its drafters consider bicyclists to be a problem, but does not state any broad action that would be taken to restrict bicycle use in Natural Areas. However, in early 2015, the NAP erected signs prohibiting the public from bringing bicycles into Natural Areas. (See the sign photo in section 1.) The NAP is only allowing bicycles on a few trails by special exception. Prior to the posting of these signs, RPD regulations permitted bicycles on all trails unless signs were posted forbidding them. There were no such signs in the Natural Areas when the new signs were installed. See the discussion in Appendix G.

This hidden agenda of the NAP was not disclosed in the SNRAMP and the idea that the implementation of the SNRAMP would bar people from walking their bikes or riding them in NAP managed parklands is incorrectly addressed by the RTC.

Not only does the prohibition prevent people from riding their bicycles in our parks, it prevents them from riding their bicycles to our parks. You cannot expect people to lock their bicycles at park borders and leave them while they spend time in the park. Bike theft is just too rampant. **This bicycle prohibition flies in the face of City initiatives including Green Connections, Transit First and the ROSE.**

RTC Response PD-6 "Opposition to the proposed public access restrictions" page 4-146 claims,
"The SNRAMP does not propose changes to bicycle use in the Natural Areas."
This is not true. Prior to the NAP's premature implementation of the SNRAMP, bicycles were allowed anywhere in Natural Areas unless specifically prohibited. In 2015, the NAP blanketed the Natural Areas with signs prohibiting riding or walking bicycles in Natural Areas.

Response RE-10 "Recreational analysis related to trails" page 4-339
"The SNRAMP does not single out bicyclists as a concern and does not include actions directed specifically at bicycle use. Off-road bicyclists would be affected by proposed trail closures similarly to other trail users, such as hikers and runners."
That is incorrect. The NAP allows all other users on Designated Trails while people with bicycles are forbidden to enter Program areas at all.

The RTC fails to address this important issue and misstates the facts.

9 Aesthetic Impact of Fences

The NAP's implementation of the SNRAMP in advance of the EIR demonstrates that the use of fences will be much more extensive than what is disclosed in the SNRAMP. Recommendation GR-11C in the SNRAMP says, "If off-trail use continues in a particularly sensitive habitat (e.g., wetlands), permanent fencing shall be considered as a last resort once all other options, including enforcement, have failed." In fact, the NAP has installed vast quantities of fencing that have a Significant Environmental Effect on Aesthetics. The EIR only discusses the aesthetic impact of the seawall fence at Sharp Park. The impact of fences in other areas is not addressed.

Parks particularly hard hit with fences are Corona Heights, Grandview and Glen Canyon where fences are now dominant features of the landscapes. Here is a tabulation for parks that have benefited from "improvement" projects.

Bayview Hill	430 feet	Chainlink fence installed some time ago, but gate now locked
	80 feet	splitrail fence installed since 2005
Corona Heights	936 feet	splitrail fence installed since 2005
	500 feet	low wire fence (not the old chainlink fence for public safety)
Glen Canyon	680 feet	splitrail fence installed since 2005

	80 feet	plastic on metal posts installed since 2005
Grandview	856 feet	splitrail fence installed since 2005

See the fence photos in Appendix H.

The effect of fences on Aesthetics is a Significant Environmental Effect not addressed by the EIR.

10 Bias

The EIR contains a surprising number of statements that are not true. Their inclusion indicates bias by the drafters of the document.

A Response GG-1 and its supporting technical memorandum, "Sequestration Study of Greenhouse Gases for SNRAMP" discussed in Section 2.3 are wrong. Given the author's "expert" status, one can only assume the faulty GHG accounting method was intentionally presented.

B HortScience, a frequent beneficiary of NAP contracts, was asked to author a very unscientific paper in January 2013 titled, "Age of blue gum in San Francisco's Natural Area Parks". This report is cited by ESA in their carbon sequestration memo and used to support the false GHG calculations that appear in the EIR.

HortScience cites their assessment of 800 blue gums larger than 6" diameter, with a median size larger than 20" diameter to make the statement that, "Given my observations of blue gum in Glen Canyon, McLaren, Mount Davidson and Pine Lake Park, I estimate that at least 90% are more than 20 years old." Obviously, given the large trees Mr. Clark was examining, they were indeed more than 20 years old. Given the title of the document, you would think these statements were referring broadly to all trees in our Natural Areas, but the writing allows the possibility he was referring to only the large trees he was assessing.

HortScience never actually studied the parks with the intent to determine the mix of tree ages. Their work included no assessment of smaller trees. The only evidence presented about the quantity of young trees is:

-a paper from Dr. Joe McBride from 1994 related to some specific stands in the Presidio and Golden Gate Park.

-an examination of Google Earth historical photos from which he somehow deduces that there are very few young trees in our forests.

-finally the author says young trees observed at the edges of the stands examined were not common. (That is a recollection of something the author was not specifically looking at when he was in the parks.)

HortScience must know there is a high percentage of young trees in our natural areas. The language of this memo is intentionally ambiguous to give the impression the author is saying 90% of the blue gums in our natural areas are more than 20 years old, when the legalistic meaning is that 90% of the trees HortScience specifically assessed were more than 20 years old.

Please see the photos in Appendix E. These were taken in various natural areas that show the mix of trees that actually exist.

C The HortScience report only dealt with observations of a few parks in San Francisco, yet the EIR specifically cites it to claim that 90% of the trees in Sharp Park are more than 20 years old. There is no connection. RTC Footnote 76, page 4-300

D Impact of removing benches and recreational amenities

The response to comments about the removal of benches from Natural Areas, RE-11 page 4-340 contains an outright lie,

"In 2011, SFRPD removed a bench on the northern portion of Mt. Davidson because it was rotting and unsafe for sitting. " The truth is revealed in the email below sent by Chris Campbell of the NAP. The bench was not rotting and unsafe. It was removed because people liked it and used it.

To: jacquieproctor@hotmail.com
CC: chuck@paskerian.com; Lisa.Wayne@sfgov.org
Subject: Re: Bench missing on Mt. Davidson
From: Christopher.Campbell@sfgov.org
Date: Thu, 27 May 2010 08:42:45 -0700

Hello Jacquie,

The bench that you're referring to was installed by the Recreation and Park Natural Areas Program. It was installed a number of years ago on this site to take advantage of the views, beauty and serenity of the plateau. We monitored the use of the bench and it unfortunately became an attractive nuisance. The secluded location was a draw for night time drinking and smoking. Bottles were thrown down the hill slope and most often broke, causing a hazard for both animals and people. Secondly the bench became a draw for commercial dog walkers, at times with more than 12 dogs in the area at once. This activity resulted in trampling of this sensitive slope, disturbance of wildlife and the creation of trails around the bench. One of the trails remains in the grassland below the bench location. After consideration we concluded it was best to remove this bench.

Over the coming year we will evaluate the installation of benches city-wide. This will be done in correlation with a natural areas trail project . Due to the activities associated with this bench we unfortunately do not have intentions to re-install one on the lower plateau at Mount Davidson.

Sorry for the disappointment this may bring,
Christopher

Christopher Campbell
Natural Areas Program

E Closure of the Miraloma trail in Glen Canyon, Comment LU-2 page 4-214
In Glen Canyon the only sustainable trail on the entire west side of the park was closed. This runs from O'Shaughnessy Blvd. down to the Silver Tree Camp.
Response LU-2
"The trail to which the commenter refers (at the entry to the park from O'Shaughnessy Blvd.) was closed prior to the commencement of the environmental review for the SNRAMP. This unofficial path was deemed unsafe, due to a significant presence of poison oak. A low post-and-cable fence was installed near Silver Tree camp and day care center to discourage use. This trail closure is not part of the SNRAMP project and thus was not analyzed in the EIR."

This is a fabrication. The trail closure is part of the SNRAMP. The trail is shown on the SNRAMP Glen Canyon map as an existing trail slated for closure. (SNRAMP page 6.3-24) The bottom of the trail was closed with a split rail fence after 2011. The trail itself is not hazardous. The NAP could easily control the poison oak along the trail if they wanted to. They simply want to exclude the public from the west side of the park.

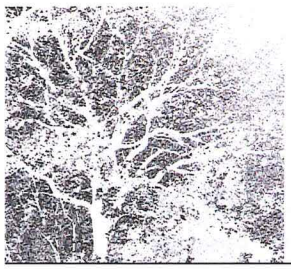
Not only is this trail closure planned under the SNRAMP and subject to this EIR, it was still indicated as an existing trail under the Glen Canyon Trails Improvement Project published in July 2011. It clearly shows this trail as one they plan to close under that project.
http://sfrecpark.org/wp-content/uploads/GlenCanyonTrailconceptplan.pdf

F Forest Management Objectives

As noted in section 2.4 of this document, the EIR willfully misstates the forest management objectives of the SNRAMP. This occurs on pages 4-284 to 4-285 of the RTC. It is amazing the authors would try to pass off such a bald lie involving the fundamental purpose of the SNRAMP tree removals.

Appendices' relation to items in SFFA Appeal of EIR

Item in SFFA Appeal of EIR	**Appendix detailed information**
1.Public access restrictions	H
2. Greenhouse gases	A, A-1, B, C, D
3.Herbicide use	
4.CEQA process violations	F
5. Planned trail closures	F
6.??	
7. CEQA implementation violations	E
8.Bicycle prohibition	G
9. Aesthetics of fencing	H
10. Bias	



Appendix A

Quercus Group

Forest & Greenhouse Gas Consultants
a division of Horizon Forest Products
P.O. Box 5325 / Richmond, CA 94805
510/236-0924 / QuercusGrp@sbcglobal.net

January 15, 2017

San Francisco Board of Supervisors
1 Dr. Carlton B. Goodlett Place
City Hall, Room 244
San Francisco, Ca. 94102-4689

Re: Planning Case No. 205.1912E SNRAMP

Board Members:

The Quercus Group appreciates the opportunity to submit Significant Natural Resource Areas Management Plan EIR comments on behalf of the San Francisco Forest Alliance. We incorporate by reference the Alliance forest comments of November 27, 2016.

Review of the EIR finds that the project fails to comprehensively analyze or feasibly and proportionally mitigate terrestrial conversion vegetation and soil organic matter direct/indirect[1] greenhouse gas (GHG) emissions pursuant to California Environmental Quality Act (CEQA) requirements. Specifically, the failure to fully account for the foreseeable carbon dioxide (CO_2) and methane (CH_4) emission effects due to biomass disposal decomposition (Exhibit A) and soil disturbance. These EIR omissions represent a failure to proceed in the manner prescribed by CEQA.

Forest Resources Conversion Greenhouse Gas Emissions

The limitations of the Intergovernmental Panel on Climate Change (IPCC) generic vegetation land use change general default standards were clearly demonstrated in the excellent Forest Alliance comments. The California Emissions Estimator Model (CalEEMod) used for the EIR GHG biogenic emissions analysis employs IPCC forest general defaults that are unrelated to actual California forest carbon stocking conditions (CalEEMod, Appendix A, pp. 51, 52). This one size fits all approach does not reflect California's diverse forests resources and fails to account for CEQA site-specific forest conversion requirements or other pertinent California GHG policies/laws (Exhibit B). In fact the only IPCC general default standards relevant to California forest resources are the international GHG global warming potential (GWP) values established by the 2013 IPCC Fifth Assessment Report.

CEQA § 15364.5 states that "Greenhouse gas" or "greenhouse gases" includes but is not limited to: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. In 2016 Senate Bill 1383 designated methane a short-lived climate "super" pollutant.[2] Neither the 2009 CEQA GHG amendments nor the enabling legislation Senate Bill 97 mention the term "carbon sequestration." CEQA's focus is "*the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions*." Further, the EIR must explain how the terrestrial conversion mitigation proposals result in less than significant GHG emissions consistent with state 2020, 2030 and 2050 GHG reduction targets.

---

[1] CEQA recognizes these secondary GHG biogenic emissions in the indirect effects language of Guidelines § 15358(2), "... are later in time or farther removed in distance, but are still reasonably foreseeable."

[2] SB 1383 requires a 40 percent statewide reduction in methane emissions from 2013 levels by 2030.

Upon the disposal of impacted vegetation, the decomposition of biomass does in all cases result in CO_2 and CH_4 biogenic emissions.[3] CEQA doesn't differentiate between anthropogenic and biogenic GHG emissions. The following 2009 Natural Resources Agency response to the California Wastewater Climate Change Group proves the point:

Response 95-1: "Regarding the comment that the Guidelines should distinguish between anthropogenic and biogenic carbon dioxide emissions, the Natural Resources Agency notes that SB 97 did not distinguish between the sources of greenhouse gas emissions. Thus, it would not be appropriate for the Natural Resources Agency to treat the different categories of emissions differently absent a legislative intent that the Guidelines do so. Neither AB 32 nor the Air Resources Board's Scoping Plan distinguishes between biogenic and anthropogenic sources of greenhouse gas emissions. On the contrary, the Scoping Plan identifies methane from, among other sources, organic wastes decomposing in landfills as a source of emissions that should be controlled. (Scoping Plan, at pp. 62-63)."

AB 32 defines carbon dioxide equivalent (CO_2e) to mean, "... the amount of carbon dioxide by weight that would produce the same global warming impact as a given weight of another greenhouse gas, based on the best available science, including from the Intergovernmental Panel on Climate Change."

"The IPCC released its Fifth Assessment Report (AR5) in 2013, including scientific research and conclusions regarding current GHG global warming potential (GWP) values for determining CO_2e. The IPCC recommends using the AR5 GWP values, as they reflect the best information on global warming potentials. The Air District is using the GWP values from AR5, which include a GWP for methane (including all feedback effects) of 34. We recommend that ARB also use GWPs from AR5 in the Strategy."[4] Consistent with the AB 32 carbon dioxide equivalent definition, the Bay Area Air Quality Management District uses the GWP values from AR5.

CalEEMod Model Methodology

The CalEEMod model is used for project forest conversion GHG biogenic emissions analysis. Like all publicly available forest conversion models the CalEEMod measures only the carbon loss (emission) or carbon gain (sequestration). The CalEEMod was not designed to calculate vegetation methane biogenic emissions due to biomass decomposition. The California Air Pollution Control Officers Association have never claimed their model has that capability regarding forest resources conversion GHG biogenic emissions analysis.

Other flawed aspects of the forest resources GHG biogenic emissions analysis include:

- "IPCC Good practice Guidance for Land Use and Forestry (2003) applies a 20 year window for calculating positive sequestration from trees" (Appendix B).

The cited IPCC standard is antiquated, pre-dating California's development of extensive GHG policy and law. Both forest resources and GHG biogenic emissions are analyzed over a standard one-hundred year planning horizon. The assertion that trees are limited to a 20 year positive carbon sequestration window is baseless and the EIR provides no science or fact to support this speculative opinion. In fact planted native oak trees don't attain appreciable carbon sequestration until about 20 years of age.

---

[3] "Anaerobic digestion, chemical process in which organic matter is broken down by microorganisms in the absence of oxygen, which results in the generation of carbon dioxide (CO_2) and methane (CH_4) .... Sugars, starches, and cellulose produce approximately equal amounts of methane and carbon dioxide." Encyclopædia Britannica (2016). http://www.britannica.com/EBchecked/topic/22310/anaerobic-digestion.

[4] BAAQMD May 26, 2016 letter from Jack P. Broadbent, Executive Officer/APCO to Richard Corey, Executive Officer, California Air Resources Board regarding ARB Short-Lived Climate Pollutants Strategy.

- The CalEEMod uses a IPCC forest general default of 111 metric tonnes (MT) of CO_2e emissions per acre.

Dividing 111 MT CO_2e by 3.67 yields 30 MT biomass/soil carbon sequestration per acre. Based on the age and density of the forest this figure substantially underestimates the carbon sequestration stocking per acre values of the thousands of large trees to be removed. Actual non-plantation eucalyptus aboveground biomass carbon sequestration stocks are $\pm$60 MT C/acre and 0.4 MT C/acre-year. According to the latest literature eucalyptus soil carbon stocks are as high as 50 MT C/acre.

- "At the end of the 20 year horizon window of the SNRAMP, there would be a calculated net gain of sequestration of approximately 388 MT of CO_2 per year. The primary contributing factor to this sequestration gain would be the removal of an aging eucalyptus tree population which would be replaced with much more efficiently sequestering tree and plant growth" (Appendix B).

The EIR does not stipulate that new planted trees will be a mitigation measure. Nor does it provide data on the species/number of planted trees required to reduce GHG biogenic emission impacts consistent with state 2020, 2030 and 2050 reduction goals. Essentially the EIR is falsely claiming that the existing forest carbon sequestration capacity will be more than replaced by the grassland sequestration. Quercus Group suggests the EIR preparers query the USDA Forest Service or CALFIRE regarding the veracity of this assertion.

- The SNRAMP defines a Tree as a tree having a dominant vertical trunk greater than 15 feet tall. Smaller trees are considered "Saplings" (EIR at 92).

The thousands of EIR uncounted "saplings," which under the plan may be removed, would replace the "aging eucalyptus tree population" over time and sequester significantly more carbon, much faster than grassland.

To accurately and fully account for forest conversion GHG biogenic emissions the total biomass weight or total biomass carbon weight of the impacted overstory/understory vegetation must be known, the means of vegetation disposal identified and the soil organic matter emissions calculated.

- Please provide the following forest resources information:

1. What is the estimated total biomass weight or total biomass carbon weight of all the impacted vegetation?

2. What are the estimated biomass decomposition CO_2 and CH_4 emissions?

3. What are the estimated soil organic matter CO_2 biogenic emissions associated with ground disturbing activities?[5]

---

[5] Soil organic matter (SOM) is the organic matter component of soil, consisting of plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by soil organisms. The SOM carbon sequestration zone extends to a depth of 1 meter.

The EIR provides no science or fact to support how its potential mitigation measures are going to actually mitigate the project's dual impacts of lost forest carbon sequestration capacity *and* significant biomass disposal/soil disturbance GHG biogenic emissions.

- Please provide the following forest resources mitigation information:

1. Demonstrate mathematically how the proposed measures will mitigate the CO_2 and CH_4 biogenic emissions due to the decomposition of the impacted biomass.

2. Demonstrate mathematically how the proposed measures will mitigate the soil organic matter CO_2 biogenic emissions associated with ground disturbing activities.

3. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane emissions.

4. Explain how the non-tree planting migration measures are consistent with reducing GHG emissions statewide 80 percent by 2050.

Wetlands are major carbon sinks. Impacted wetlands carbon sequestration rates can take decades or longer to replicate through replacement mitigation. In general, Ambrose et al. (2007) found that the primary state and federal wetland protection programs have been generating more wetlands of lower quality than the wetlands they allowed to be destroyed. The EIR proposes the conversion of freshwater marsh, willow scrub and wet meadow wetland habitat to open water habitat.

- Please provide the following wetlands conversion information:

1. What are the estimated CO_2 and CH_4 biogenic emissions associated with impacts to all project area wetland classifications, including the dredging of up to 60,000 cubic yards of "material"?

2. What is the estimated carbon sequestration rate (i.e. metric tonnes carbon per acre per year) for the wetland classifications replacement mitigation?

3. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane emissions.

Summary

The 2008 California Air Resources Board's AB 32 Scoping Plan recognized the significant contribution that terrestrial greenhouse gas storage will make in meeting the state's GHG emissions reduction goals: "This plan also acknowledges the important role of terrestrial sequestration in our forests, rangelands, wetlands, and other land resources." The EIR perpetuates the myth that forest and other terrestrial conversion GHG emissions are simply an issue of carbon transformed to carbon dioxide. This fallacy belies the fact that potentially four other GHGs are involved, including the super pollutant methane. The constant among court decisions regarding GHG analysis is that project emissions must be accurately and fully rendered in a CEQA document. This EIR appears designed to obfuscate and minimize project GHG biogenic emissions, rather than a bona fide attempt to comply with CEQA's focus of ascertaining the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions.

Substantial evidence has been presented that project GHG biogenic emissions will result in potentially significant environmental effects that have not been sufficiently analyzed or feasibly mitigated. The project has not made "a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project" (CEQA Guidelines § 15064.4(a)). Therefore the EIR is deficient as an informational document, in that it fails to apprise decision-makers/public of the full range and intensity of the adverse GHG emission effects on the environment that may reasonably be expected if the project is approved.

Sincerely,

Ron Cowan

Ron Cowan, Principal

attachments (3)

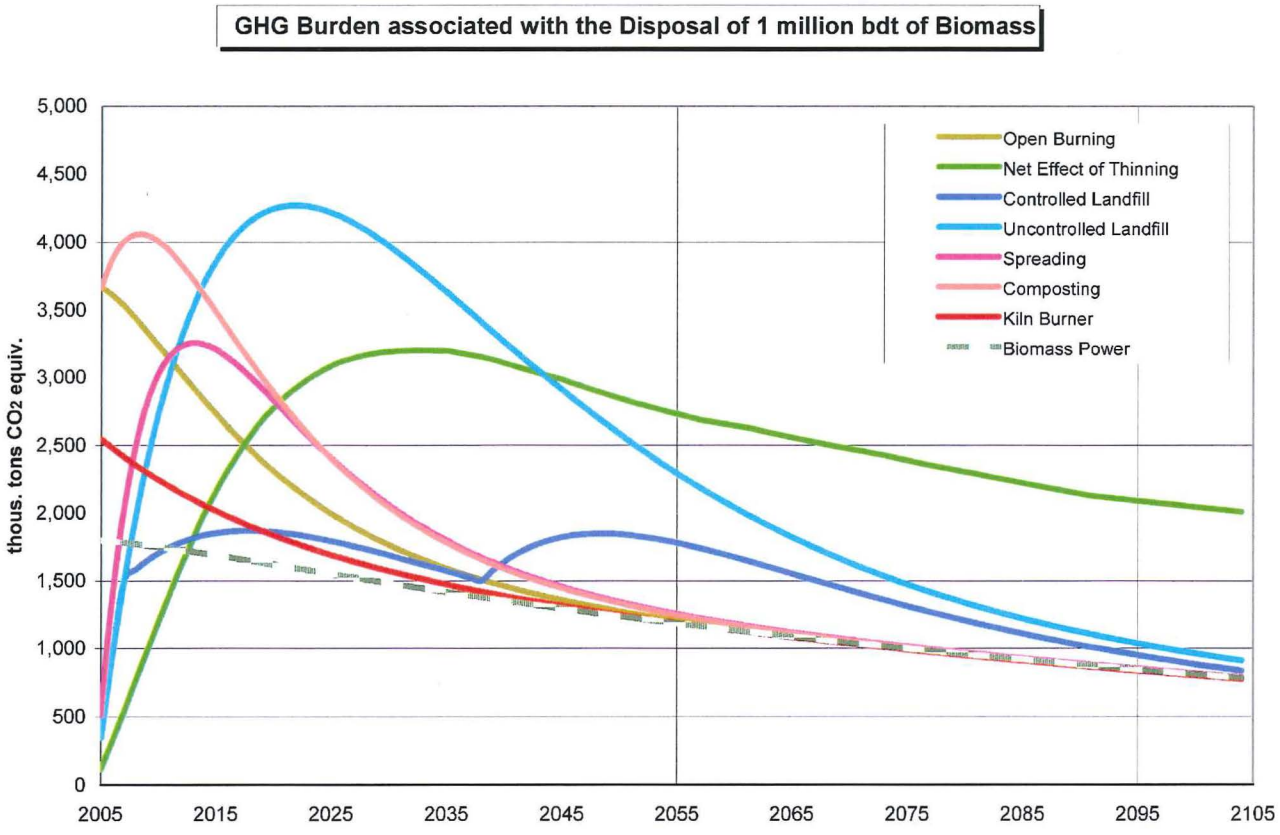
Exhibit A

Biomass Disposal Greenhouse Gas Emissions

The following chart illustrates the relative GHG indirect biogenic emission effects from common methods of vegetation (biomass) disposal.[1] The biomass combustion GHG emission values do no include black carbon emissions.

Uncontrolled landfill disposal produces the greatest biomass GHG biogenic emissions followed by composting, open burning, mulching, forest thinning, controlled landfills and biomass power. The chart demonstrates that peak greenhouse gas emissions vary substantially depending on the means of biomass disposal, with the higher peaks reflecting increased amounts of methane and/or nitrous oxide emissions.

Terminology: Net effect of thinning emissions apply to forest thinning emissions and spreading emissions are equivalent to mulching emissions.



Graphic: Gregory Morris, PhD. *Bioenergy and Greenhouse Gases*. Published by Pacific Institute (2008).

[1] One bone dry ton (bdt) is a volume of wood chips (or other bulk material) that would weigh one ton (2000 pounds, or 0.9072 metric tons) if all the moisture content was removed.

Exhibit B

Terrestrial Conversion Greenhouse Gas Emissions

Policy and Regulatory Framework
The following policy and regulatory background information provides context to the importance of reducing and feasibly mitigating terrestrial conversion greenhouse gas (GHG) biogenic emission effects:

Governor Brown
"We must also reduce the relentless release of methane, black carbon and other potent pollutants across industries. And we must manage farm and rangelands, forests and wetlands so they can store carbon." – January 2015 inaugural address regarding the state's greenhouse gas reduction goals for the next 15 years.

California Air Resources Board
"California is committed to reducing emissions of CO_2, which is the most abundant greenhouse gas and drives long-term climate change. However, short-lived climate pollutants [methane, black carbon, etc.] have been shown to account for 30-40 percent of global warming experienced to date. Immediate and significant reduction of both CO_2 and short-lived climate pollutants is needed to stabilize global warming and avoid catastrophic climate change." *Reducing Short-Lived Climate Pollutants in California, 2014.*

Assembly Bill 32
Signed by Governor Schwarzenegger on Setember 27, 2006. This statute requires a statewide GHG emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020.

Senate Bill 97
Signed by Governor Schwarzenegger on August 24, 2007. This statute required that the Office of Planning and Research prepare CEQA guidelines for evaluating the effects of GHG emissions and for mitigating such effects. The Natural Resources Agency adopted these guidelines on December 31, 2009.

Senate Bill 32
Signed by Governor Brown on September 8, 2016. This statute requires that statewide GHG emissions be reduced to 40% below the 1990 level by 2030.

Senate Bill 1383
Signed by Governor Brown on September 19, 2016. This statute requires a 50 percent statewide reduction in black carbon emissions and a 40 percent reduction in methane and hydrofluorocarbon emissions from 2013 levels by 2030.

Executive Order S-3-05
Signed by Governor Schwarzenegger on June 1, 2005. Executive Order S-3-05 established a California GHG reduction target of 80 percent below 1990 levels by 2050.

Phoenix Energy
"As wood starts to decompose it releases roughly equal amounts of methane (CH_4) and carbon dioxide (CO_2)." 2014. http://www.phoenixenergy.net/powerplan/environment

Macpherson Energy Corporation
"Rotting produces a mixture of up to 50 percent CH_4, while open burning produces 5 to 10 percent CH_4." 2014. http://macphersonenergy.com/mt-poso-conversion.html

References

Vegetation

Brown, S., T. Pearson, A. Dushku, J. Kadyzewski, and Y. Qi. 2004. *Baseline greenhouse gas emissions for forest, range, and agricultural lands in California*. Winrock International, for the California Energy Commission, PIER Energy-Related Environmental Research. Publication # CEC 500-04-069F.

Chojnacky D. C.; Heath L. S.; Jenkins J. C. 2014. *Updated generalized biomass equations for North American tree species*. Forestry Journal, 87, 129-151.

Gonzalez et al. 2010. *Forest carbon densities and uncertainties from Lidar, QuickBird, and field measurements in California*. Center for Forestry, University of California, Berkeley, CA.

Smith, James E.; Heath, Linda S.; Jenkins, J. C. 2003. *Forest Volume-to-Biomass Models and Estimates of Mass for Live and Standing Dead Trees of U.S. Forests*. General Technical Report NE-298. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 57 p.

Van Deusen, P., and L.S. Heath. 2016. *Carbon OnLine Estimator (COLE) web applications suite*. NCASI and USDA Forest Service, Northern Research Station. COLE database last updated 1/21/2016.

Waddell, K. and B. Hiserote. 2005. *The PNW-FIA Integrated Database User Guide: A database of forest inventory information for California, Oregon, and Washington*. Forest Inventory and Analysis Program, Pacific Northwest Research Station, Portland, Oregon, USA.

Woodall, C.W., L.S. Heath, G.M. Domke, and M.C. Nichols. (2011) *Methods and equations for estimating aboveground volume, biomass, and carbon for trees in the U.S. forest inventory.* Gen. Tech. Rep. NRS -88. Newtown Square, PA: USDA Forest Service, Northern Research Station. 30 p.

Soil

Brady, N.C., and Weil, R.R. 1999. *The nature and properties of soils*. Prentice Hall, Inc., Upper Saddle River, NJ.

USDA Natural Resources Conservation Service. 2016. *Rapid Carbon Assessment (RaCA) web applications suite*. USDA-NRCS Soil Science Division.
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054164#intro

Whendee L. Silver, Rebecca Ryals, and Valerie Eviner. 2010. *Soil Carbon Pools in California's Annual Grassland Ecosystems*. University of California-Davis, 1210 PES, Mail Stop 1, One Shields Ave, Davis, CA 95616, USA

Zhi J, Jing C, Lin S, Zhang C, Liu Q, DeGloria SD, et al. (2014). *Estimating Soil Organic Carbon Stocks and Spatial Patterns with Statistical and GIS-Based Methods*. PLoS ONE 9(5): e97757. doi:10.1371/journal.pone.0097757.

Wetlands

Ambrose, R.F., Callaway, J. C., and S. F. Lee. 2007. *An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Resources Control Board, 1991-2002*. Prepared for California State Water Resources Control Board. 158 pp.

Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2008. *California Rapid Assessment Method (CRAM) for Wetlands.* Version 5.0.2. 151 pp.

Nahlik, A. M. & Fennessy, M. S. *Carbon storage in US wetlands*. 2016. Nat. Commun. 7, 13835 doi:

Appendix A-1

heart of green

February 14, 2017

San Francisco Board of Supervisors
1 Dr. Carlton B. Goodlett Place
City Hall, Room 244
San Francisco, CA 94102

Please Support the EIR Appeal
Significant Natural Resource Areas Management Plan

Dear Members of the Board of Supervisors,

We ask you to please support the appeal of the Environmental Impact Report (EIR) for the Significant Natural Resource Areas Management Plan.

We are concerned that the EIR violates CEQA law because it contains fundamental math errors, incorrect assumptions, and outdated science related to Greenhouse Gas Emissions.

We are concerned that the Significant Natural Resource Areas Management Plan violates AB 32, the California Global Warming Solutions Act, by generating significant carbon emissions and causing climate change by felling 18,448 large trees and only replanting 3,448 of them (a replacement rate of 0.19).

We are concerned that this Plan threatens public safety by causing climate change, degrading air quality, increasing mudslide risk, and spraying toxins in children's parks.

CEQA: The CEQA Guidelines §15364.5 require the City of San Francisco to determine the significance of impacts from Greenhouse Gas Emissions. Greenhouse gases include but are not limited to carbon dioxide, methane, and nitrous oxide. By law, the lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project.

Please send the EIR back to Planning to correct the math errors and incorrect science contained within as follows:

- Math Errors: The EIR adds together a rate and a stock and produces a meaningless final number for Greenhouse Gas Emissions.

- 90% of Trees Deleted: The EIR assumes 90% of the existing trees are absorbing no carbon because they are over 20 years old. According to best available science from 2010 Forest Ecology & Management and the 2014 U.S. Geological Survey, older trees continue to actively sequester more carbon than younger trees. To be good faith, all 18,448 trees must be included in the Greenhouse Gas Emissions.

- Tree Survival Rates: The Greenhouse Gas calculations in the EIR presume that 100% of the newly-planted trees will survive. This is overly optimistic. SF Rec and Park's numerical model assumes that all new trees are live oaks. Per the Department of Public Works, oaks are known to be uneven survivors in San Francisco because they prefer heat, wind protection, and good drainage. This is why in the 1800s, oak trees were found in San Francisco only in limited numbers in creek beds. To be good faith, a more realistic tree survival rate needs to be incorporated into the EIR when estimating net Greenhouse Gas Emissions.

CEQA law requires the lead agency, SF Rec and Park, to answer the following questions in good faith. Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

The EIR Responses to Comments (4-301) concludes, "There would be a calculated total net sequestration gain of 202 MT of CO2 per year." The Sharp Park portion of this total is shown as 64 MT, but this number is meaningless because it results from combining an annual rate with a stock. This is a fundamental math error that renders the result invalid.

When the math errors and assumptions are corrected using best available science and the same methodology, the new Greenhouse Gas calculations are shown below. Subsequently, a top sustainability and greenhouse gas verification firm was hired to perform the carbon calculations using best practices in accordance with AB 32. Per the attached appendix, they found that felling the 18,448 trees in the Plan would release total carbon emissions of **177,572 MT of CO2e** and would result in a loss of carbon sequestration over the life of the project of **-44,275 MT of CO2e**.

Greenhouse Gas Emissions for SNRAMP

	Annual Carbon Sequestration	**Carbon Emissions**
EIR with Errors:	Gain of +202 MT of CO2 per year	Not Presented
Corrected Math:	Loss of -2,401 MT of CO2 per year	65,101 MT of CO2
Top GHG Firm:	Loss of -44,275 MT of CO2e	177,572 MT of CO2e

Therefore, the Greenhouse Gas Emissions caused by the Natural Resource Areas Management Plan are significant under CEQA, violate the California Global Warming Solutions Act (AB 32), and must be mitigated.

The EIR Responses to Comments (4-301) erroneously concludes, “The proposed project would have a net GHG benefit and would not conflict with California’s goal of reducing GHG emissions set forth by the timetable established in AB 32.”

By presenting Greenhouse Gas calculations in the EIR that contain both fundamental math errors and assumptions that have been disproved by modern science, SF Rec and Park did not make a good-faith effort to estimate the greenhouse gas emissions from this project as required by law. Please refer the EIR back to Planning to remedy this.

Tree Replacement Rate: The tree replacement ratio in the EIR is only **0.19**. SF Rec and Park would replant only 3,448 trees out of 18,448 felled. Per the EIR on page 92, “Trees removed in San Francisco would be replaced with native tree species at a ratio of roughly one-to-one, although not necessarily at the same location or within the same Natural Area. For Sharp Park in Pacifica, many of the trees would be replaced not with trees but with native vegetation, specifically coastal scrub." The SF Rec and Park Memo "SNRAMP Tree Removal and Replacement" dated November 27, 2012 states, "At Sharp Park, a total of 15,000 trees will be removed and replaced over 20 years with native grassland or coastal scrub.” The numerical model used by SF Rec and Park to calculate Greenhouse Gases replants grassland in place of the 15,000 trees killed in Sharp Park.

This Plan will cause climate change by deforesting 15,000 large carbon-sequestering trees without replacement. We request that the minimum replacement rate be **1:1** or 18,448 trees. Best practice per the U.S. Forest Service 2016 would be **3:1** to account for the loss of carbon sequestration and the inevitable partial mortality of the saplings. If the replacement rate is not raised from 0.19 to a guaranteed 1:1 or higher with trees, then this Plan will cause climate change and threaten public safety.

Air Pollution: We are concerned that cutting down 15,000 trees without adequate replacement per the Significant Natural Resource Areas Management Plan will hurt human and environmental health by worsening air pollution. The EIR states that the deforestation “would result in significant unavoidable air quality impacts as a result of exceeding the BAAQMD thresholds for NOx pollutant emissions.” It concludes that “cumulative impacts associated with criteria air pollutants would be significant and unavoidable.” (EIR pages 438-440) We urge the SF Board of Supervisors to please send the EIR back to Planning for further air quality mitigation measures.

Herbicides: SF Rec and Park’s spraying of herbicides including Roundup required by the Plan is posing a threat to public health and safety. Per SF Rec and Park, “If you don't treat a felled eucalyptus stump with herbicides, it will come back." Glyphosate in Roundup was declared a probable carcinogen by the World Health Organization. The four toxic herbicides being used in the Natural Resource Areas are Roundup, Garlon 4 Ultra (triclopyr), Milestone (aminopyralid), and Habitat (imazapyr). San Francisco residents are very concerned that SF Rec and Park is polluting children’s parks with cancer-causing chemicals in order to kill trees that the public wants to stay standing.

In summary, SF Rec and Park's plan to cut down over 18,000 large trees without adequate replacement and spray toxic herbicides would damage public safety, public health, and the environment.

Please refer the EIR back to Planning so that it can provide an accurate picture of Greenhouse Gas Emissions under the California Environmental Quality Act and include further mitigation for the environmental harm to climate and public health. Otherwise, the City will be vulnerable to future risks under CEQA.

Please ensure that the City of San Francisco continues to be a global leader in the fight for climate resilience.

Thank you for your help and consideration.

Sincerely,

Nadine Weil

Nadine Weil
Founder
Heart of Green

cc: San Francisco Forest Alliance

Sources:

Increasing Wood Production Through Old Age in Tall Trees, Eucalyptus and Redwood, Stephen Sillett, Forest Ecology and Management Journal, February 2010: ”Increasing wood production as trees age is a mechanism underlying the maintenance of biomass accumulation during forest development and the carbon-sink capacity of old-growth forests.”
http://www.sciencedirect.com/science/article/pii/S037811270900872X

Tree Growth Never Slows
Idea debunked that young trees have the edge on their older siblings in carbon accumulation, U.S. Geological Survey, Nature Journal, January 2014
http://www.nature.com/news/tree-growth-never-slows-1.14536

Carbon Capture: Tree Size Matters
Yale Environment Review, July 2015
http://environment.yale.edu/yer/article/carbon-capture-tree-size-matters#gsc.tab=0

Compensating for the Loss of a Healthy Tree: How Many Trees Do You Owe Me?
Dr. David Nowak, U.S. Forest Service, November 2016
http://www.slideshare.net/arbordayfoundation/compensating-for-the-loss-of-a-healthy-tree-how-many-trees-do-you-owe-me

Mayor Ed Lee signs Mayors' National Climate Action Agenda Letter
November 2016
http://www.climate-mayors.org/our-letter-to-the-presidentelect-november-2016/

References:

Board of Supervisors File No. 170044

Final Environmental Impact Report for the proposed Significant Natural Resource Areas Management Plan per Planning Case No. 2005.0912E

NATURE JOURNAL

Tree growth never slows

Idea debunked that young trees have the edge on their older siblings in carbon accumulation.

Jeff Tollefson
January 15, 2014

Trees add an increasing amount of mass every year.

Many foresters have long assumed that trees gradually lose their vigor as they mature, but **a new analysis suggests that the larger a tree gets, the more kilos of carbon it puts on each year**.

“The trees that are adding the most mass are the biggest ones, and that holds pretty much everywhere on Earth that we looked,” says Nathan Stephenson, an ecologist at the US Geological Survey in Three Rivers, California, and the first author of the study, which appears today in *Nature*. “Trees have the equivalent of an adolescent growth spurt, but it just keeps going.”

The scientific literature is chock-full of studies that focus on forests' initial growth and their gradual move towards a plateau in the amount of carbon they store as they reach maturity. Researchers have also documented a reduction in growth at the level of individual leaves in older trees.

In their study, Stephenson and his colleagues analyzed reams of data on 673,046 trees from 403 species in monitored forest plots, in both tropical and temperate areas around the world. They found that the largest trees gained the most mass each year, capitalizing on their additional leaves and adding ever more girth high in the sky.

Although they relied mostly on existing data, the team calculated growth rates at the level of the individual trees, whereas earlier studies had typically looked at the overall carbon stored in a plot.

Estimating absolute growth for any tree remains problematic, in part because researchers typically take measurements at a person's height and have to extrapolate the growth rate higher up. **But the researchers' calculations consistently showed that larger trees added the most mass.** In one old-growth forest plot in the western United States, for instance, trees larger than 100 centimeters in diameter comprised just 6% of trees, but accounted for 33% of the growth.

The findings build on a detailed case study published in **2010**, which showed similar growth trends for two of the world's tallest trees — the coast redwood (*Sequoia sempervirens*) and the **eucalyptus** (*Eucalyptus regnans*), both of which can grow well past 100 meters in height. In that study, researchers climbed, and took detailed measurements of, branches and limbs throughout the canopy to calculate overall tree growth. Stephen Sillett, a botanist at Humboldt State University in Arcata, California, who led the 2010 study, says that the latest analysis confirms that his group's basic findings apply to almost all trees.

The results are consistent with the known reduction in growth at the leaf level as trees age. Although individual leaves may be less efficient, older trees have more of them. And in older forests, fewer large trees dominate growth trends until they are eventually brought down by a combination of fungi, fires, wind and gravity; the rate of carbon accumulation depends on how fast old forests turn over.

"It's the geometric reality of tree growth: bigger trees have more leaves, and they have more surface across which wood is deposited," Sillett says.

The findings help to resolve some of these contradictions, says Maurizio Mencuccini, a forest ecologist at the University of Edinburgh, UK. "On an absolute scale, the old trees keep growing far more."

The study has broad implications for forest management, whether in maximizing the yield of timber harvests or providing old-growth habitat and increasing carbon stocks. More broadly, the research could help scientists to develop better models of how forests function and their role in regulating the climate.

Appendix A-1
Technical Memorandum for Nadine Weil
02/16/17

Background:
This memorandum is intended to provide support to Nadine Weil regarding greenhouse gas (GHG) sequestration and emissions quantification related to implementation of the proposed Significant Natural Resources Area Management Plan (SNRAMP). The proposed activities include removal of non-native trees, predominantly *Eucalyptus globulus* (blue gum eucalyptus), in Pacifica (Sharp Park Natural Area) and in San Francisco (in several parks and natural areas), followed by subsequent replanting of the areas with diverse native vegetation types, as stated in the "Sequestration Study of Greenhouse Gases for SNRAMP" prepared by the firm Environmental Science Associates (ESA 2013).

The main purpose of this analysis is to provide a quantification using best practices of the carbon stored in the 18,448 trees proposed for removal at the Pacifica and San Francisco sites. Below and in the attached worksheet ("Euc_removal_GHG_021417.xls"), we provide detailed description of the quantification (including data and assumptions) used. Please note that much of the analysis uses the methods set forth in the US Forest Projects Protocol for California Air Resources Board's compliance offset forest protocols for AB32 Cap and Trade. These are the most rigorous methods available. In addition, we calculated the amount of annual mean sequestration that would occur over the 20 year proposed timeline of the study. For the purposes of the study, all trees proposed for removal were assumed to be *Eucalyptus globulus*.

In summary, our results indicate the following:

Carbon Storage and Annual Carbon Sequestration

Parameter Measured	Sharp Park	San Francisco	Total
Loss of stored carbon for all trees	-144,383 MT CO2	-33,189 MT CO2	**-177,572 MT CO2**
Loss of annual sequestration (over 20 years)	-36,000 MT CO2	-8,275 MT CO2	**-44,275 MT CO2**

The numbers reported here (shown in negative to indicate emissions if the trees are harvested) are much larger than those reported in the ESA 2013 study used in the EIR. While limited information is available regarding the calculations employed in the ESA study, a principle reason for the difference may be the key assumption made in the ESA 2013 study that carbon sequestration ceases at 20 years of age. Based on best current scientific information (e.g. Nature 2014 and prior), we do not believe it is appropriate to assume that sequestration ceases at 20 years of age, or at any age for healthy trees, for that matter. More information to this effect is provided on page 3 of this memo.

Methodology:

Greenhouse gas calculations were conducted by converting volume of trees to biomass to carbon content to metric tons of CO2e as follows.

Volume

Volumetric values were calculated in cubic feet from DBH values using local volume equations as follows:

Vol (cf) = a (DBH^b)

Where a and b are known species-specific regression coefficients.

The following local volume equation was derived from Pillsbury and Reimer (1997), from local coastal California eucalyptus globulus stands:

- Blue-gum eucalyptus: Vol (cf) = 0.055113 ($DBH^{2.436970}$)
- = 0.055113 ($28.0'' ^{2.436970}$)

Note: Vol = volume outside bark

Converting Volume to Biomass:

Once volume was derived, the following steps were taken to determine the amount of carbon stored in the standing live Eucalytpus trees. The methodology used was the Air Resource Board (ARB) Cap and Trade AB32 US Forest Project Protocol for determining the amount of carbon in the live standing trees (ARB 2014; Appendix C, Section C.1):

- Multiply the cubic foot volume by the appropriate wood density factor by species. This results in pounds of biomass with zero moisture content, also referred to as biomass of dry weight.

A wood density factor of 49.92 lbs/ft^3 was used, from the United States Forest Service's (USFS) Forest Inventory Analysis's wood density factor for *Eucalyptus globulus*.

- Biomass of dry weight= (volume * wood density)
- Multiply the biomass of dry weight values by 0.5 pounds of carbon/pound of wood to compute the total carbon weight.
- Divide the carbon weight by 2,204.6 pounds/metric ton to convert to metric tons of carbon.

Carbon estimates are presented in CO2 equivalent rather than carbon (C) alone. Once carbon weight was derived, the total metric tons of CO2 or CO2e were calculated by multiplying carbon by 3.67, the molecular weight ratio of CO2 to C (IPCC, 2007). Because the resulting carbon amounts were for trunks only, the following conservative ratio was used as a root to shoot ratio, added into the carbon total: 0.25.

Harvested Wood

The fate of the harvested wood determines the rate at which carbon is released into the atmosphere through decomposition. For example, if the wood is used in wood products, more carbon is retained than if it is allowed to decompose on the forest floor, or if it is mulched or sent to a landfill. Nowak et al 2002 modeled carbon content of wood over time following harvest, in two common tree disposal/utilization scenarios 1) mulching and 2) taking wood to landfills, two common tree disposal/utilization scenarios. Although no mulch decomposition studies could be found, studies on decomposition reveal that 37–56% of carbon in tree roots and 48–67% of carbon in twigs is released within the first 3 years. The remaining carbon was estimated to be lost within 20 years of mulching. For the purposes of this analysis, it was assumed that carbon in the harvested wood pool will be lost within 20 years; however a greater level of effort would be needed to determine this with greater accuracy.

Replacement with Native Vegetation following Removal of Trees:

The SNRAMP study states that removed trees at Sharp Park would be replaced with native grassland and coastal scrub over a 20 year period. ESA 2013 calculated replacement vegetation as grassland (rather than a scrub type) in the CalEEMod emissions estimator model. This is a conservative assumption given the scrub type would sequester more carbon than the grassland type. Replacement planting with trees in certain areas is also calculated in the ESA 2013 study.

A greater level of effort would be needed to prepare analysis for the replacement plantings. For the purposes of this report, the sequestration values for the replacement types are small compared to the numbers associated with the removal of trees.

False Assumption: Sequestration does not occur in trees 20 years and after

Based on best current scientific information (e.g. Nature 2014 and others), it is not appropriate to assume that sequestration ceases at 20 years of age. The study reported in Nature (2014) presents a global analysis of 403 tropical and temperate tree species, including *Eucalyptus* species, including 673,046 trees, demonstrating that for most species mass growth rate increases continuously with tree size. They found that the largest trees gained the most mass each year, capitalizing on their additional leaves and adding ever more girth high in the sky. The study finds that large, old trees do not act simply as senescent carbon reservoirs but actively fix large amounts of carbon compared to smaller trees. At the extreme, a single big tree can add the same amount of carbon to the forest within a year as is contained in an entire mid-sized tree. The apparent paradoxes of individual tree growth increasing with tree size despite declining leaf-level and stand-level productivity can be explained, respectively, by increases in a tree's total leaf area that outpace declines in productivity per unit of leaf area and, among other factors, age-related reductions in population density. The study's authors assert that their results resolve conflicting assumptions about the nature of tree growth, inform efforts to

understand and model forest carbon dynamics, and have additional implications for theories of resource allocation and plant senescence.

References:

ARB. 2014. Compliance Offset Protocol U.S. Forest Projects. California Air Resources Board. Adopted Novemeber 14 2014. Appendix C- Estimating Carbon in Wood Products. https://www.arb.ca.gov/regact/2014/capandtrade14/ctusforestprojectsprotocol.pdf

ESA. 2013. Sequestration Study of Greenhouse Gases for SNRAMP. Environmental Science Associates.

HortScience. 2013. Diameter of Eucalyptus Trees in SF Natural Resource Areas. Memo. January 2013.

Nature 2014. Stephenson, NL, AJ Das, R Condit, SE Russo, PJ Baker, NG Beckman, DA Coomes, ER Lines, WK Morris, N Rüger, E Álvarez, C Blundo, S Bunyavejchewin, G Chuyong, SJ Davies, Á Duque, CN Ewango, O Flores, JF Franklin, HR Grau, Z Hao, ME Harmon, SP Hubbell, D Kenfack, Y Lin, JR Makana, A Malizia, LR Malizia, RJ Pabst, N Pongpattananurak, SH Su, IF Sun, S Tan, D Thomas, PJ van Mantgem, X Wang, SK Wiser, MA Zavala. 2014. 'Rate of tree carbon accumulation increases continuously with tree size.' Nature, 507.

Nowak and Crane. 2002. Carbon storage and sequestration by urban trees in the USA. Environmental Pollution. 116: 381-389. https://pdfs.semanticscholar.org/743b/793c93faef72c9699a656f4052476d8fd649.pdf
Pillsbury and Reimer. 1997. Tree Volume Equations for 10 Urban Species in California https://www.fs.fed.us/psw/publications/documents/psw_gtr160/psw_gtr160_04e_pillsbury.pdf

USFS. 2009. United States Forest Service Forest Inventory Analysis (FIA) regional species-specific equations for biomass.

cc: San Francisco Forest Alliance

Appendix A-1

Corrected Greenhouse Gas Emissions | Significant Natural Resource Areas Management Plan EIR

Carbon Storage in Standing Live Trees	Sharp Park (Pacifica)	San Francisco	TOTAL	Data source
# of trees to be felled	15,000	3,448		
# of acres	56			
Average tree density (trees per acre)	227.66	72.95		
Average DBH (inches)	28	28		HortScience data
Volume (Live tree Bole)				
Allometric equation for euc	Blue-gum eucalyptus: Vol (cf) = 0.055113 (DBH $^{2.436970}$)			Pillsbury Reimer 1997
regression coefficient a	0.06	0.06		
regression coefficient b	2.44	2.44		
DBH^b	3,362.64	3,362.64		
Volume (ft^3)/tree	185.33	185.33		
Biomass to Carbon (for Standing Carbon Storage)	Dry Biomass of tree stem (in tons)= (volume * wood density)			
Wood Density (lbs/ft^3) value for Eucalyptus globulus	49.92	49.92		FIA data (USFS 2009)
Dry Biomass (in lbs)	9,251.44	9,251.44		
Carbon fraction (lbs C/lbs of wood)	0.50	0.50		ARB 2014
C/tree (lbs)	4,625.72	4,625.72		
C/tree (metric tons)	2.10	2.10		
C, ALL trees (metric tons)	31,473.19	7,234.64		
CO2e, ALL trees(metric tons)	115,317.78	26,507.71		
Per Tree C02e (in metric Tons)	7.70	7.70		
Per Tree with roots (using root to shoot ratio 0.25) (in metric tons)	1.93	1.93		
Per Tree C02e including roots (in metric tons)	9.63	9.63		
Carbon Emissions				
CO2e (in metric Tons)	115,506.62	26,551.12		
With roots (using root to shoot ratio 0.25)	28,876.65	6,637.78		IPCC 2007
CO2e (in metric Tons) including roots	144,383.27	33,188.90	**-177,572.17**	Carbon Emissions
Loss of Annual Carbon Sequestration				
Mean Annual Increment for Eucalyptus (MT CO2/tree/year)	0.12	0.12		ESA 2013
Per Year Sequestration (all trees combined)(MT CO2/year)	1,800.00	413.76		
x 20 years	36,000.00	8,275.20	**-44,275.20**	

Appendix A-1

Carbon Emissions using Diameter of Eucalyptus Trees

San Francisco Areas

Diameter

Diameter (in)	Average	Trees Sampled		Average Diameter		Volumes	Carbon		MTCO2 total
< 10	5	25	125			0.037037	2.784	0.16973	555.55556	94
10 - 19	15	208	3,120			0.308148	40.491	1.9225	4622.2222	8,886
20 - 29	25	181	4,525			0.268148	140.602	6.3448	4022.2222	25,520
30 - 39	35	140	4,900			0.207407	319.228	14.0938	3111.1111	43,847
40 - 49	45	74	3,330			0.10963	588.817	25.6875	1644.4444	42,242
50 - 59	55	28	1,540			0.041481	960.429	41.5658	622.22222	25,863
60 - 69	65	15	975			0.022222	1443.011	62.1165	333.33333	20,706
70 - 79	75	2	150			0.002963	2045.136	87.6896	44.444444	3,897
80 - 89	85	1	85			0.001481	2774.534	118.606	22.222222	2,636
90 +	90	1	90			0.001481	3189.219	136.162	22.222222	3,026
TOTAL		675	18,840	**28**	inches	TOTAL		49.43582	15,000	**176,717**

Carbon Emissions

Source: HortScience Memo, January 2013

Age

McBride and Froehlich (1984) noted that almost all of the older blue gum stands in San Francisco were even-aged, established in a brief period in the late 1800s and early 1900s. Therefore, many trees are over 100 years old.

Conclusion:

We used the smaller of the two total MT CO2 #'s to be conservative, but thought it would be interesting to see this as well.

ESA Community Development

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

Appendix B

Technical Memorandum

date February 19, 2013

to Nancy Clark; Barbara Sahm; Michael Li
Turnstone Consulting

from Chris Sanchez
Environmental Science Associates

subject Sequestration Study of Greenhouse Gases for SNRAMP

This Technical Memorandum is intended to provide an estimate of the greenhouse gas (GHG) sequestration and release potential related to implementation of the Significant Natural Resources Area Management Plan (SNRAMP). The SNRAMP would result in removal of non-native trees and their replacement with either native tree species or grasslands. These tree removal and replacement activities would occur at various restoration sites throughout the City of San Francisco as well as within the Sharp Park Natural Area (Sharp Park) in Pacifica, under the management of the San Francisco Recreation and Park Department. In addition, the SNRAMP outlines the City's program to propagate trees and plants at restoration sites throughout the City. Tree removal throughout San Francisco and in Sharp Park would result in initial CO_2 sequestration loss, whereas tree planting and planting of scrub, grasslands and herbaceous plants would result in carbon sequestration.

Methodology

The following analysis draws from a number of resources to estimate anticipated CO_2 sequestration gains and losses. These include the Urban Forestry Carbon Sequestration Workbook published by the U.S. Department of Energy,[1] the Center for Urban Forest Research Tree Carbon Calculator published by the U.S. Forest Service[2] , the *Good Practice Guidance for Land Use, Land Use Change and Forestry* published by the International Panel on Climate Change (IPCC)[3] and the CalEEMod emissions estimator Model supporting calculations.[4]

Trees have a relatively high rate of CO_2 sequestration potential. However, while the sequestration rate increases over a period of time (assumed to be approximately 20 years, based on professional practice), after that point the accumulation of carbon in biomass slows with age, and eventually is completely offset by losses associated with tree clipping, pruning, and occasional death (IPCC, 2003). Sequestration rates for grasslands and herbaceous plants, which grow quickly, were assumed to be static. This analysis applied tree age for Blue Gum (eucalyptus trees would be the predominant species removed) provided by San Francisco Recreation and Park Department to

[1] U.S. Department of Energy, Urban Forestry Carbon Sequestration Workbook, 2007

[2] U.S. Forest Service, Urban Forest Research Tree Carbon Calculator, 2005.

[3] International Panel on Climate Control, National greenhouse Gas Inventories Programme, *Good Practice Guidance for Land Use, Land Use Change and Forestry*, 2003.

[4] SQAQMD, CalEEMOd Appendix A, 2011.

determine increases and loses in CO_2. The Urban Forestry Carbon Sequestration Workbook was used to estimate increasing carbon sequestration of new tree plantings over a 20 year period. The Tree Carbon Calculator from the USFS was used as a source of sequestration rates for specific tree types to be removed as provided by San Francisco Recreation and Park Department.[5] The CalEEMod model supporting documentation provided the sequestration rates for grasslands.

Sequestration Losses and Gains from Tree Replacement in San Francisco

Data provided indicate that 3,443 trees would be removed in San Francisco over a 20 year period. While six species of tree were identified for removal, species-specific sequestration rates could not be identified for four of these species. However, the remaining two species (eucalyptus and pine) comprise over 96 percent of the trees to be removed. Consequently, sequestration rates for the remaining species were assigned to the known sequestration rates equally. Based on field data estimates provided by Hort Science[6], approximately 2,942 of these trees to be removed are Blue Gum trees greater than 20 years of age for which sequestration has been slowed and is assumed by IPCC Good Practice[7] to be offset by maintenance and mortality. Loss of sequestration from trees to be removed in San Francisco is presented in Table 1.

Over the same 20-year period that trees would be removed, new tree plantings would occur. These trees were assumed, based on data provided, to largely consist of California Live Oak. Consequently, these trees were assigned to the "medium hardwood" category in the Urban Forestry Carbon Sequestration Workbook. Carbon sequestration increases over time from replanting 3,448 trees are also presented in Table 1.

Table 1 - CO_2 Sequestration Losses and Gains from Tree Removal and Planting in San Francisco

Tree Removal – San Francisco	**Estimated CO_2 Losses (-) and Gains (+)**
Annual Sequestration loss (over 20 years)	- 54 MT CO_2/year
Tree Plantings – San Francisco	
Annual Sequestration gained (year 20)	+ 192 MT CO_2/year
Net sequestration gain at end of 20 year program =	+ 138 MT CO_2/year

Sequestration Losses and Gains from Tree Removal and Grassland and Scrub placement in Sharp Park

Data provided indicate that 15,000 trees would be removed in Sharp Park over a 20 year period. These tree species are almost entirely eucalyptus. Based on field data estimates provided by Hort Science[5], approximately 13,500 of these trees to be removed are Blue Gum trees greater than 20 years of age for which sequestration has been slowed and is assumed by IPCC Good Practice to be offset by maintenance and mortality. Loss of sequestration from trees to be removed at Sharp Park is presented in Table 2.

Over the same 20-year period that trees would be removed from Sharp Park, trees would be replaced with native grassland and coastal scrub. Replacement vegetation was assigned a grassland sequestration rate as provided in the CalEEMod emissions estimator model. A specific sequestration rate for coastal scrub was not available and all

---

[5] San Francisco Recreation and Park Department, Memorandum to Jessica Range of San Francisco Environmental Planning, November 27, 2012.

[6] Hort Science, Memorandum to Jessica Range, January 17, 2013.

[7] International Panel on Climate Control, National greenhouse Gas Inventories Programme, *Good Practice Guidance for Land Use, Land Use Change and Forestry*, 2003.

56 acres of replaced vegetation was assumed to be grassland for purposes of calculation. Carbon sequestration associated with planting approximately 56 acres of grasslands is also presented in Table 2.

Sequestration Gains from Annual Plantings of propagated plants and trees in San Francisco

Each year the Natural Areas Program propagates and plants over 10,000 plants in restoration sites throughout the City[5]. Each year these plantings mature and their GHG sequestration potential increases. Consequently, the plants, and particularly the trees, continue to increase their sequestration of CO_2 during the 20 year horizon of this analysis. Table 3 provides an estimate of this increase at the end of the 20 year planting window.

Table 2- CO_2 Sequestration Losses and Gains from Tree Removal and Grassland Planting in Sharp Park

Tree Removal – Sharp Park	**Estimated CO_2 Losses (-) and Gains (+)**
Annual Sequestration loss (over 20 years)	- 177 MT CO_2/year
Grassland Plantings – San Francisco	
Annual Sequestration gained (year 20)	+ 241 MT CO_2/year
Total Sequestration Gain (after 20 years)	**+ 64 MT CO_2/year**

Table3- CO_2 Sequestration Gains from Propagated Tree and Herbaceous Plant Planting in San Francisco

Tree Plantings	**Estimated CO_2 Losses (-) and Gains (+)**
Annual Sequestration gain (after 20 years)	+ 166 MT CO_2/year
Herbaceous Plant Plantings –	
Annual Sequestration gained (after 20 years)	+ 20 MT CO_2/year
Net sequestration gain at end of 20 year program =	**+ 186 MT CO_2/year**

Conclusion: Net Sequestration Changes Associated with the Implementation of the SNRAMP

At the end of the 20 year horizon window of the SNRAMP, there would be a calculated net gain of sequestration of approximately 388 MT of CO_2 per year. The primary contributing factor to this sequestration gain would be the removal of an aging eucalyptus tree population which would be replaced with much more efficiently sequestering tree and plant growth.

Tree Replacement in San Francisco Natural Areas

3443 tree would be removed in phases over the next 20 years, replaced with primarily native trees such as coast live oak, red alder, California buckeye, toyon, wax myrtle, and various willow trees.

Table 1 shows the trees proposed for removal by park and species

Table 1: Trees proposed for removal in SF:

	Eucalyptus	Pine	Cypress	Maytens	Tea	Acacia
	3269	50	54	10	4	56
Species specific data only for Eucalypyus & Pine>allot others evenly	3331	112				
# of trees with active sequestration (see below)	388.9	112				

All will be replaced by natives trees.
Coast live oak will be the most commonly planted replacement tree.

IPCC Good practice Guidance for Land Use and Forestry (2003) applies a 20 year window for calculating positive sequestration from trees.

Tree survey Results (Hort Science, 2013) :

Percentage of Blue Gum/Eucalypyus trees > 20 years =	90%
Number of Eucalyptus Trees with active positve sequestration =	326.9

TREE REMOVAL:

Results:						
SF Tree:	Eucalyptus	Pine	Cypress	Matens	Tea	Acacia
CUFR Tree:	EUFI81 (Eucalyptus globulous)	PICO5 (Pinus contorta var. bolanderi)				
Sequestration Rate at 20 years =	260	163	N/A	N/A	N/A	N/A
kg CO2/tree/year =	118.00	74.23				
MT/tree/year =	0.12	0.07				
MT CO2 loss over 20 yrs:	46	8				

Sum MT CO2 loss over 20 years:	54	MT eCO2/yr
Loss of sequstration in each year	2.71	MT eCO2/yr

TREE REPLACEMENT: This calculation used data in a separate workbook: Urban Forestry Carbon Sequestration Workbook

	Live Oak		
# Trees	3448		
Tree type in Model:	Medium Hardwood		
Model has 15 year window			
Planting rate =	230 trees /year		
Total MT CO2 sequestered after 15 years=		178.18	MT eCO2
Total MT CO2 sequestered in Year 15 =		28.71	MT eCO2/yr
After 15 years annual increase =		2.79	MT eCO2/yr
Sequestration after 20 years =		192.13	

Sharp Park Vegetation Replacement

15000 tree would be removed in phases over the next 20 years, replaced with grassland or coastal scrub.

Table 1 shows the trees proposed for removal by park and species

Table 1: Trees proposed for removal in SF:

Eucalyptus
15000

IPCC Good practice Guidance for Land Use and Forestry (2003) applies a 20 year window for calculating positive sequestration from trees.

Tree survey Results (Hort Science, 2013) :

Percentage of trees > 20 years =	90%
Number of Trees with active positve sequestration =	1500

TREE REMOVAL:

	Results:		
SF Tree:	Eucalyptus		
CUFR Tree:	EUFI81 (Eucalyptus ficifolia)		
Sequestration Rate at 20 years =	260	lb CO2/tree/yr	
kg CO2/tree/year =	118.00		
MT/tree/year =	0.12		
Total MT CO2 loss over 20 yrs:	177		
Sum MT CO2 loss:	177		
Annual MT CO2 loss over 20 years =	8.85	MT eCO2/yr	

GRASSLAND REPLACEMENT:

Seuestration Rate =	4.31	MT CO2/acre	(Source CalEEMod, Appendix A;
Grassland acreage =	56	acres	
Sequestration =	241.36	MT eCO2/yr	

Planting in San Francisco Natural Areas

10000 plantings/yr — The number of plants the NAP propogates and plants in restoration sites throughout the City. Typically at least 200 of those plants being trees.

200 trees/yr
9800 plants/yr

TREE PLANTINGS: This calculation used data in a separate workbook: Urban Forestry Carbon Sequestration Workbook

# Trees	200 per year	
Tree type in Model:	Medium Hardwood	
Model has 15 year window		
Planting rate =	200 trees /year	
Total MT CO2 sequestered after 15 years=		154.94 MT eCO2
Total MT CO2 sequestered in Year 15 =		24.96 MT eCO2/yr
After 15 years annual increase =		2.28 MT eCO2/yr
Total MT CO2 sequestered after 20 years=		166.34 MT eCO2

PLANTS

No data available for singular herbaceous plant types
deep-rooted prairie grasses, forbs and herbaceous perennials have been found to sequester as much as 1/3 of a ton of carbon per acre per year (Rice, 200
The above data from : http://www.plna.com/content.asp?pl=99&contentid=99

Sequestration rate for herbaceous plants =

0.33	Ton C/acre/year	
1.22	Ton CO2/acre/yr	(based on C to CO2 conversion factor of 3.667 from Urban Forestry Carbon Seq
1.11	MT CO2/acre/yr	

Convert plants to acres

Assume:	4	square feet (sf)/plant
9800 plants =	39200	square feet
	0.90	acre of planting/year
Sequestration =	0.997	MT CO2/yr
Sequestration after 20 years =	19.94	MT eCO2/yr this is annual increase in sequestration that includes 20

2).

|uestration Workbook)

years of planting

Edwin M. Lee, Mayor
Philip A. Ginsburg, General Manager

MEMORANDUN

TO: Jessica Range, Environmental Planner, San Francisco Planning Department
FROM: Lisa Wayne, Open Space Manager, San Francisco Recreation and Park Department (SFRPD)
CC: Karen Mauney-Brodek, Deputy Director for Park Planning, SFRPD
DATE: November 27, 2012
RE: SNRAMP Tree Removal and Replacement

This memorandum provides additional detail on tree removal and replacement practices pursuant to the Significant Natural Resource Areas Management Plan (SNRAMP) and SFRPD's Natural Areas Program (NAP) current practices.

1. *Tree Removal:* The number and species of trees proposed for removal are detailed in the specific chapters of the SNRAMP and within SNRAMP Appendix F: Urban Forestry Statements. Appendix F of the SNRAMP explains how the number of trees to be removed from each Natural Area was determined, what defines a tree and other urban forestry practices. The number of trees to be removed from each Natural Area is also shown in Table 5 of the SNRAMP. Table 1 below, provides further detail on the species of tree proposed for removal under the SNRAMP. All tree removal proposed in the SNRAMP would be phased over 20 years.

2. *Tree Replacement in San Francisco Natural Areas:* In San Francisco, all trees that are proposed for removal would be replaced, although not necessarily within the same location or with the same species. A total of 3,448 trees would be removed in phases over 20 years and replaced with primarily native trees such as coast live oak, red alder, California buckeye, toyon, wax myrtle, and various willow trees (e. g., arroyo, shining, or yellow willow). Some non-native trees that provide high value habitat for wildlife may also be planted as replacement trees including Douglas fir, pines and other non-invasive conifers. The species that would be planted at a location would depend upon the particular habitat needs and ecosystem suitability. It is anticipated that coast live oak trees would be the most commonly planted replacement tree.

3. *Vegetation Replacement at Sharp Park Natural Area*: At Sharp Park, a total of 15,000 invasive trees, primarily blue gum eucalyptus, will be removed and replaced over 20 years with native grassland or coastal scrub such that all areas are restored with dense vegetative cover. It is anticipated that most of the 56 acres would be replanted with coastal scrub species.

4. *Planting in San Francisco Natural Areas*: Each year, the NAP propagates and plants over 10,000 plants in restoration sites throughout the City. Typically at least 200 of those plants being trees. Attached are four years of plant inventories from 2009 to 2013 that detail the plants that have been propagated and planted by NAP.

Table 1: Trees proposed for removal by park and species

Natural Area	Trees to be Removed by Species						Total trees to be removed
	Eucalyptus	Pine	Cypress	Maytens	Tea	Acacia	
Balboa	0	0	0	0	0	0	0
Bayview Park	506	5	0	0	0	0	511
Bernal Hill	0	0	0	0	0	0	0
Billy Goat Hill	0	0	0	0	0	0	0
Brooks Park	0	0	3	0	0	0	3
Buena Vista Park	10	0	0	0	0	0	10
Corona Heights		15	0	0	0	0	15
Dorothy Erskine	14	0	0	0	0	0	14
Duncan- Castro	0	0	0	0	0	0	0
Edgehill Mountain	0	0	0	0	0	0	0
Everson/Digby	0	0	0	0	0	0	0
Fairmount Park	0	0	0	0	0	0	0
Glen Canyon / O'Shaughnessy Hollow	120	0	0	0	0	0	120
Golden Gate Heights	0	0	0	0	0	0	0
Golden Gate Park/ Oak Woodlands	12	0	0	10	4	56	82
Grandview Park	4	0	1	0	0	0	5
Hawk Hill	0	0	0	0	0	0	0
India Basin	0	0	0	0	0	0	0
Interior Greenbelt	140	0	0	0	0	0	140
Kite Hill	0	0	0	0	0	0	0
Lake Merced	134	0	0	0	0	0	134
Lakeview/Ashton Mini Park	0	0	0	0	0	0	0
McLaren Park	759*	20*	30*	0	0	0	809
Mount Davidson	1570*	10*	20*	0	0	0	1600
Palou-Phelps	2	0	0	0	0	0	2
Pine Lake	0	0	0	0	0	0	0
Rock Outcrop	0	0	0	0	0	0	0
Tank Hill	0	0	0	0	0	0	0
Twin Peaks	0	3	0	0	0	0	3
15th Ave Steps	0	0	0	0	0	0	0
Sharp Park	14,800*	50*	150*	0	0	0	15,000

* Represents an estimate of species distribution

Edwin M. Lee, Mayor
Philip A. Ginsburg, General Manager

ATTACHMENT:

NAP Plant Inventories 2009 to 2013

Propagation Request and Inventory --2009/2010

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Abronia latifolia																		
Acaena pinnatifida var. californica																		
Achillea millefolium	50	70	150	80	200	48	130	20	150	21	70	10	400	139	350	110	50	29
Aesculus califonica		15	2	5			3	2		22	2	15		37	7	22	-7	15
Alnus rubra	30	160		33				5					30	160		38	30	122
Amelanchier pallida					40	16		5					40	16		5	40	11
Anaphalis margaritacea			10	35		45		10						45	10	45	-10	
Angelica hendersonii				10	16								16			10	16	-10
Aquilegia formosa	1				50	14	40					10	51	14	40	10	11	4
Arctostaphylos crustacea ssp. Crustac		1												1				1
Arctostaphylos tomentosa ssp. Crusta		1												1				1
Aristolochia californica		10		10		15								25		10		15
Armeria maritima ssp. californica																		
Artemisia californica	50		15	50	94			35		141	25	55	144	141	40	140	104	1
Artemisia douglasiana		16		10			15							16	15	10	-15	6
Artemisia pycnocephala		49	15	35										49	15	35	-15	14
Aster chilensis	200	12	120	50	21	33	50	15	175	104	30	10	396	149	200	75	196	74
Athyrium filix-femina var. cyclosorum			20	5		45		10						45	20	15	-20	30
Baccharis pilularis	360	45	85	45	100	40	60	30		40		35	460	125	145	110	315	15
Baccharis pilularis ssp. consanguinea			15	50				20	30	70	20		30	70	35	70	-5	
Calamagrostis nutkaensis					150		55						150		55		95	
Cardamine californica var. integrifolia					2		30				20		2		50		-48	
Carex obnupta						8								8				8
Castilleja wightii	10		50	25									10		50	25	-40	-25
Ceanothus thyrsiflorus	16	188	50	45			10	15			10	52	16	188	70	112	-54	76
Chlorogalum pomeridianum						14	5	5	15			5	15	14	5	10	10	4
Cirsium occidentale var. californicum	15		25										15		25		-10	
Cirsium occidentale var. occidentale		12												12				12
Cirsium quercetorum									25	10	25		25	10	25			10
Cornus sericea ssp. sericea	60	26	35	5								5	60	26	35	10	25	16
Danthonia californica var. americana	18		10										18		10		8	
Delphinium californicum									25		25		25		25			
Dichelostemma capitatum			10		10		10						10		20		-10	
Disporum hookeri					8	1	1						8	1	1		7	1
Dudleya farinosa																		
Elymus glaucus			35		35		10		50		55		85		100		-15	
Elymus multisetus									50		50		50		50			
Ericameria ericoides		45		45										45		45		
Erigeron glaucus	300	12	350										300	12	350		-50	12
Eriogonum latifolium	37		60		200	57	165	15					237	57	225	15	12	42
Eriophyllum confertiflorum	1				1	20	22						2	20	22		-20	20
Eriophyllum confertiflorum var. confertif																		

Propagation Request and Inventory --2009/2010

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Eriophyllum staechadifolium	25		35	5		23							25	23	35	5	-10	18
Festuca californica					100		100						100		100			
Festuca rubra			70	40					150	40	80		150	40	150	40		
Fragaria chiloensis	48		48										48		48			
Fragaria vesca					68		65						68		65		3	
Gaultheria shallon					35		10						35		10		25	
Heracleum lanatum	12	90	25		2	40	10	15		5	20	5	14	135	55	20	-41	115
Heteromeles arbutifolia		22	10	25	2	21		5	16				18	43	10	30	8	13
Heuchera micrantha					200		30						200		30		170	
Holodiscus discolor		13		5			10	5						13	10	10	-10	3
Hordeum brachyantherum									50		30		50		30		20	
Horkelia californica					100		80						100		80		20	
Iris douglasiana	11	16	25	15	12	90	10		22		25		45	106	60	15	-15	91
Iris longipetala									311		75		311		75		236	
Juncus effusus var. brunneus			10		65						50	10	65		60	10	5	-10
Juncus patens	45		50		120						50		165		100		65	
Leymus xvancouverensis		10		10										10		10		
Lomatium caruifolium									8				8				8	
Lomatium dasycarpum									1				1				1	
Lonicera hispidula var. vacillans						4				4				8				8
Lonicera involucrata	130	80	35	10		5	5			45	10	5	130	130	50	15	80	115
Lotus scoparius		15	20						60		55		60	15	75		-15	15
Lupinus albifrons var. collinus					110		174			8			110	8	174		-64	8
Lupinus chamissonis	37	49	20	45									37	49	20	45	17	4
Lupinus formosus var. formosus					60		141						60		141		-81	
Lupinus variicolor							175								175		-175	
Melica californica					75	61	130	35		40	20		75	101	150	35	-75	66
Melica torreyana					25	25	25	25					25	25	25	25		
Mimulus aurantiacus	250	120	145	160	150	19	90	45	100	470	50	55	500	609	285	260	215	349
Mimulus cardinalis					48						25		48		25		23	
Monardella villosa					10		25		90	40			100	40	25		75	40
Myrica californica	80	100		33								15	80	100		48	80	52
Nassella pulchra			10		50	46	115		150		40		200	46	165		35	46
Oemleria cerasiformis		20	5	30	45	80	40	5					45	100	45	35		65
Pentagramma triangularis					6								6				6	
Perideridia kelloggii						32				20	55			52	55		-55	52
Phacelia californica	1	40	25		65	140	150	15					66	180	175	15	-109	165
Polypodium californicum										12				12				12
Polystichum munitum	25			85	120	455	60			48		50	145	503	60	135	85	368
Prunus ilicifolia							5	20		60		15		60	5	35	-5	25
Pteridium aquilinum var. pubescens		3						5						3		5		-2
Quercus agrifolia		60		15		51	3	17		15				126	3	32	-3	94

Propagation Request and Inventory --2009/2010

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Ranunculus californicus							20		65		25		65		45		20	
Rhamnus californica	50	35	45	85	145	75	15	20	359	35	25	40	554	145	85	145	469	
Rhamnus crocea					3								3				3	
Ribes menziesii					1								1				1	
Ribes sanguineum var. glutinosum		5	80	50	225	240	70				25	20	225	245	175	70	50	175
Rosa californica	6	49		25									6	49		25	6	24
Rosa gymnocarpa							15								15		-15	
Rubus parviflorus	100	63	50	25			25						100	63	75	25	25	38
Rubus ursinus	6		10	10									6		10	10	-4	-10
Salix lasiolepis										20				20				20
Salix lucida ssp. lasiandra								10								10		-10
Salvia spathacea										14	10			14	10		-10	14
Sambucus mexicana		44								11				55				55
Sambucus racemosa var. racemosa			25	15	100	25							100	25	25	15	75	10
Satureja douglasii									16			25	16			25	16	-25
Scrophularia californica	100	159	110	140	21	40		10	150	218	50	25	271	417	160	175	111	242
Sedum spathulifolium					21					3			21	3			21	3
Senecio aronicoides											20				20		-20	
Sidalcea malvaeflora					37		89		182	3	30		219	3	119		100	3
Silene scouleri ssp. grandis									50		25		50		25		25	
Silene verecunda ssp. verecunda					32	28	25						32	28	25		7	28
Sisyrinchium bellum										65	65			65	65		-65	65
Solanum umbelliferum																		
Stachys ajugoides var. ajugoides						7						10		7		10		-3
Symphoricarpos albus var. laevigatus		22		5										22		5		17
Tellima grandiflora					138		65						138		65		73	
Triteleia laxa			10		9		20		12		10		21		40		-19	
Vaccinium ovatum						21	30			5				26	30		-30	26
Viola pedunculata							25		45		10		45		35		10	
Woodwardia fimbriata					6								6				6	
Wyethia angustifolia		6					20				20			6	40		-40	6
	2,074	1,683	1,920	1,371	3,133	1,884	2,478	419	2,357	1,589	1,232	472	7,564	5,156	5,630	2,262	1,934	2,894

Propagation Request and Inventory --2010/2011

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Abronia latifolia																		
Achillea millefolium	350	40	24	58	400	60	220	10			35	15	750	100	279	83	471	17
Aesculus californica		6		3				5		22		2		28		10		18
Agoseris grandiflora		38										5		38		5		33
Allium dichlamydeum							45		2		10		2		55		-53	
Alnus rubra	305	132											305	132			305	132
Amelanchier pallida					45	17		25					45	17		25	45	-8
Anaphalis margaritacea		40		30				15						40		45		-5
Angelica hendersonii					16								16				16	
Aquilegia formosa					125	14	20				10		125	14	30		95	14
Arabis blepharophylla					290		20						290		20		270	
Arctostaphylos tomentosa ssp. Crusta		1												1				1
Aristolochia californica		34		15		5		5						39		20		19
Artemisia californica				10		101	30	30	9	9	35	15	9	110	65	55	-56	55
Artemisia douglasiana		19		10			10	10						19	10	20	-10	-1
Artemisia pycnocephala	20	191		30									20	191		30	20	161
Aster chilensis	139	48	10	24		12	25	10	25	35	10	25	164	95	45	59	119	36
Athyrium filix-femina var. cyclosorum		3				11				3				17				17
Baccharis pilularis	90			35		14	10	15	19	39	10	10	109	53	20	60	89	-7
Baccharis pilularis ssp. consanguinea				10				10	19	38			19	38		20	19	18
Calamagrostis nutkaensis					20	78	20						20	78	20			78
Cardamine californica var. integrifolia							10				10				20		-20	
Carex obnupta										6				6				6
Castilleja wightii	80		25	10									80		25	10	55	-10
Ceanothus thyrsiflorus		89		75			5	33			15	15		89	20	123	-20	-34
Cirsium occidentale var. californicum		14	25											14	25		-25	14
Cirsium occidentale var. occidentale																		
Cirsium quercetorum									3	8		10	3	8		10	3	-2
Cornus sericea ssp. sericea	140	20									5		140	20	5		135	20
Corylus cornuta var. californica	5	7		5									5	7		5	5	2
Danthonia californica var. americana		12	10							13				25	10		-10	25
Delphinium californicum									25		10		25		10		15	
Disporum hookeri					60	1	5						60	1	5		55	1
Elymus glaucus		20							50	26		10	50	46		10	50	36
Elymus multisetus									25	20	10	10	25	20	10	10	15	10
Ericameria ericoides	100			35			15						100		15	35	85	-35
Erigeron glaucus	100	121		78			50						100	121	50	78	50	43
Eriogonum latifolium	10	60	10		125	25	140	10					135	85	150	10	-15	75
Eriophyllum confertiflorum						7		10						7		10		-3
Eriophyllum staechadifolium		80		30										80		30		50
Erysimum franciscanum	50	80		10									50	80		10	50	70
Festuca californica					50	20	45						50	20	45		5	20

Propagation Request and Inventory --2010/2011

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Festuca rubra		26		34			25		100	14	15		100	40	40	34	60	6
Fragaria chiloensis	149	6	12	60									149	6	12	60	137	-54
Fragaria vesca					22								22				22	
Fritillaria affinis					4								4				4	
Garrya elliptica						60								60				60
Gaultheria shallon					37		30						37		30		7	
Grindelia hirsutula							10								10		-10	
Heracleum lanatum	12	50				11	35	5			15		12	61	50	5	-38	56
Heteromeles arbutifolia				35				2		37				37		37		
Heterotheca sessiliflora ssp. bolanderi										9		5		9		5		4
Heuchera micrantha					250		20						250		20		230	
Holodiscus discolor		3		5		7	20	25		180				190	20	30	-20	160
Hordeum brachyantherum									90		30		90		30		60	
Horkelia californica					70		40						70		40		30	
Iris douglasiana	13	32		10	37	40	50	37			15		50	72	65	47	-15	25
Iris longipetala										225		20		225		20		205
Juncus effusus var. brunneus	25			25					50	80	10		75	80	10	25	65	55
Juncus lesueurii				48												48		-48
Juncus patens					28	30					10		28	30	10		18	30
Koeleria macrantha					50		50						50		50			
Leymus xvancouverensis		46		48										46		48		-2
Lomatium caruifolium						4								4				4
Lomatium dasycarpum									3				3				3	
Lonicera hispidula var. vacillans						5								5				5
Lonicera involucrata	100	149									5		100	149	5		95	149
Lotus scoparius									1				1				1	
Lupinus albifrons var. collinus					225		140			7	10		225	7	150		75	7
Lupinus chamissonis		62		65										62		65		-3
Lupinus formosus var. formosus					85		140		22		10		107		150		-43	
Lupinus variicolor					510		160						510		160		350	
Melica californica						5				20		15		25		15		10
Melica torreyana						5								5				5
Mimulus aurantiacus		36		75		96	70	40		51	35	25		183	105	140	-105	43
Mimulus cardinalis											10				10		-10	
Mimulus guttatus					14								14				14	
Monardella villosa					6	1	30			85		30	6	86	30	30	-24	56
Myrica californica	50	30									5	5	50	30	5	5	45	25
Nassella pulchra			10			40		30	50	13		15	50	53	10	45	40	8
Oemleria cerasiformis				45	36	132		15					36	132		60	36	72
Pentagramma triangularis					104	3							104	3			104	3
Perideridia kelloggii						15	5					15		15	5	15	-5	
Phacelia californica		20		20	400		130	10					400	20	130	30	270	-10

Propagation Request and Inventory --2010/2011

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Polygonum paronychia	22	15		15									22	15		15	22	
Polypodium californicum						46								46				46
Polystichum munitum				175	360	279		35				30	360	279		240	360	39
Prunus ilicifolia				15				5		26				26		20		6
Pteridium aquilinum var. pubescens				10				5								15		-15
Quercus agrifolia		134		18		36		7		30				200		25		175
Ranunculus californicus									29				29				29	
Rhamnus californica	12	17	10	90		123	13	35	50	319	20	15	62	459	43	140	19	319
Rhamnus crocea						7								7				7
Ribes divaricatum				15												15		-15
Ribes malvaceum																		
Ribes menziesii		1												1				1
Ribes sanguineum var. glutinosum				75	420	214	5	5			25		420	214	30	80	390	134
Rosa californica	5	21		5									5	21		5	5	16
Rosa gymnocarpa		1					20							1	20		-20	1
Rubus parviflorus	100	40		40									100	40		40	100	
Rubus ursinus	3		24										3		24		-21	
Salix lucida ssp. lasiandra										10				10				10
Salvia spathacea										45		30		45		30		15
Sambucus mexicana		39						3						39		3		36
Sambucus racemosa var. racemosa				10	200	18		8	100		10		300	18	10	18	290	
Satureja douglasii					21						10		21		10		11	
Scrophularia californica				132		74	10	10		188	35			262	45	142	-45	120
Sedum spathulifolium					30								30				30	
Senecio aronicoides											5				5		-5	
Sidalcea malvaeflora					37		75	20		78		15	37	78	75	35	-38	43
Silene scouleri ssp. grandis					6				7		10		13		10		3	
Silene verecunda ssp. verecunda																		
Sisyrinchium bellum		40			200			40	200		25	15	400	40	25	55	375	-15
Solanum umbelliferum										9				9				9
Solidago sp.							10								10		-10	
Stachys ajugoides var. ajugoides											10				10		-10	
Symphoricarpos albus var. laevigatus				5	10	13							10	13		5	10	8
Tellima grandiflora					46								46				46	
Triteleia laxa							10								10		-10	
Vaccinium ovatum					180		10	5					180		10	5	170	-5
Viola adunca							20								20		-20	
Viola pedunculata							10		12		10		12		20		-8	
Woodwardia fimbriata						10		20						10		20		-10
Wyethia angustifolia							10		4				4		10		-6	
	1,880	1,823	160	1,543	4,519	1,639	1,818	550	895	1,645	490	352	7,294	5,107	2,468	2,445	4,826	2,662

Propagation Request and Inventory --2011/2012

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Achillea millefolium	100	444	115	376	200		260				55		300	444	430	376	-130	68
Aesculus califonica										39				39				39
Allium dichlamydeum					90		10		100		10		190		20		170	
Alnus rhombifolia																		
Alnus rubra	20	126										5	20	126		5	20	121
Amelanchier pallida					46	53		15					46	53		15	46	38
Anaphalis margaritacea		18	25		32	14	20	20					32	32	45	20	-13	12
Angelica hendersonii						16								16				16
Aquilegia formosa						76		25						76		25		51
Arabis blepharophylla					96		25						96		25		71	
Arctostaphylos tomentosa ssp. Crusta		1												1				1
Aristolochia californica		24		10		6								30		10		20
Artemisia californica		20	30	20		62		55		62	5	45		144	35	120	-35	24
Artemisia douglasiana	1		10								10		1		20		-19	
Artemisia pycnocephala		164	10	100										164	10	100	-10	64
Aster chilensis	2	74	60		139	60	30	75	28		5	30	169	134	95	105	74	29
Athyrium filix-femina var. cyclosorum						12								12				12
Baccharis pilularis	38	33	20	65	58	120	15	65		20	20	25	96	173	55	155	41	18
Baccharis pilularis ssp. consanguinea		20	10	20				10	25				25	20	10	30	15	-10
Bromus carinatus ssp. carinatus																		
Calamagrostis nutkaensis																		
Calystegia purpurata ssp. purpurata	36		40										36		40		-4	
Camissonia cheiranthifolia	145		100										145		100		45	
Cardamine californica var. integrifolia							20		25				25		20		5	
Castilleja wightii	78		50										78		50		28	
Ceanothus thyrsiflorus	9	125	15	20				35	2	23		50	11	148	15	105	-4	43
Chlorogalum pomeridianum						15		10	15				15	15		10	15	5
Cirsium occidentale var. californicum	20		65										20		65		-45	
Cirsium quercetorum						3	10				15			3	25		-25	3
Cornus sericea ssp. sericea		164								20		5		184		5		179
Corylus cornuta var. californica		33		5										33		5		28
Danthonia californica var. americana		10							31		20		31	10	20		11	10
Delphinium californicum											10				10		-10	
Dichelostemma capitatum					7								7				7	
Disporum hookeri					38	7							38	7			38	7
Dodecatheon hendersonii					2		10		12				14		10		4	
Dryopteris arguta						2								2				2
Dudleya farinosa	86		70										86		70		16	
Elymus californicus																		
Elymus glaucus					10						5		10		5		5	
Ericameria ericoides		37		35										37		35		2
Erigeron glaucus	180	162	75	149	44		20						224	162	95	149	129	13

Propagation Request and Inventory --2011/2012

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Eriogonum latifolium	89	401		380	33		40	20			20		122	401	60	400	62	1
Eriophyllum staechadifolium	12		15	10									12		15	10	-3	-10
Erysimum franciscanum	100		25										100		25		75	
Festuca rubra	10		45						220		75		230		120		110	
Fragaria chiloensis	161		125										161		125		36	
Fragaria vesca					16								16				16	
Garrya elliptica					1	49		7					1	49		7	1	42
Gaultheria shallon						3								3				3
Grindelia hirsutula var. maritima					75		25						75		25		50	
Grindelia maritima																		
Heracleum lanatum	12	18					10	15			15		12	18	25	15	-13	3
Heteromeles arbutifolia				5		15	3	5			2			15	5	10	-5	5
Heuchera micrantha					15		10						15		10		5	
Holodiscus discolor	3			10		145		30					3	145		40	3	105
Hordeum brachyantherum									50		10		50		10		40	
Horkelia californica					50		20						50		20		30	
Iris douglasiana		80	100		7	6	40	30					7	86	140	30	-133	56
Iris longipetala						17				174		60		191		60		131
Juncus effusus var. brunneus					150						10		150		10		140	
Juncus effusus var. pacificus			15												15		-15	
Juncus lesueurii			20												20		-20	
Juncus patens					25						10		25		10		15	
Juncus phaeocephalus						2								2				2
Koeleria macrantha					7								7				7	
Leymus xvancouverensis		9	20											9	20		-20	9
Lomatium caruifolium										4				4				4
Lonicera hispidula var. vacillans	15					4							15	4			15	4
Lonicera involucrata	103	26										5	103	26		5	103	21
Lotus scoparius	50												50				50	
Lupinus albifrons var. collinus							40		50				50		40		10	
Lupinus chamissonis	70	280		305									70	280		305	70	-25
Lupinus formosus var. formosus							120		175				175		120		55	
Lupinus variicolor					45		110						45		110		-65	
Melica californica					50						5		50		5		45	
Melica torreyana						10								10				10
Mimulus aurantiacus		520	35	380		197	85	105	46	88	80	25	46	805	200	510	-154	295
Monardella villosa					45	20	40		45			10	90	20	40	10	50	10
Myrica californica		34										2		34		2		32
Nassella pulchra					200		150				10		200		160		40	
Oemleria cerasiformis				15		107		30						107		45		62
Pentagramma triangularis					53								53				53	
Pentagramma triangularis ssp. triangul																		

Propagation Request and Inventory --2011/2012

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Perideridia kelloggii					55		10				25		55		35		20	
Phacelia californica	150			100	138	100	100	45					288	100	100	145	188	-45
Polygonum paronychia	28		40										28		40		-12	
Polypodium californicum						18								18				18
Polystichum munitum				130	160	340		20					160	340		150	160	190
Prunus ilicifolia										8				8				8
Pteridium aquilinum var. pubescens							10								10		-10	
Quercus agrifolia		180		5		31		2		35				246		7		239
Rhamnus californica	7	5		85	42	31		65	20	237	20	30	69	273	20	180	49	93
Rhamnus crocea						7								7				7
Ribes divaricatum			15												15		-15	
Ribes malvaceum										22				22				22
Ribes menziesii		4												4				4
Ribes sanguineum var. glutinosum		202		75			15	45						202	15	120	-15	82
Rosa californica	100	8		10									100	8		10	100	-2
Rosa gymnocarpa	50	2				7							50	9			50	9
Rubus parviflorus		70		5	3								3	70		5	3	65
Rubus ursinus			25		3								3		25		-22	
Salix lucida ssp. lasiandra		10												10				10
Salvia spathacea										5				5				5
Sambucus mexicana		37							23		5		23	37	5		18	37
Sambucus racemosa var. racemosa		5		5	80				75				155	5		5	155	
Satureja douglasii					48	10			10				58	10			58	10
Scrophularia californica	85		70		100	40	105			39	25		185	79	200		-15	79
Sedum spathulifolium					30		25						30		25		5	
Sidalcea malvaeflora					94		40				5		94		45		49	
Silene scouleri ssp. grandis									9		10		9		10		-1	
Silene verecunda ssp. verecunda					222		20						222		20		202	
Sisyrinchium bellum					20		25		200		30		220		55		165	
Solanum umbelliferum										23				23				23
Solidago californica							20								20		-20	
Solidago spathulata ssp. spathulata	100		100										100		100			
Symphoricarpos albus var. laevigatus		10		5		22	10							32	10	5	-10	27
Tanacetum camphoratum	106		50										106		50		56	
Tellima grandiflora					32		30						32		30		2	
Triteleia laxa					15		10				10		15		20		-5	
Vaccinium ovatum						194								194				194
Viola adunca	6				2	10		20					8	10		20	8	-10
Viola pedunculata					15		10		59		15		74		25		49	
Woodwardia fimbriata					4								4				4	
Wyethia angustifolia					10		10			20		20	10	20	10	20		
	1,972	3,356	1,395	2,325	2,607	1,831	1,553	749	1,220	819	537	312	5,799	6,006	3,485	3,386	2,314	2,620

Propagation Request and Inventory --2012/2013

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Achillea millefolium		8	10	30	50	92	40	30					50	100	50	60		40
Aesculus californica								5		60		15		60		20		40
Allium dichlamydeum					177				286				463				463	
Alnus rubra		52						5				7		52		12		40
Amelanchier pallida						88		35						88		35		53
Anaphalis margaritacea						78		25						78		25		53
Angelica hendersonii					6			25					6			25	6	-25
Aquilegia formosa												20				20		-20
Aristolochia californica		10		10										10		10		
Armeria maritima ssp. californica	80	20		20									80	20		20	80	
Artemisia californica		65		15		140		53		40		35		245		103		142
Artemisia douglasiana	1	24										10	1	24		10	1	14
Artemisia pycnocephala		265		260										265		260		5
Aster chilensis	56			20		45		10		35		10	56	80		40	56	40
Aster radulinus									2				2				2	
Athyrium filix-femina var. cyclosorum						7								7				7
Baccharis pilularis	94	96		97	12	49		42		25		25	106	170		164	106	6
Baccharis pilularis ssp. consanguinea		20							175				175	20			175	20
Berberis pinnata					1								1				1	
Bromus carinatus ssp. maritimus																		
Camissonia cheiranthifolia		50		40										50		40		10
Camissonia ovata									158				158				158	
Cardamine californica var. integrifolia					2		20		8				10		20		-10	
Carex obnupta										30				30				30
Castilleja wightii	19		50	20									19		50	20	-31	-20
Ceanothus thyrsiflorus	15	38		32				5				20	15	38		57	15	-19
Chlorogalum pomeridianum					15								15				15	
Chlorogalum pomeridianum var. divaric																		
Cirsium occidentale var. californicum	45	7	50	5									45	7	50	5	-5	2
Clarkia rubicunda																		
Cornus sericea ssp. sericea		25						10		125		60		150		70		80
Corylus cornuta var. californica		24		30				15						24		45		-21
Delphinium californicum									119	8	25		119	8	25		94	8
Dichelostemma capitatum					196								196				196	
Disporum hookeri						30		10						30		10		20
Dodecatheon clevelandii ssp. patulum									13				13				13	
Dodecatheon hendersonii									98				98				98	
Elymus glaucus									5		5		5		5			
Ericameria ericoides		65		89										65		89		-24
Erigeron glaucus	115	107		87				20					115	107		107	115	
Eriogonum latifolium	50	140		87			40	5			10	10	50	140	50	102		38
Eriophyllum confertiflorum								5								5		-5

Propagation Request and Inventory --2012/2013

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Eriophyllum staechadifolium		100		15										100		15		85
Erysimum franciscanum	5	60	5	20									5	60	5	20		40
Eschscholzia californica																		
Festuca californica						40		15						40		15		25
Festuca rubra		70		50						30	30			100	30	50	-30	50
Fragaria chiloensis	20	61		80									20	61		80	20	-19
Fragaria vesca					24			24					24			24	24	-24
Fritillaria affinis					1								1				1	
Garrya elliptica					18	39		40					18	39		40	18	-1
Gaultheria shallon						4								4				4
Gnaphalium californicum						40								40				40
Gnaphalium canescens ssp. beneolen																		
Heracleum lanatum		110		45				40				5		110		90		20
Heteromeles arbutifolia	8	40		23				5					8	40		28	8	12
Heuchera micrantha					15								15				15	
Holodiscus discolor				51		91		40				5		91		96		-5
Hordeum brachyantherum								155		146				146		155		-9
Horkelia californica						20		15						20		15		5
Iris douglasiana	725	223		10	650	180		150				100	1,375	403		260	1,375	143
Iris longipetala										24				24				24
Juncus effusus var. brunneus		50						30				20		50		50		
Juncus lesueurii		20		20										20		20		
Juncus patens	41												41				41	
Lasthenia californica																		
Leymus xvancouverensis		26		20										26		20		6
Lonicera hispidula var. vacillans		72		40	4	3							4	75		40	4	35
Lonicera involucrata	50	36						85		52		22	50	88		107	50	-19
Lotus scoparius		6		25										6		25		-19
Lupinus albifrons var. collinus					50		80						50		80		-30	
Lupinus arboreus																		
Lupinus bicolor																		
Lupinus chamissonis		115		109										115		109		6
Lupinus formosus var. formosus							160		257				257		160		97	
Lupinus variicolor					11		40						11		40		-29	
Mimulus aurantiacus	130	134		44				45				10	130	134		99	130	35
Monardella villosa					27	40		40		10		10	27	50		50	27	
Myrica californica		32						5						32		5		27
Nassella pulchra					200		100				10		200		110		90	
Oemleria cerasiformis				15		25		5				5		25		25		
Oenothera elata ssp. hookeri																		
Pentagramma triangularis					50								50				50	
Perideridia kelloggii					42						10		42		10		32	

Propagation Request and Inventory --2012/2013

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL
Phacelia californica	10			34		69	40	25				10	10	69	40	69	-30	
Phacelia distans																		
Phacelia malvifolia																		
Plantago erecta																		
Polygonum paronychia		20		5										20		5		15
Polypodium californicum						4		2						4		2		2
Polystichum munitum				400		376		25				10		376		435		-59
Prunus ilicifolia				8						8				8		8		
Pteridium aquilinum var. pubescens		3												3				3
Quercus agrifolia	35	146		131		24		5	27			15	62	170		151	62	19
Rhamnus californica	10	4		95		69				86		60	10	159		155	10	4
Rhamnus crocea					6	6		5					6	6		5	6	1
Ribes divaricatum				15												15		-15
Ribes malvaceum										19		20		19		20		-1
Ribes menziesii	5	1											5	1			5	1
Ribes sanguineum var. glutinosum		76		50		52		35				35		128		120		8
Rosa californica	3	90				9		30					3	99		30	3	69
Rosa gymnocarpa		5		24		12								17		24		-7
Rubus parviflorus		31		15				25						31		40		-9
Rubus ursinus				95	130	70							130	70		95	130	-25
Salix lucida ssp. lasiandra		6												6				6
Salvia spathacea								20		26				26		20		6
Sambucus mexicana		7		15										7		15		-8
Sambucus racemosa var. racemosa				112		130		40				20		130		172		-42
Satureja douglasii					80	15		5				10	80	15		15	80	
Scrophularia californica		40		40		20		10						60		50		10
Sedum spathulifolium					25		20						25		20		5	
Sidalcea malvaeflora										20	10			20	10		-10	20
Silene scouleri ssp. grandis									9				9				9	
Silene verecunda ssp. verecunda					42		50						42		50		-8	
Sisyrinchium bellum									50		10		50		10		40	
Solanum umbelliferum										3				3				3
Solidago spathulata ssp. spathulata	65	65		65									65	65		65	65	
Symphoricarpos albus var. laevigatus		4			120			5					120	4		5	120	-1
Symphoricarpos mollis								15								15		-15
Tanacetum camphoratum		100		90										100		90		10
Tellima grandiflora				80				10				12				102		-102
Triteleia laxa					98								98				98	
Vaccinium ovatum						101		50						101		50		51
Viola adunca					6	6	60			5			6	11	60		-54	11
Viola pedunculata									46				46				46	
Woodwardia fimbriata	35							5	24	10		8	59	10		13	59	-3

Propagation Request and Inventory --2012/2013

	ZONE 1				ZONE 2				ZONE 3				TOTALS				DELTA	
	INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS		INVENTORY		REQUESTS			
Species	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	LUKE	GAL	**LUKE**	**GAL**
	1,617	2,769	115	2,683	2,058	1,974	650	1,306	1,277	762	110	589	4,952	5,505	875	4,578	**4,077**	**927**

HORT SCIENCE

Memorandum

DATE: January 17, 2013

TO: Jessica Range, SF Planning Department

FROM: Jim Clark

SUBJECT: Age of blue gum in San Francisco's Natural Area Parks

As coordinator for the environmental analysis for the Significant Natural Resource Area Management Plan proposed by San Francisco Rec and Park, you asked if I could provide an estimate of the percentage of blue gums (*Eucalyptus globulus*) in these forests that are at least 20 years or older.

Blue gums in Natural Area parks

I have assessed over 800 blue gums in Pine Lake, Glen Canyon, Mount Davidson and McLaren Parks (Table 1). My work focused on trees adjacent to areas of high use such as streets, playgrounds, adjacent properties and parking lots. The assessment was limited to tree 6" or greater in diameter. I examined 675 trees with one stem and 146 with 2 or more stems.

Table 1. Diameter distribution and condition of blue gum. Pine Lake, Glen Canyon, McLaren and Mount Davidson. Recreation & Park Department. San Francisco CA.

Diameter Class (in.)	Condition					Avg. Condition	No. of Trees
	Dead	Poor	Fair	Good	Excel-lent		
<10	--	24	1	--	--	1.8	25
10 to 19	--	151	45	12	--	2.2	208
20 to 29	--	72	76	25	8	2.8	181
30 to 39	--	41	66	30	3	2.9	140
40 to 49	--	11	40	21	2	3.2	74
50 to 59	--	1	13	13	1	3.5	28
60 to 69	--	--	8	7	--	3.5	15
70 to 79	--	1	1	--	--	2.5	2
80 to 89	--	--	--	1	--	4.0	1
90 & >	--	--	1	--	--	3.0	1
Multistem	--	46	84	16	--	2.8	146
Total	**--**	**347**	**335**	**125**	**14**	**2.7**	**821**

Condition rating: 0 = dead. 1=poor. 5=excellent.
Trees with more than one stem were categorized as multistem.

HortScience, Inc. | 325 Ray Street | Pleasanton, CA 94566
phone 925.484.0211 | fax 925.484.5096 | www.hortscience.com

Among the 675 trees with one stem, approximately 33% were less than 20" in diameter. Almost half of the trees were between 21" and 40" while about 18% were larger than 40". In these four parks, trunk diameters varied from 6" to 90". Tree condition was poorer in small diameter trees.

In general the blue gum stands I examined were a mix of large diameter, tall dominant trees, smaller diameter codominant and intermediate trees and small diameter suppressed individuals. In some cases, small diameter trees were present along the edge of the stand.

All stands had a large variation in trunk diameter. Although I made no measurements, tree height appeared to vary just as widely. I think that all of the trees were planted at the same time. Some grew faster than others, becoming large and dominant. Because blue gum is intolerant of shade, slow growing trees became less vigorous and remained small in size.

Blue gum stands

Stands of blue gums in San Francisco were created by planting. McBride and Froehlich (1984) noted that almost all of the older blue gum stands in San Francisco were even-aged, established in a brief period in the late 1800s and early 1900s. It is likely that some blue gum stands in San Francisco parks including Glen Canyon, McLaren, Mount Davidson and Pine Lake Parks were planted after this time.

I did not observe, however, any recent plantings of this species. All of the stands I observed were mature in development.

Historical photos viewed on Google Earth illustrate overall patterns of vegetation. For the four Natural Area Parks, it is clear that vegetation was well-established by 1993. This would suggest that the large majority of blue gums are over 20 years old.

Blue gum can reproduce by both seed and root sprouts. McBride and Froelich noted the absence of seedling development and the presence of root sprouts in their assessment of old blue gum stands in Golden Gate Park, Mountain Lake Park and the Presidio. I don't know if the small diameter trees I observed at the edge of some stands were sprouts or seedlings. Whatever their origin, such small trees were not common.

Given my observations of blue gum in Glen Canyon, McLaren, Mount Davidson and Pine Lake Park, I estimate that at least 90% are more than 20 years old.

Please contact me with any questions.

McBride, J. and D. Froehlich. 1984. Structure and condition of older stands in parks and open space areas of San Francisco CA. *Urban Ecology*. 8: 165-178.

Appendix C

10 Vegetation

The program calculates GHG emissions associated with the vegetation activities of land use change and the planting of new trees.

The program calculates GHG emissions from vegetation activities according to the IPCC protocol for vegetation since it has default values that work well with the information typically available for development projects. This method is similar to the CAR Forest Protocol[54] and the Center for Urban Forest Research Tree Carbon Calculator[55], but it has more general default values available that will generally apply to all areas of California without requiring detailed site-specific information[56].

10.1 Land Use Change

A development which changes land use type results in changes in CO_2 sequestration from the atmosphere which would not have been captured had there been no land-type change.

Overall Change in Sequestered CO_2 [MT CO_2]

$$= \sum_i (SeqCO_2)_i \times (area)_i - \sum_j (SeqCO_2)_j \times (area)_j$$

Where:

$SeqCO_2$	=	mass of sequestered CO_2 per unit area [MT CO_2/acre]
area	=	area of land for specific land use type [acre]
i	=	index for final land use type
j	=	index for initial land use type

Overall change in sequestered CO_2 is the summation of sequestered CO_2 from initial land use type multiplied by area of land for initial land use type subtracted by the summation of sequestered CO_2 from final land use type multiplied by area of land for final land use type. There is no reduction in GHG emissions associated with preservation of a land.

$SeqCO_2$

The mass of sequestered CO_2 per unit area [MT CO_2/acre] is dependent on the specific land use type. The program uses default CO_2 sequestration values from CCAR for each land use that will be preserved or created:

---

[54] CCAR. 2007. Forest Sector Protocol Version 2.1. September. Available at: http://www.climateregistry.org/resources/docs/protocols/industry/forest/forest_sector_protocol_version_2.1_sept2007.pdf

[55] Available at: http://www.fs.fed.us/ccrc/topics/urban-forests/ctcc/

[56] The CAR Forest Protocol and Urban Forest Research Tree Carbon Calculator are not used since their main focus is annual emissions for carbon offset considerations. As such they are designed to work with very specific details of the vegetation that is not available at a CEQA level of analysis.

this is equivalent CO2 stored in mature vegetation per acre
this is not a sequestration rate as in MT CO2/acre/year

Land Use	Sub-Category	Default CO_2 accumulation per acre (MT CO_2/ acre)
Forest Land	Scrub	14.3
	Trees	111
Cropland	--	6.20
Grassland	--	4.31
Wetlands	--	0

The EIR uses the 4.31 figure as an annual CO2 capture rate of CO2/acre/year.
It is not a rate.

The default annual CO_2 is calculated by multiplying total biomass (MT dry matter/acre) from IPCC data by the carbon fraction in plant material (0.47), then using the ratio of molecular weights (44/12) to convert from MT of carbon (C) to MT of carbon dioxide (CO_2).

Vegetation Type

Vegetation types are defined by IPCC as follows:

(i) Forest Land

This category includes all land with woody vegetation consistent with thresholds used to define Forest Land in the national greenhouse gas inventory. It also includes systems with a vegetation structure that currently fall below, but *in situ* could potentially reach the threshold values used by a country to define the Forest Land category.

(ii) Cropland

This category includes cropped land, including rice fields, and agro-forestry systems where the vegetation structure falls below the thresholds used for the Forest Land category.

(iii) Grassland

This category includes rangelands and pasture land that are not considered Cropland. It also includes systems with woody vegetation and other non-grass vegetation such as herbs and brushes that fall below the threshold values used in the Forest Land category. The category also includes all grassland from wild lands to recreational areas as well as agricultural and silvi-pastural systems, consistent with national definitions.

(iv) Wetlands

This category includes areas of peat extraction and land that is covered or saturated by water for all or part of the year (e.g., peatlands) and that does not fall into the Forest Land, Cropland, Grassland or Settlements categories. It includes reservoirs as a managed sub-division and natural rivers and lakes as unmanaged sub-divisions.

Area

The user must specify area of land in acres for specific final and initial land use types. These area changes include not only the area of land that will be converted to buildings, but also areas disrupted by the construction of utility corridors, water tank sites, and associated borrow and

grading areas. Areas temporarily disturbed that will eventually recover to become vegetated will not be counted as vegetation removed as there is no net change in vegetation or land use.[57]

10.2 Sequestration

Planting trees will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing. The amount of CO_2 sequestered depends on the type of tree.

sequestration rate only comes in to calculate carbon storage in a mature landscape

$$\text{Total Sequestered } CO_2 = (\text{Growing Period} \times \sum_{i=1}^{n} [\text{Sequestration } i \times \text{Trees } i])$$

Where:

Growing Period = Growing period for all trees, expressed in years (20).
n = Number of broad species classes.
Sequestration i = Default annual CO_2 accumulation per tree for broad species class i.
Trees i = Number of net new trees of broad species class i.

Total Sequestered CO_2 is the growing period for all trees multiplied by the summation of annual CO_2 accumulation multiplied by the number of new trees per broad species class.

Growing Period

The program assumes the IPCC active growing period of 20 years. Thereafter, the accumulation of carbon in biomass slows with age, and will be completely offset by losses from clipping, pruning, and occasional death. Actual active growing periods are subject to, among other things, species, climate regime, and planting density. Note that trees may also be replaced at the end of the 20-year cycle, which would result in additional years of carbon sequestration. However, this would be offset by the potential net release of carbon from the removal of the replaced tree.

[57] This assumption facilitates the calculation as a yearly growth rate and CO_2 removal rate does not have to be calculated. As long as the disturbed land will indeed return to its original state, this assumption is valid for time periods over 20 years.

Sequestration

The program uses default annual CO_2 accumulation per tree for broad species class as follows:

Broad species class	**Default annual CO_2 accumulation per tree[1] (MT CO_2/ year)**
Aspen	0.0352
Soft maple	0.0433
Mixed hardwood	0.0367
Hardwood maple	0.0521
Juniper	0.0121
Cedar/larch	0.0264
Douglas fir	0.0447
True fir/Hemlock	0.0381
Pine	0.0319
Spruce	0.0337
Miscellaneous[2]	0.0354

1. IPCC's carbon (C) values converted to carbon dioxide (CO_2) using ratio of molecular weights (44/12).
2. Average of all other broad species classes. To be assumed if tree type is not known.

Appendix D1, D2

EIP ASSOCIATES

Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1-foot resolution - 2001; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 29, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science (SFSUIGIS).

N

DRAFT
May 29, 2005

0 70 140 280
Feet

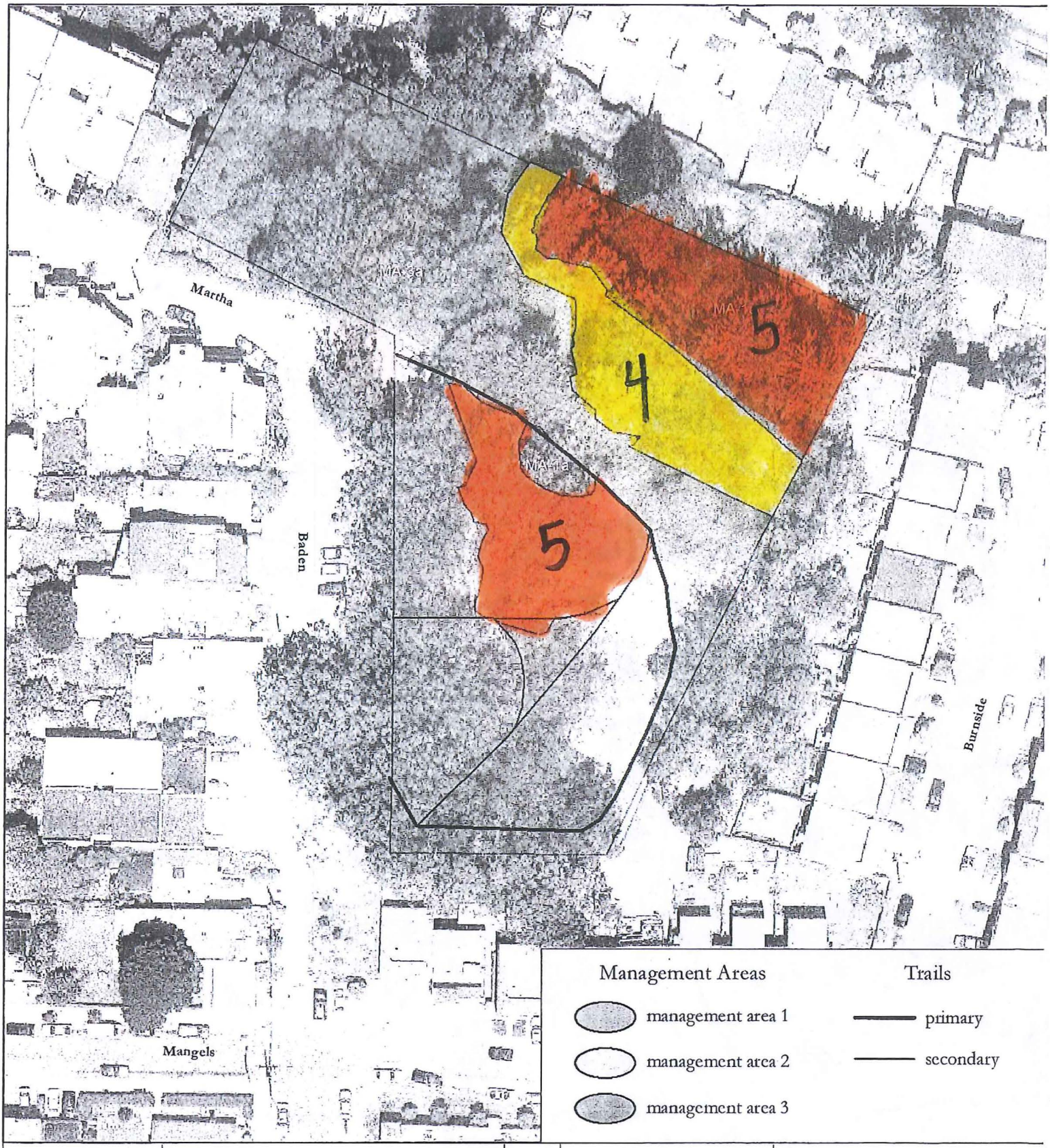
FIGURE 6.23 - 5

MANAGEMENT AREAS AND TRAIL PLAN

Interior Greenbelt

Significant Natural Resource Areas Management Plan

San Francisco, California



EIP ASSOCIATES

Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1-foot resolution - 2001; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 28, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science (SFSUIGIS).

N

DRAFT
May 28, 2005

0 12.5 25 50
Feet

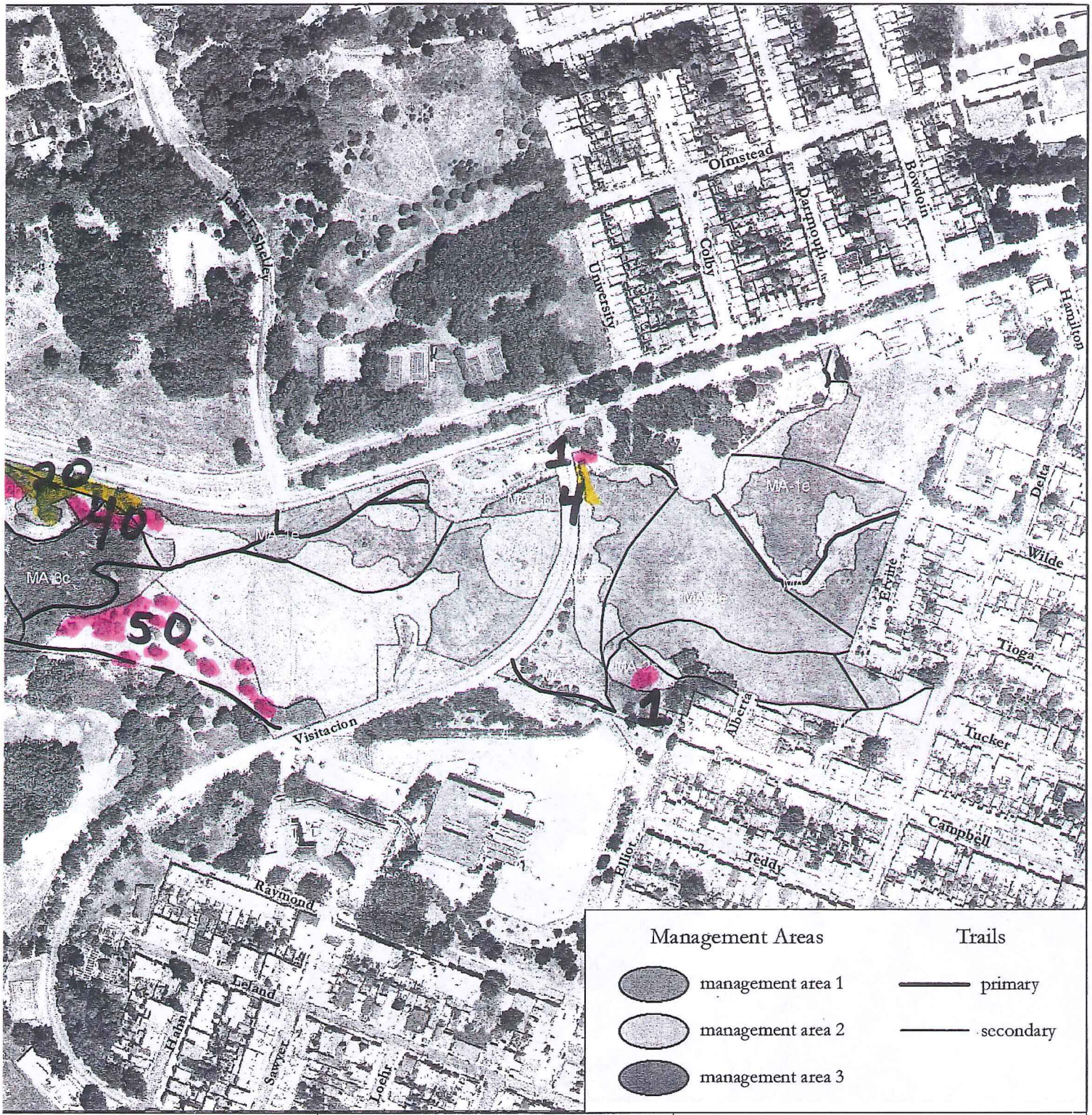
FIGURE 6.24 - 4

MANAGEMENT AREAS AND TRAIL PLAN

Dorothy Erskine

Significant Natural Resource Areas Management Plan

San Francisco, California

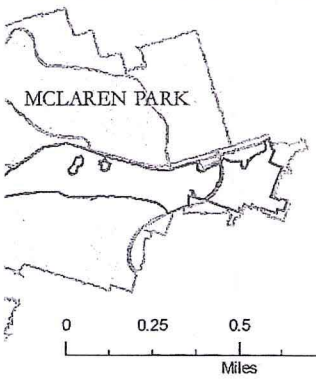


Management Areas

- management area 1
- management area 2
- management area 3

Trails

- primary
- secondary



DRAFT
May 30, 2005

0 187.5 375 750
Feet

FIGURE 6.19 - 12

MANAGEMENT AREAS AND TRAIL PLAN

McLaren Park

Significant Natural Resource Areas Management Plan

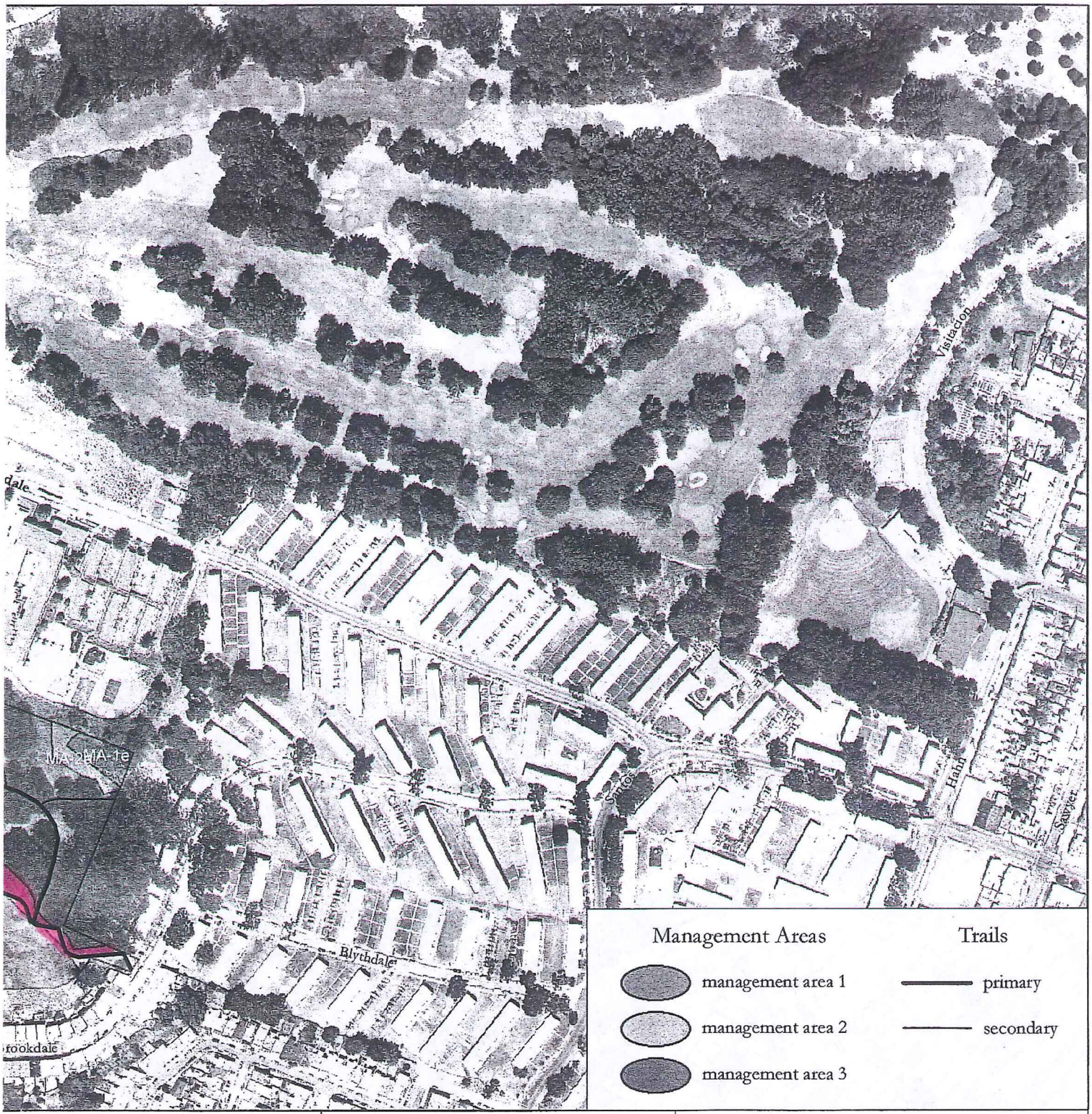
San Francisco, California

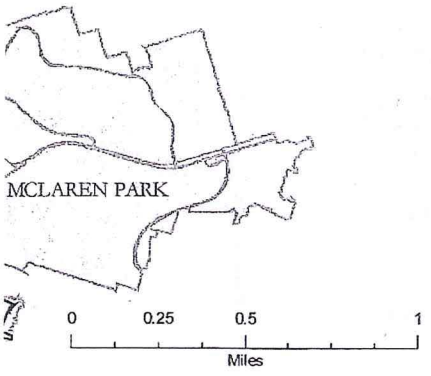
Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1 Foot Resolution - 2001: City of San Francisco Department of Public Works, San Francisco; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 30, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science (SFSUIGIS).

EIP ASSOCIATES

N





DRAFT
May 30, 2005

0 125 250 500
Feet

FIGURE 6.19 - 13

MANAGEMENT AREAS AND TRAIL PLAN

McLaren Park

Significant Natural Resource Areas Management Plan

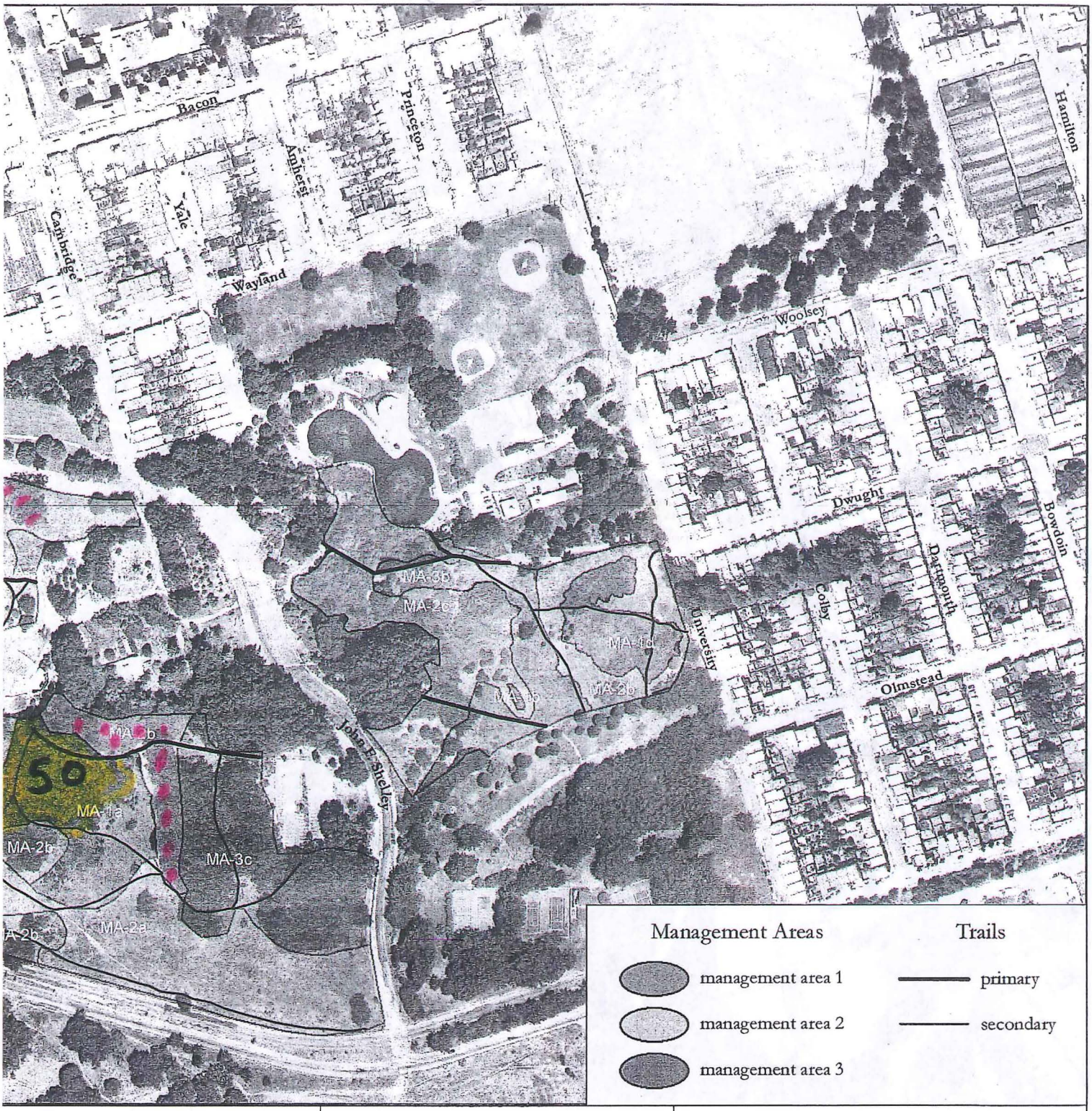
San Francisco, California

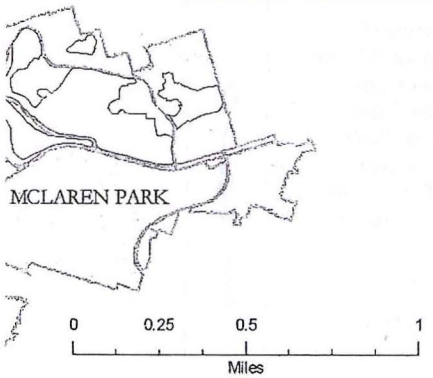
EIP ASSOCIATES

Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1 Foot Resolution - 2001: City of San Francisco Department of Public Works, San Francisco; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 29, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science (SFSUIGIS).

N





DRAFT
May 30, 2005

0 125 250 500
Feet

FIGURE 6.19 - 11

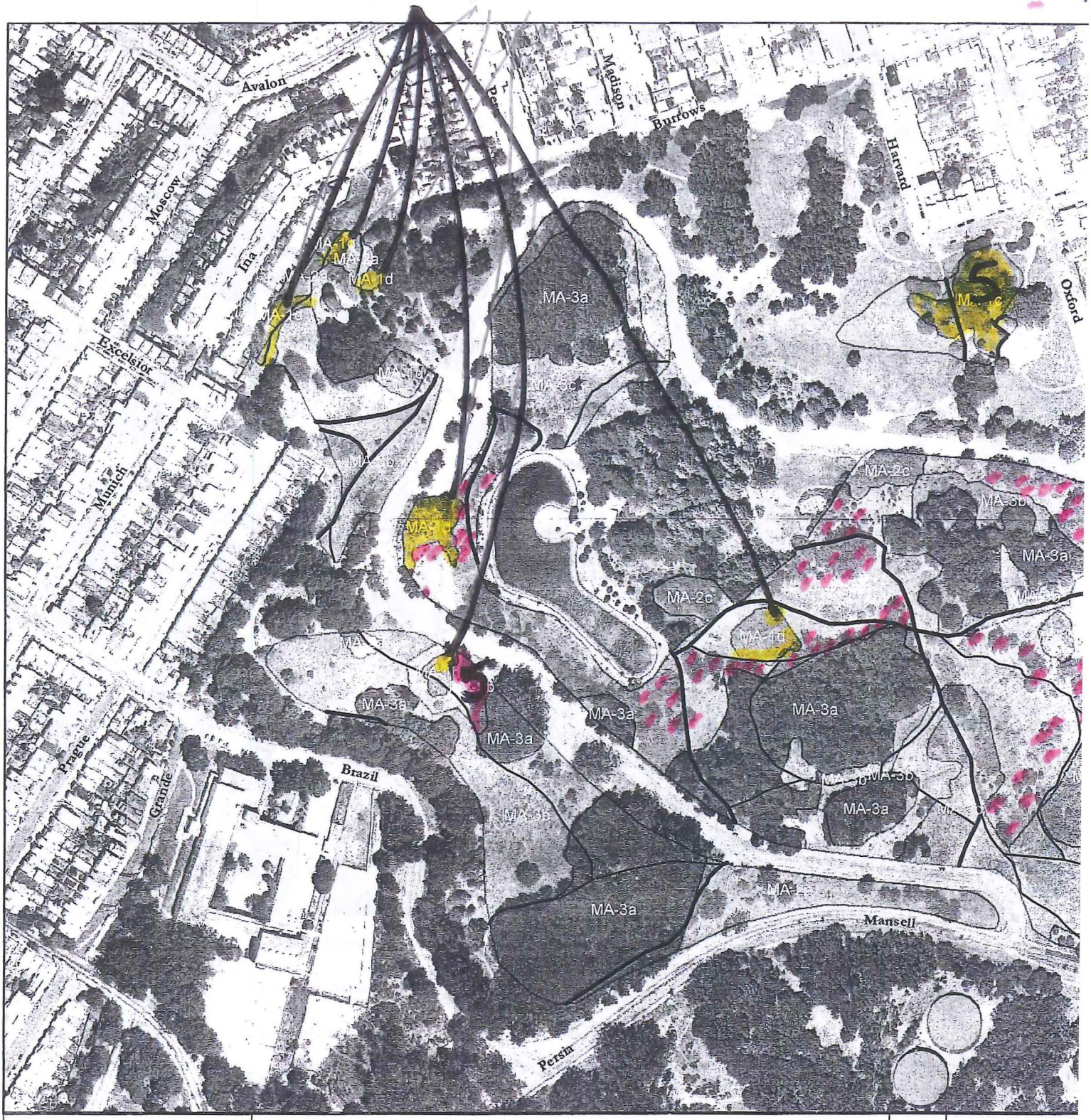
MANAGEMENT AREAS AND TRAIL PLAN

McLaren Park

Significant Natural Resource Areas Management Plan

San Francisco, California

20 total



Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s StreetMap 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1 Foot Resolution - 2001: City of San Francisco Department of Public Works, San Francisco; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 29, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science (SFSUIGIS).

EIP ASSOCIATES

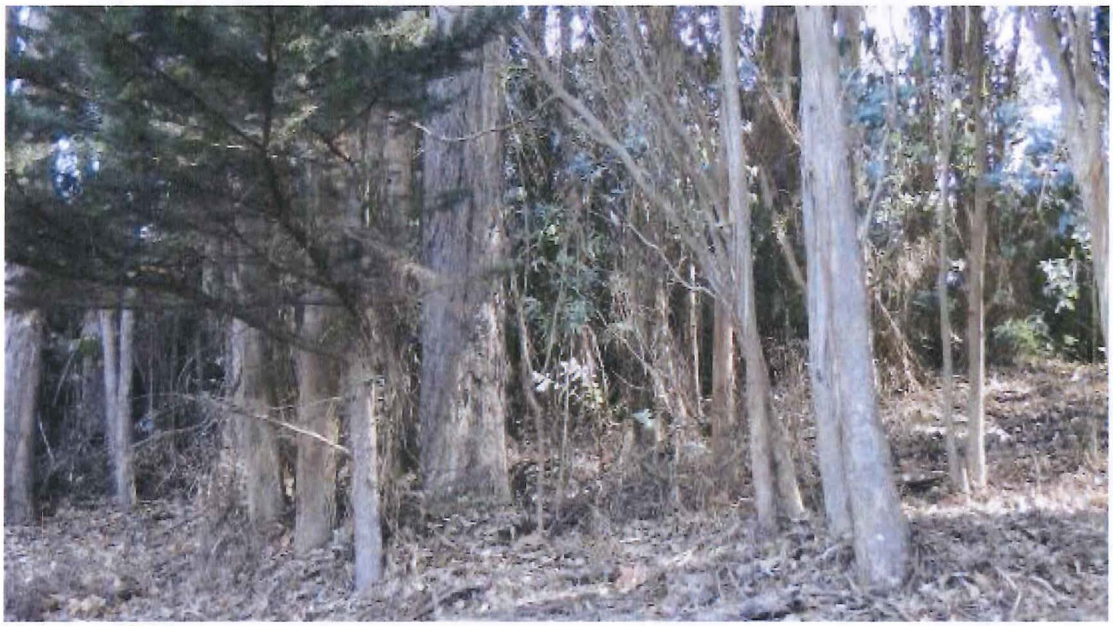
N

Appendix E Our forests regenerate. There are many young trees.

Bayview Hill, large trees killed by NAP supporters surrounded by young trees

McLaren Park

McLaren Park It is not just eucalyptus saplings we worry about.



McLaren Park

Mt Davidson

Mt. Davidson, girdled tree with younger trees

Mt Davidson, there would be more saplings in the photo above, but they have been cut.

Edge Hill has lots of young trees

where they have not been cut down.

Appendix F Trail Closure Maps

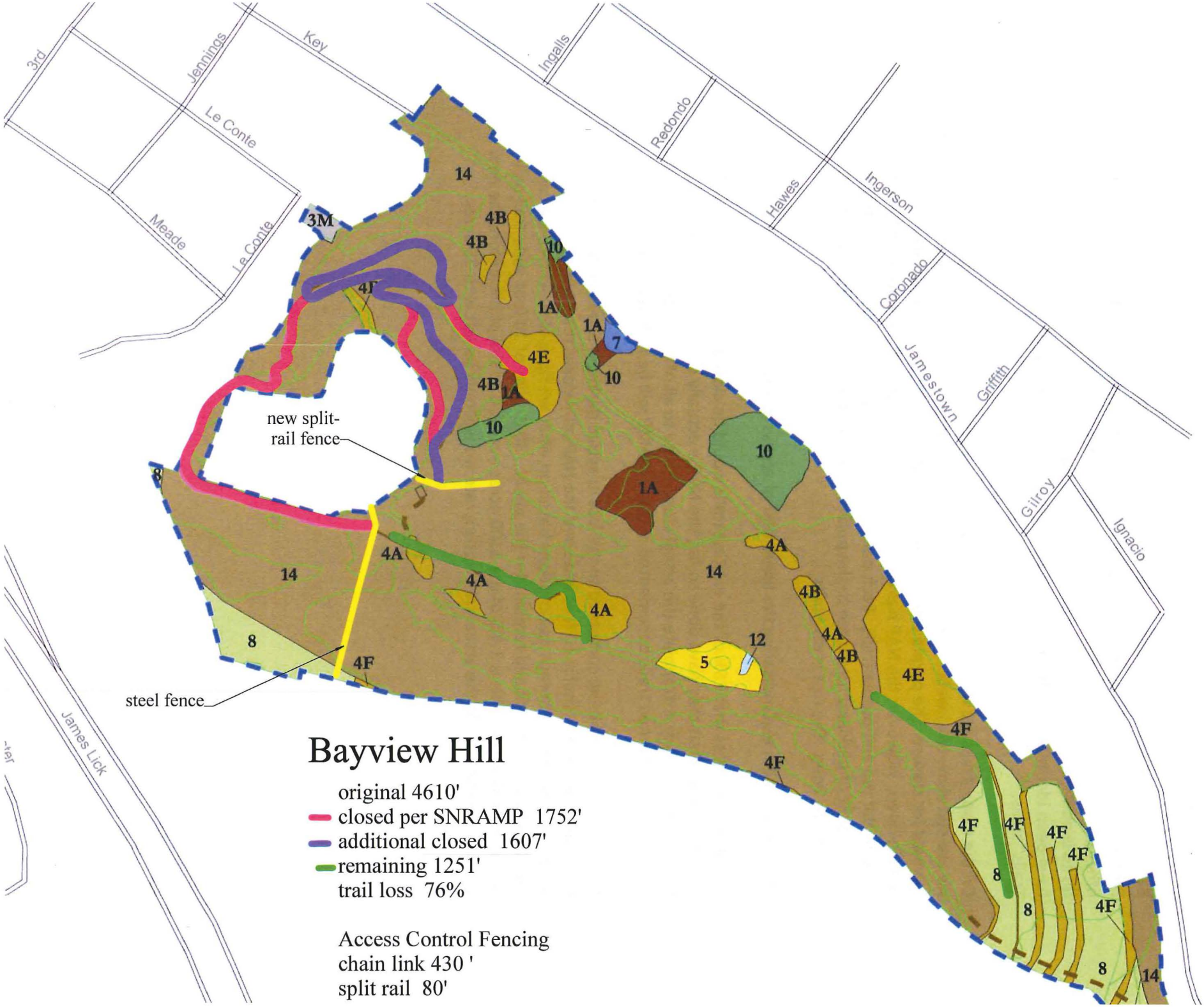
Below are maps of the Natural Areas showing trail closures implemented by the Natural Areas Program since 2006. Some have been physically decommissioned by placing logs, branches and other obstructions in the trails. Many have been fenced off. Others can still be accessed, but to do so is punishable by a fine. The latter applies to Natural Areas where "Designated Trails" have been identified for the public and users would be disobeying the "Stay On Designated Trails" signs.

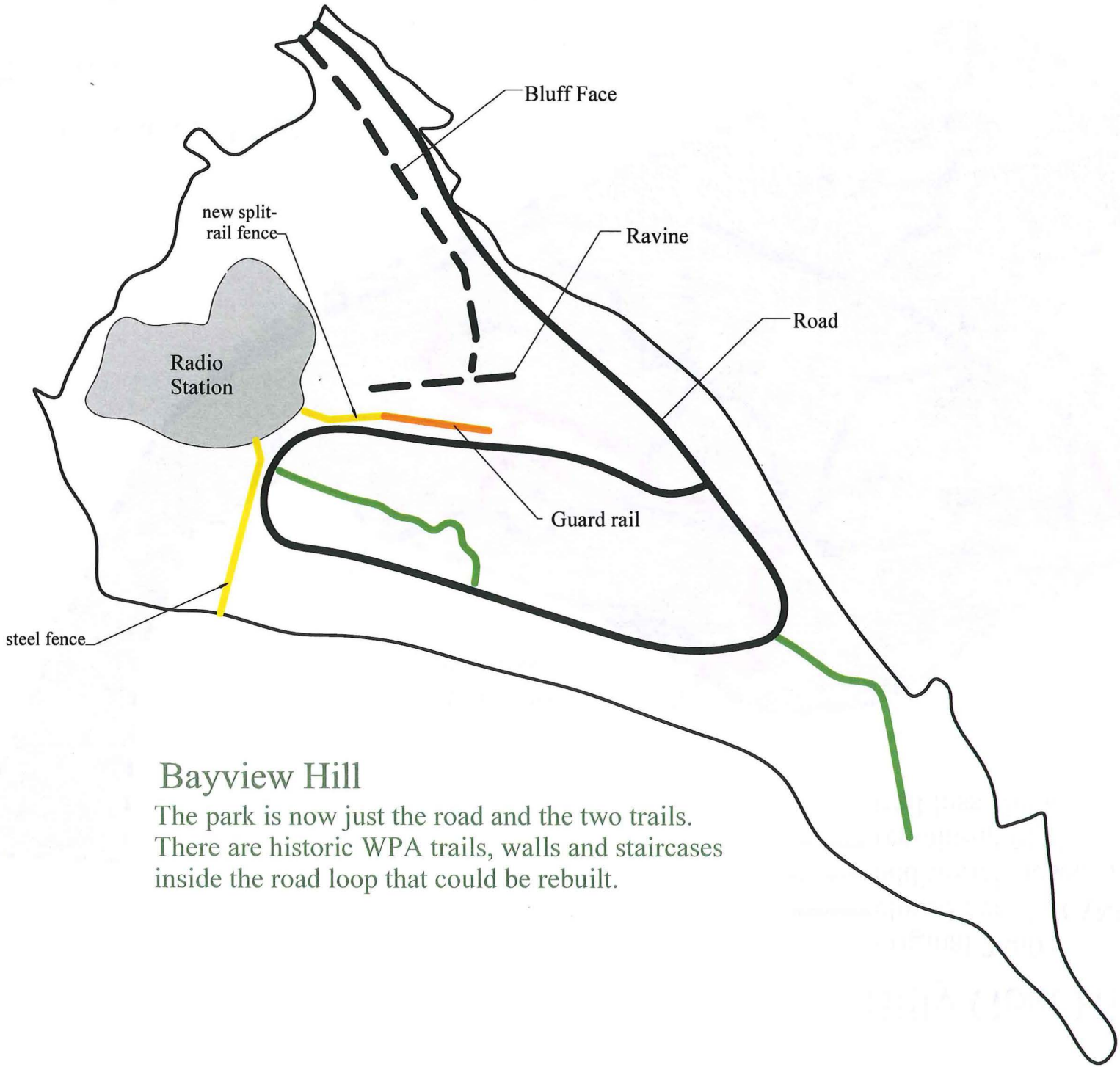
On the maps, trails are marked in three colors. The green trails are the Designated Trails where we are still allowed to walk. The red trails are ones identified in the SNRAMP as unwanted and planned for closure. The purple trails are identified in the SNRAMP as Designated Trails to remain open. However, the NAP has chosen to close those as well. We are now forbidden to walk on the red and purple trails. Each park map is followed by a skeleton map highlighting the tiny amount of parkland now open to the public. The only public use of NAP parkland is along those green lines. The rest is off-limits.

The maps contain text indicating the linear feet of access control fence installed by the NAP.

The SNRAMP states that 26% of the existing trails would be closed, leaving us with 30.8 miles of trail. Based on what they have done so far, the NAP is actually closing 51% of the trails in Natural Areas. If we extrapolate the actual closure rate to all of the Natural Areas, the 41 miles of existing and planned trails documented in the SNRAMP will be reduced to 20.9 miles.

The loss in trails is nothing compared to the loss in actual parkland available to the public. Assuming the average trail is 10 feet wide and the NAP only closes the trails disclosed in the SNRAMP (both very generous assumptions based on what we have seen so far), we can calculate how much parkland remains for the public. 30.8 miles of 10 foot wide trail only amounts to 37 acres. This is 3.4% of the 1100 acres available to the public before the new access restrictions. At the actual trail closure rate we will only be left with 25 acres.


3rd
Jennings
Key
Le Conte
Meade
Le Conte
Ingalls
Redondo
Hawes
Ingerson
Coronado
Jamestown
Griffith
Gilroy
Ignacio
James Lick
14
3M
4B
4B
10
4F
1A
1A
7
4E
10
4B
1A
10
new split-
rail fence
10
1A
8
14
4A
4A
4A
14
4B
4A
4B
4E
8
4F
5
12
steel fence
4F
4F
4F
4F
4F
4F
4F
8
8
8
14
Bayview Hill
original 4610'
closed per SNRAMP 1752'
additional closed 1607'
remaining 1251'
trail loss 76%
Access Control Fencing
chain link 430 '
split rail 80'



Bayview Hill

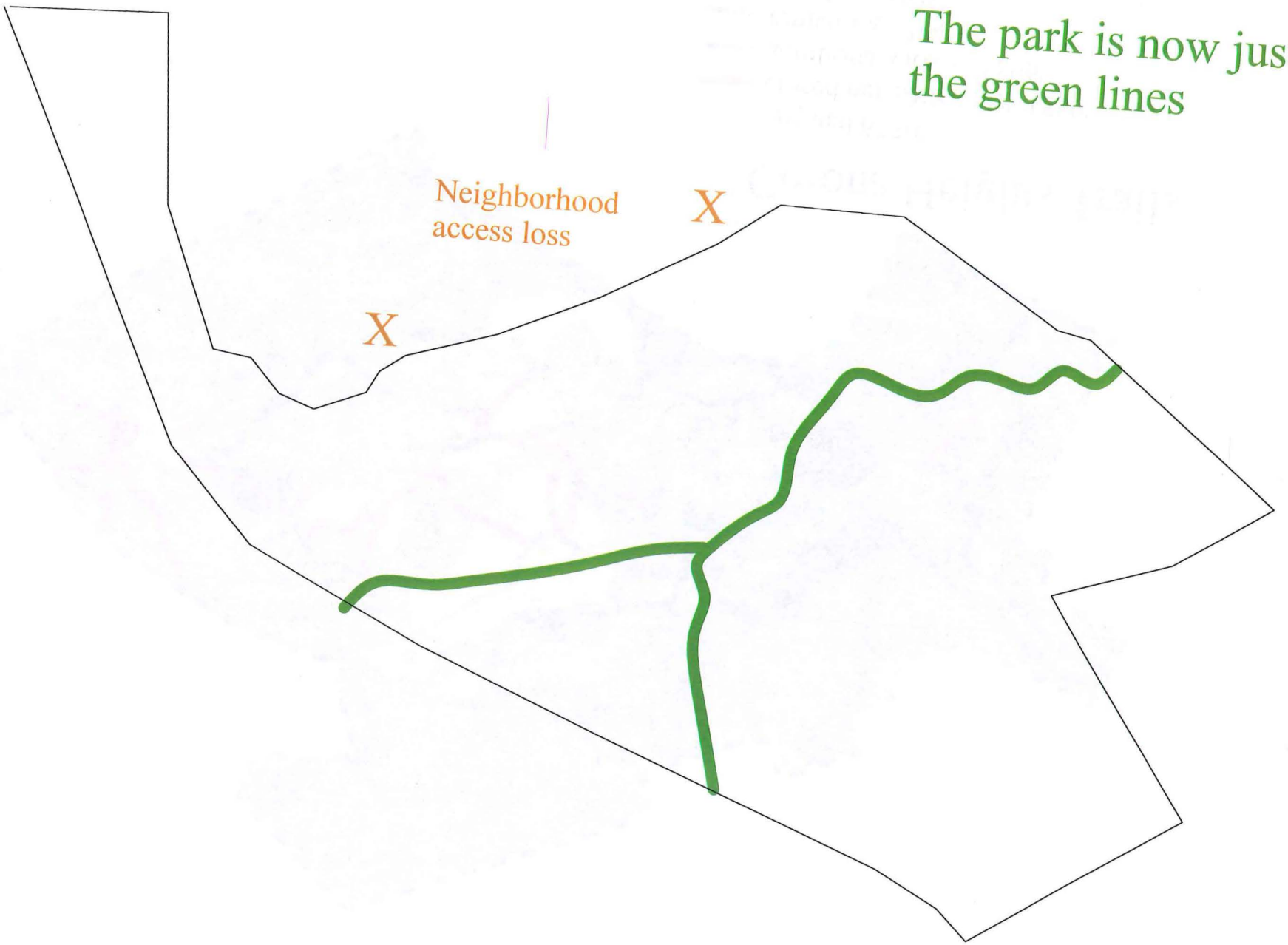
The park is now just the road and the two trails.
There are historic WPA trails, walls and staircases
inside the road loop that could be rebuilt.

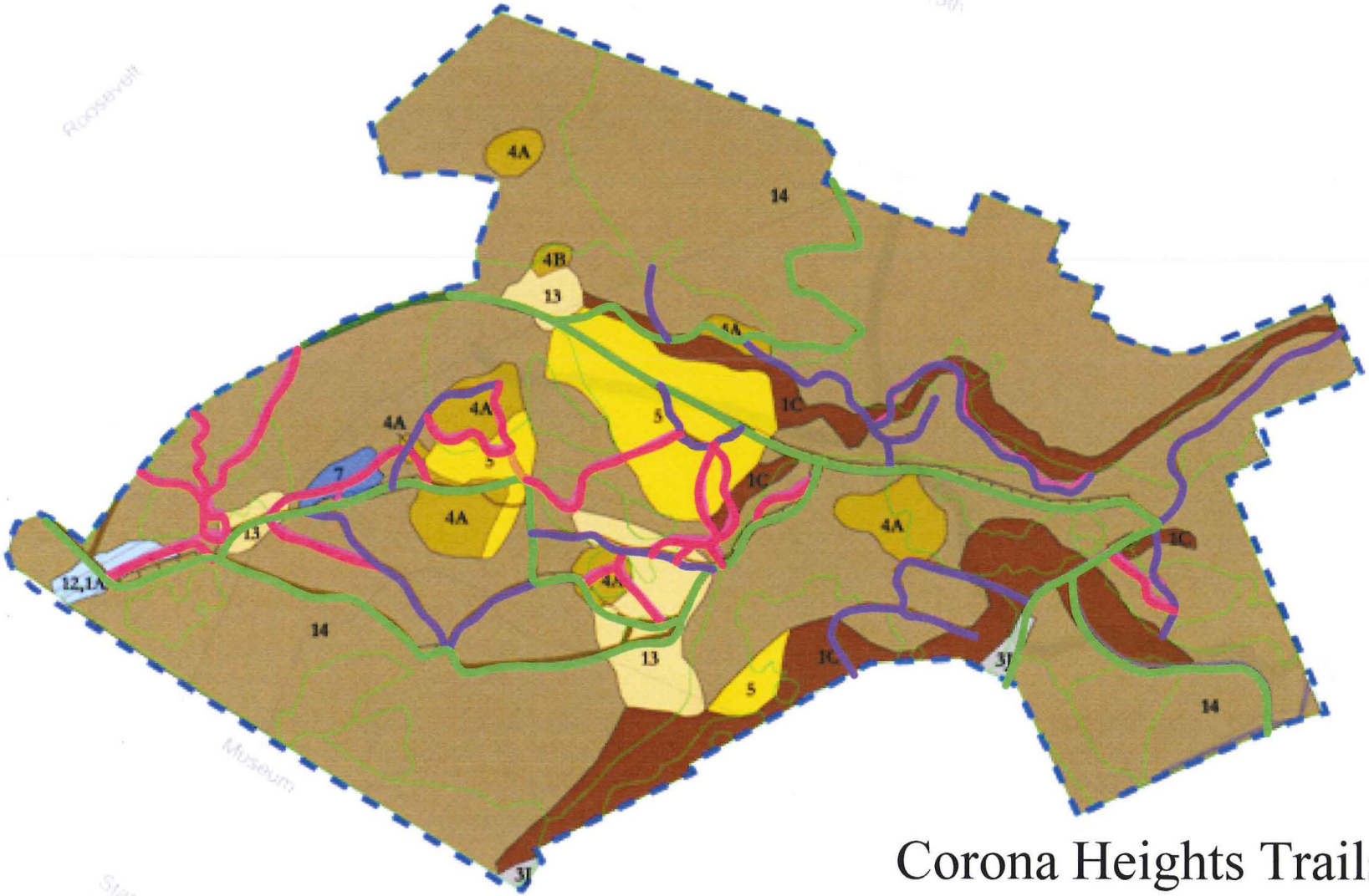
Billy Goat Hill Trails

original 2660'
closed per SNRAMP 598'
additional closed 1412'
remaining 650'
trail loss 76%

Billy Goat Hill Park

The park is now just the green lines





Corona Heights Trails

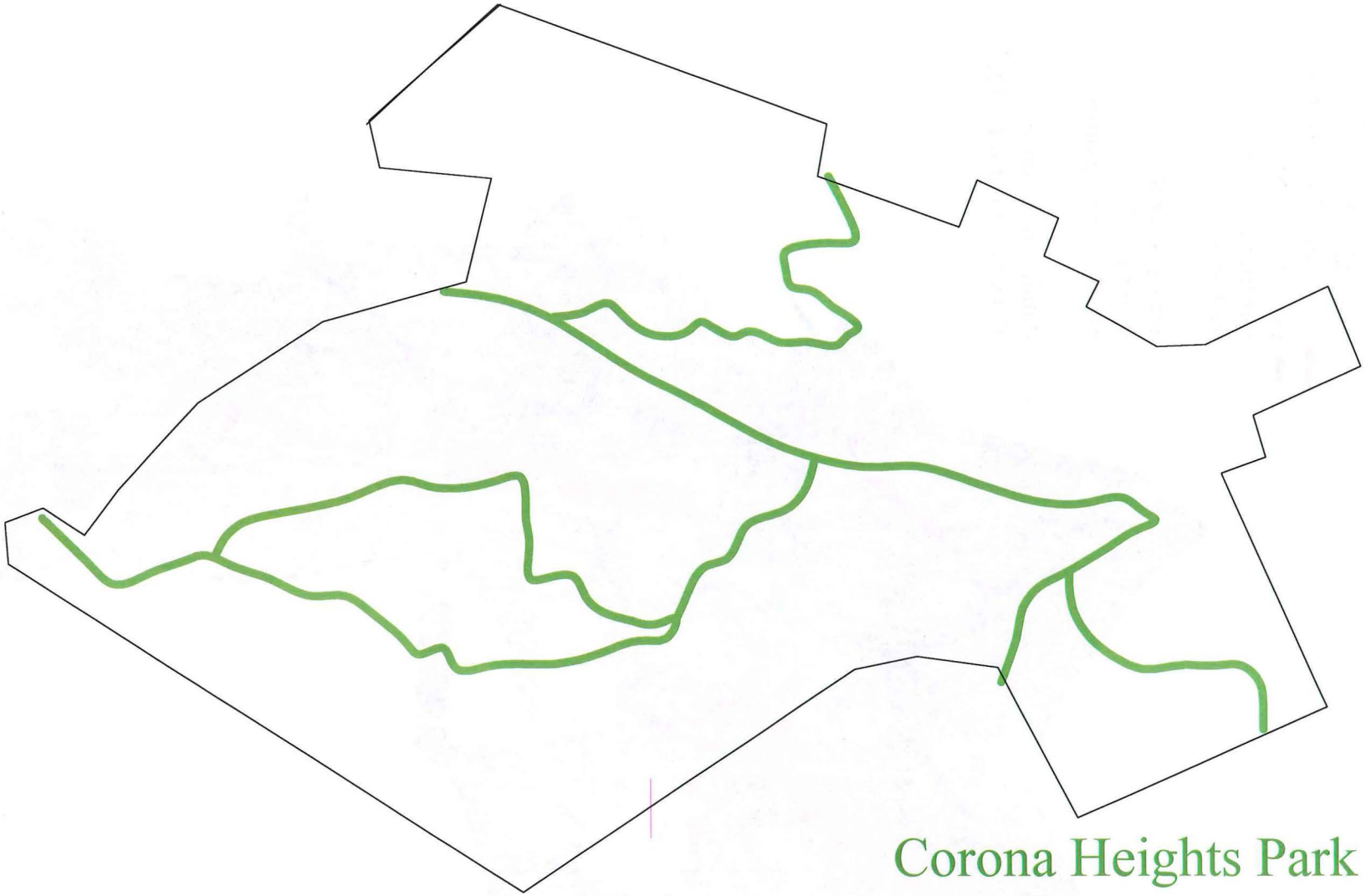
original 6230'
closed per SNRAMP 1589'
additional closed 1896'
remaining 2745'
trail loss 56%

access control fence
split rail 936'
low wire 500'

s, Land Features, and Trails

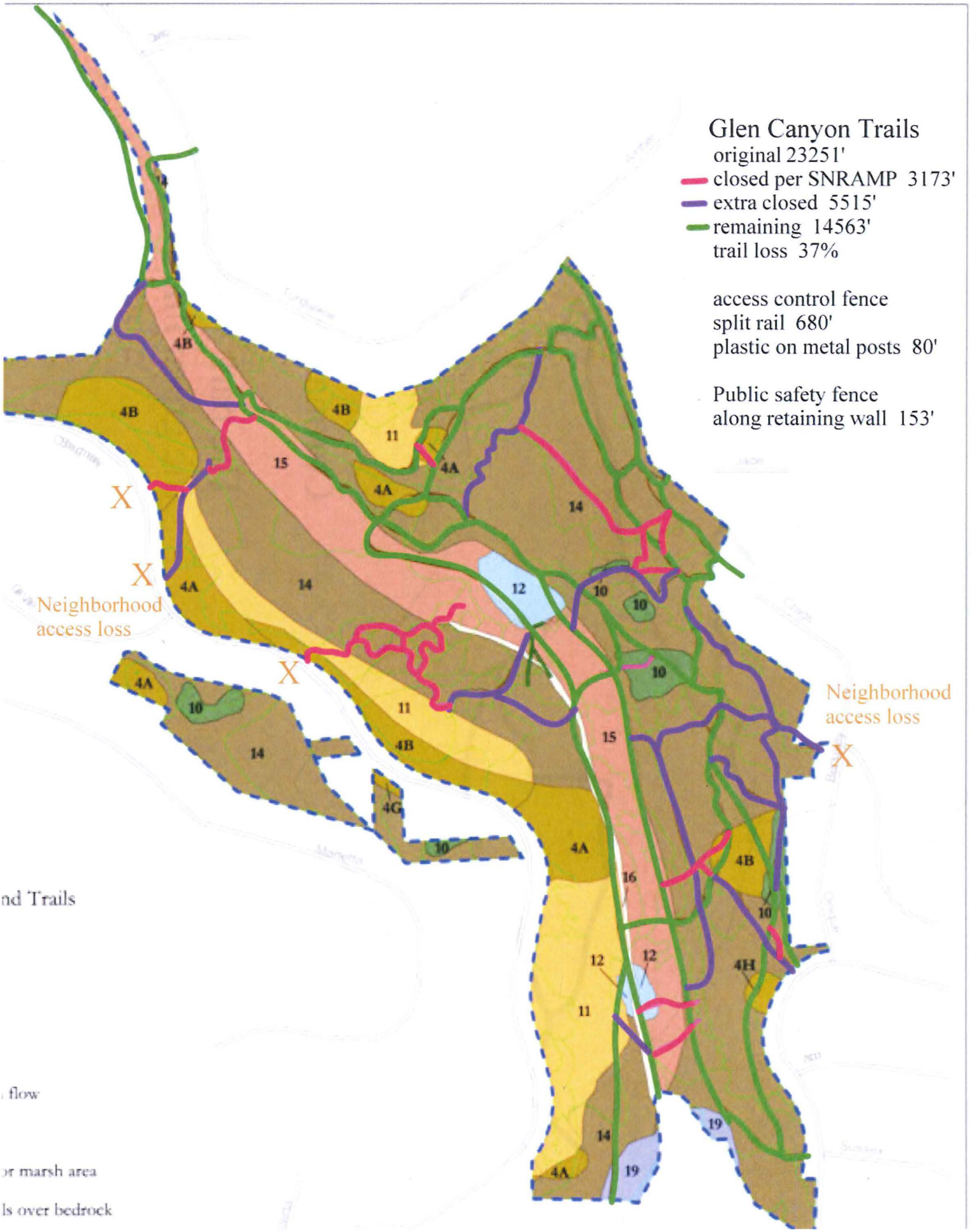
escarpment

parking lot



Corona Heights Park

The park is now just
the green lines

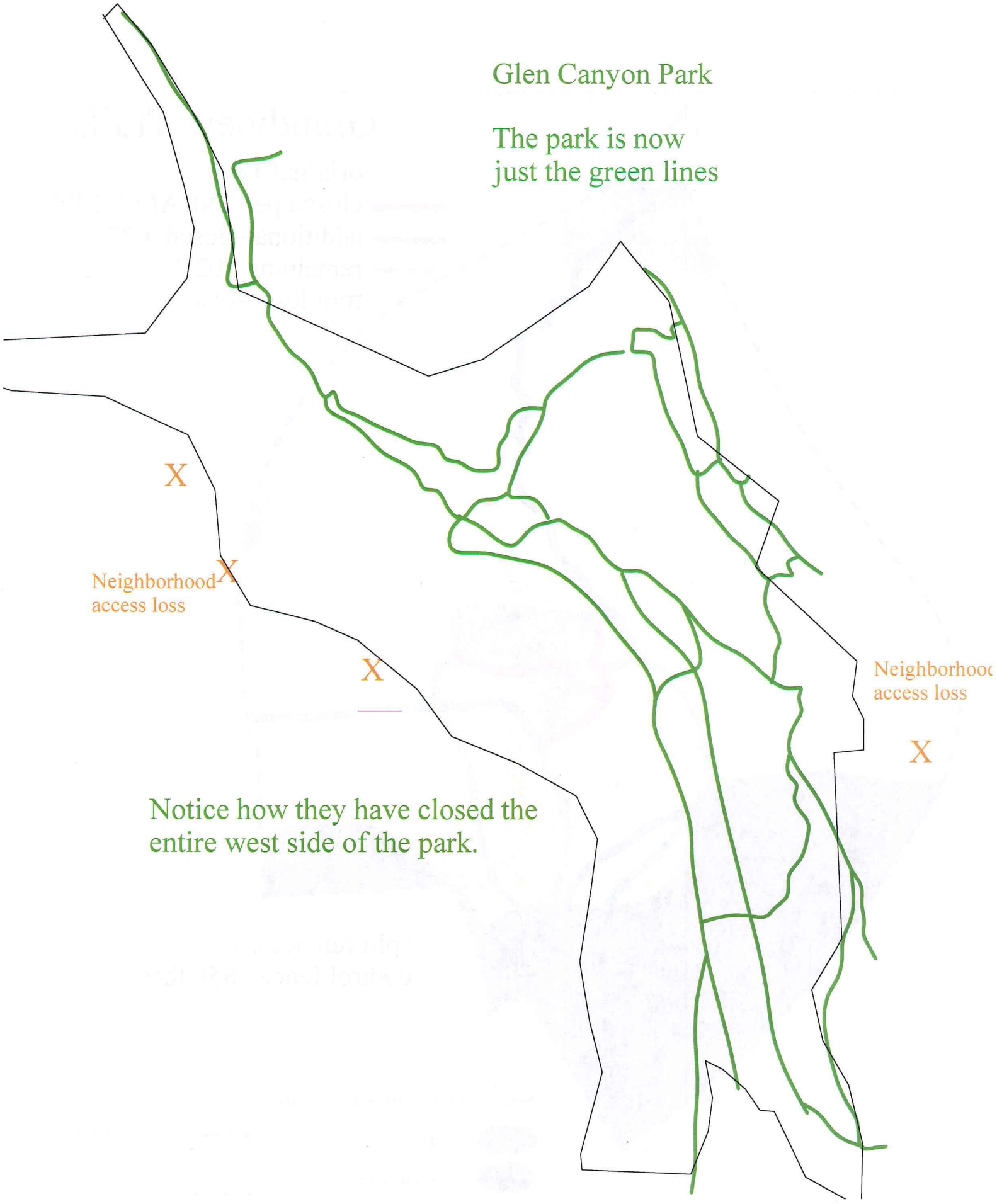


nd Trails

flow

or marsh area

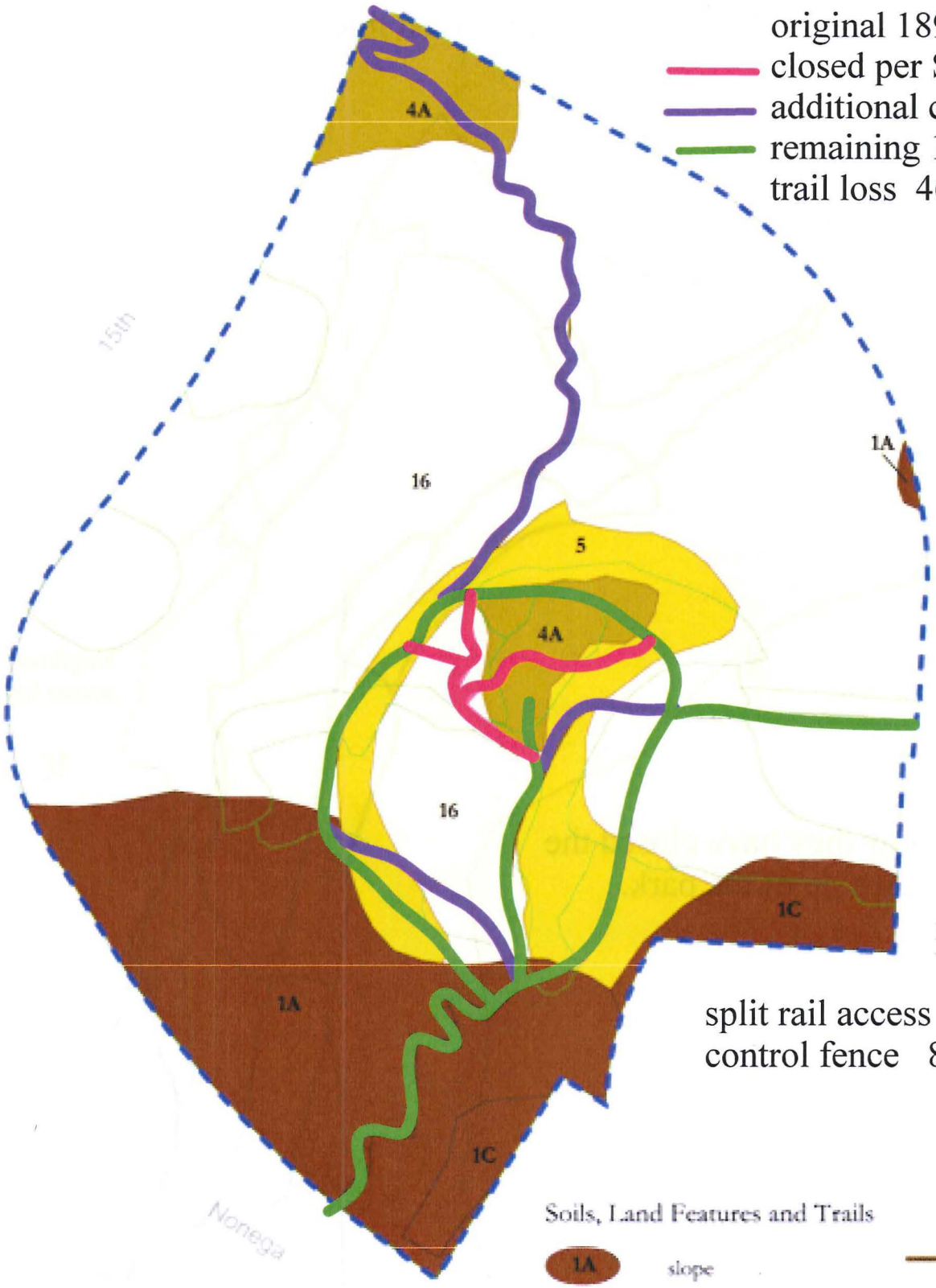
ls over bedrock


Glen Canyon Park
The park is now
just the green lines
X
Neighborhood
access loss
X
X
Neighborhood
access loss
X
Notice how they have closed the
entire west side of the park.

X neighborhood access loss

Grandview Trails

original 1893'
closed per SNRAMP 239'
additional closed 627'
remaining 1027'
trail loss 46%



split rail access
control fence 856 feet

Soils, Land Features and Trails

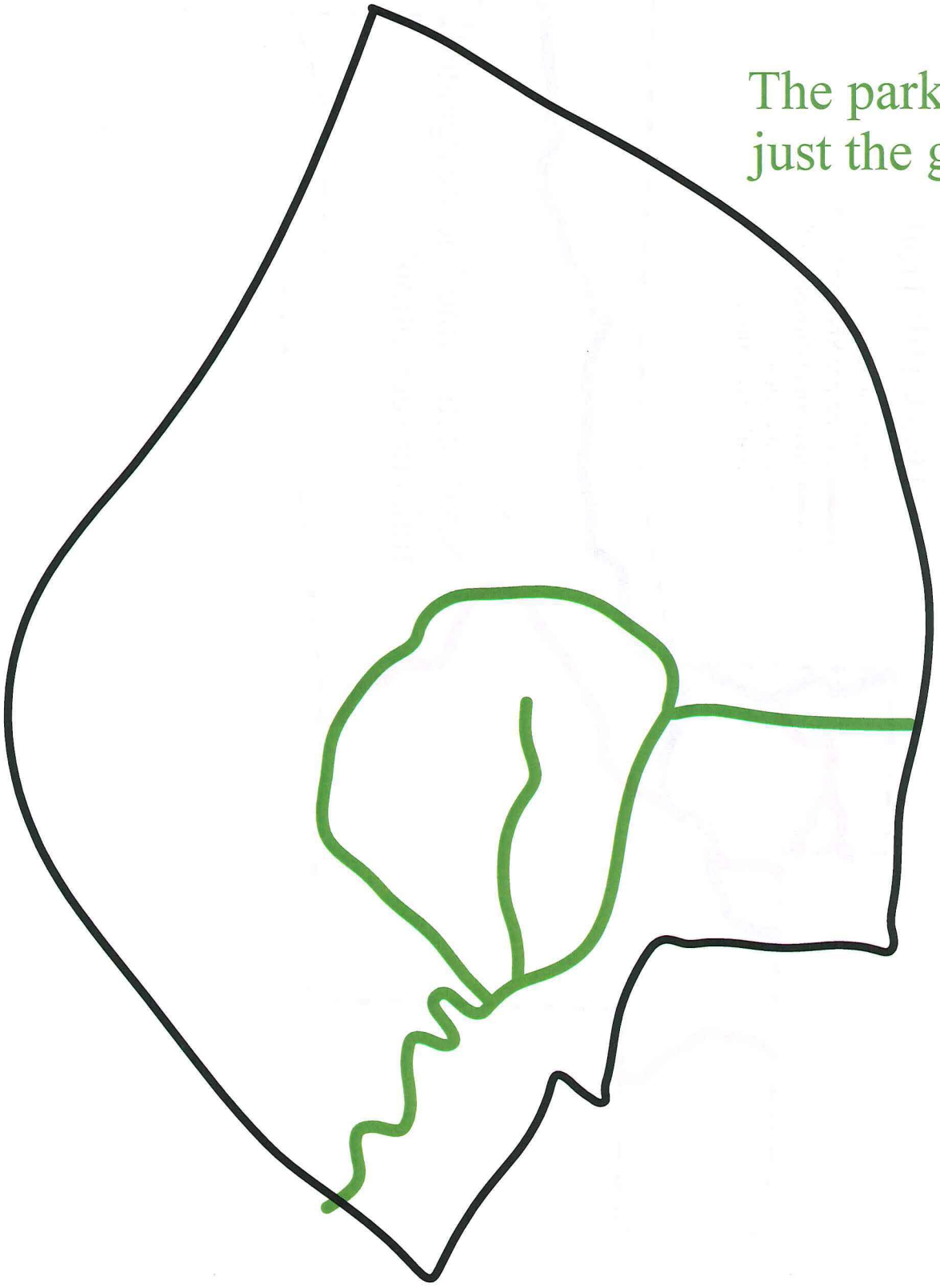
1A slope
1C escarpment

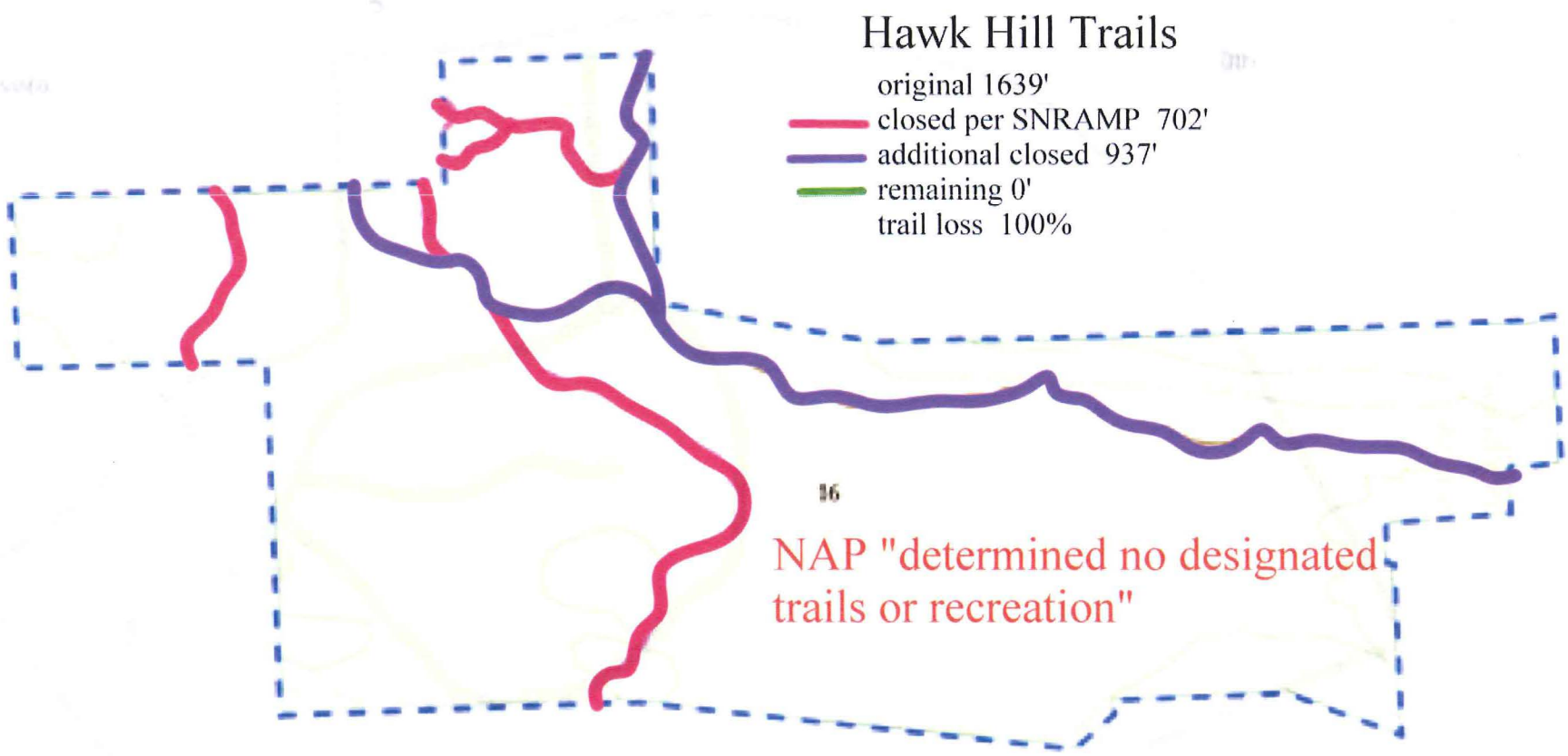
primary earthen trail
steps
secondary earthen trail

X neighborhood access loss

Grandview Park

The parks is just the green lines





Soils, Land Features, ar

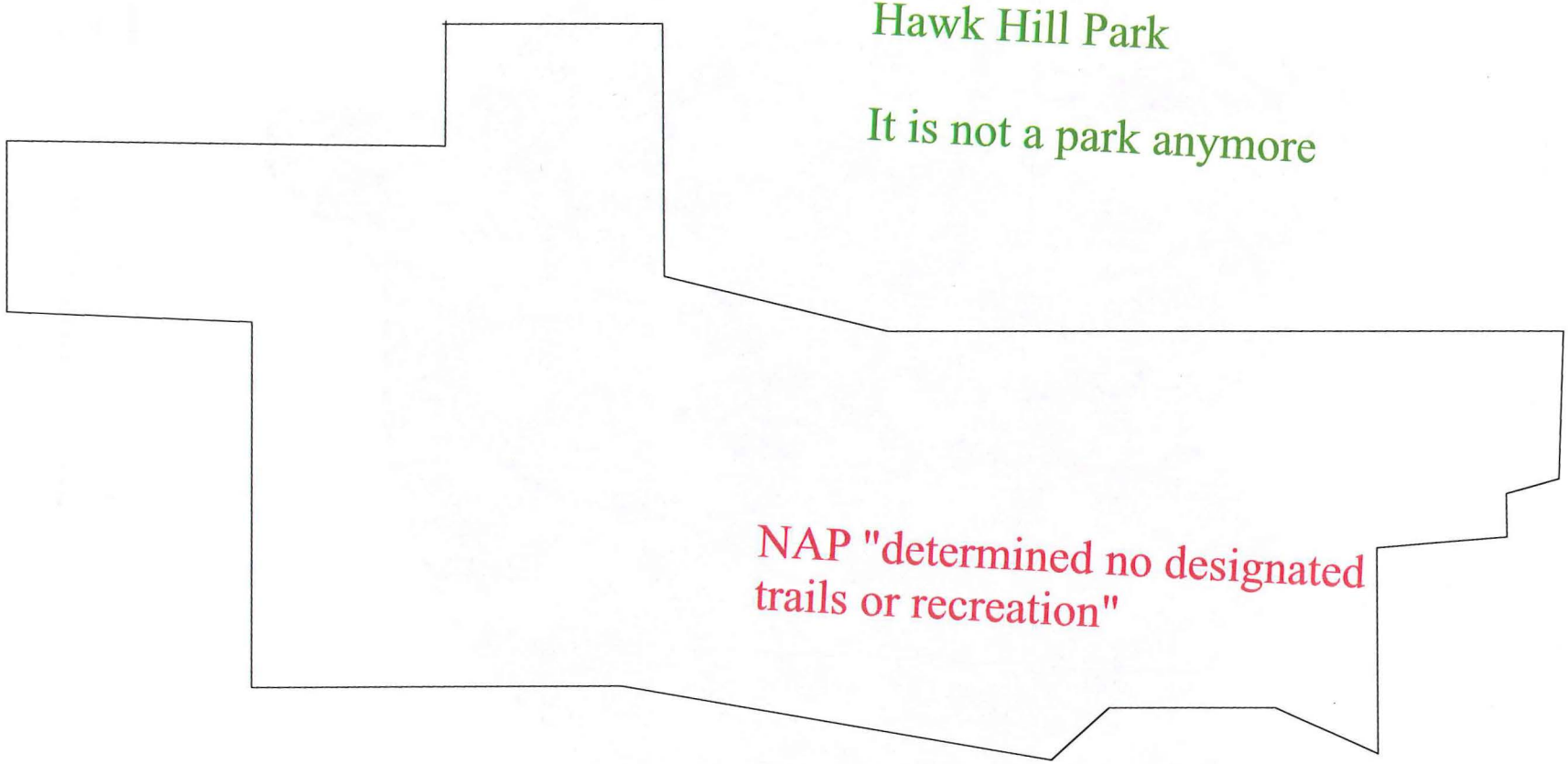
16 sandy soil

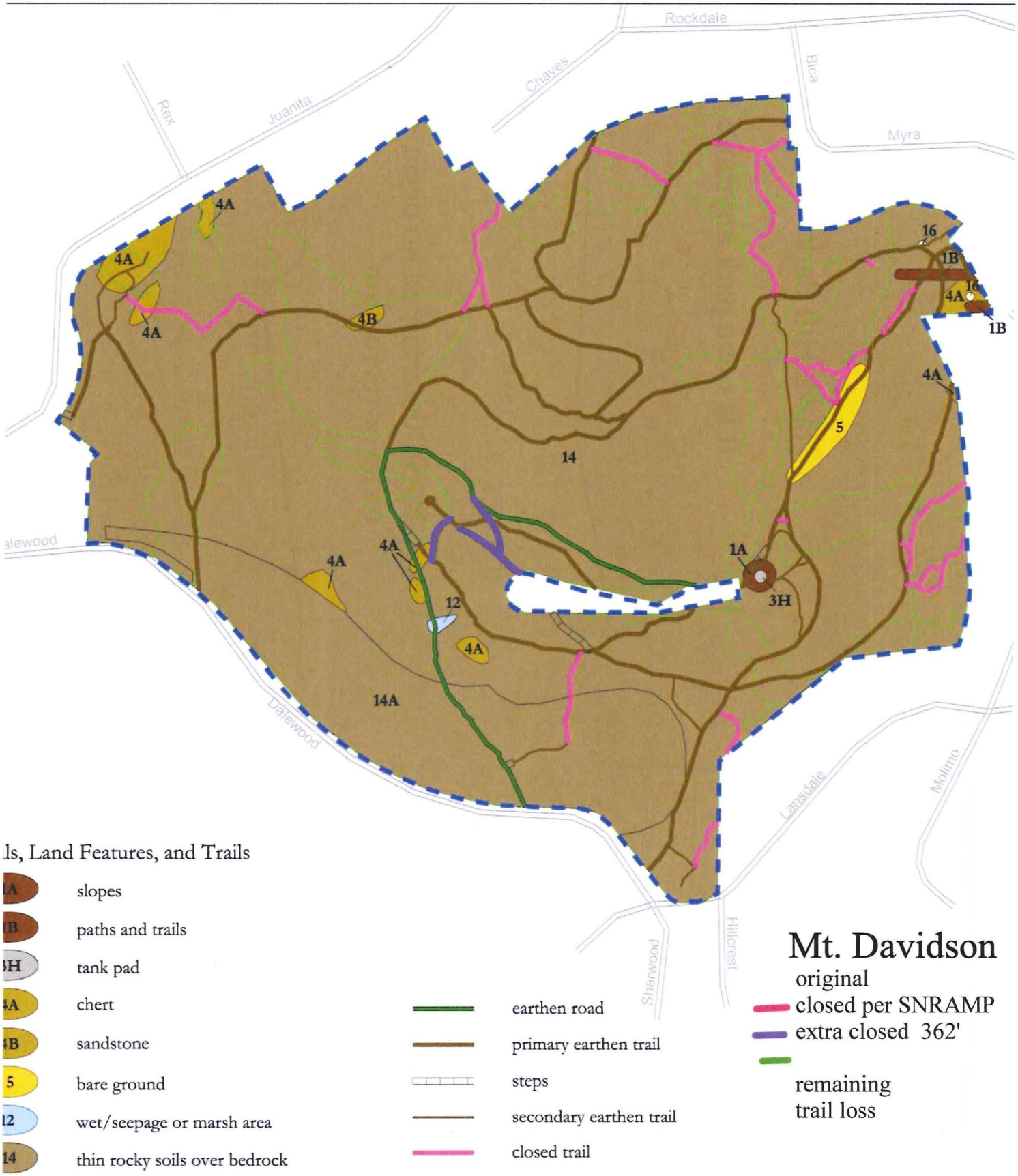
secondary cart

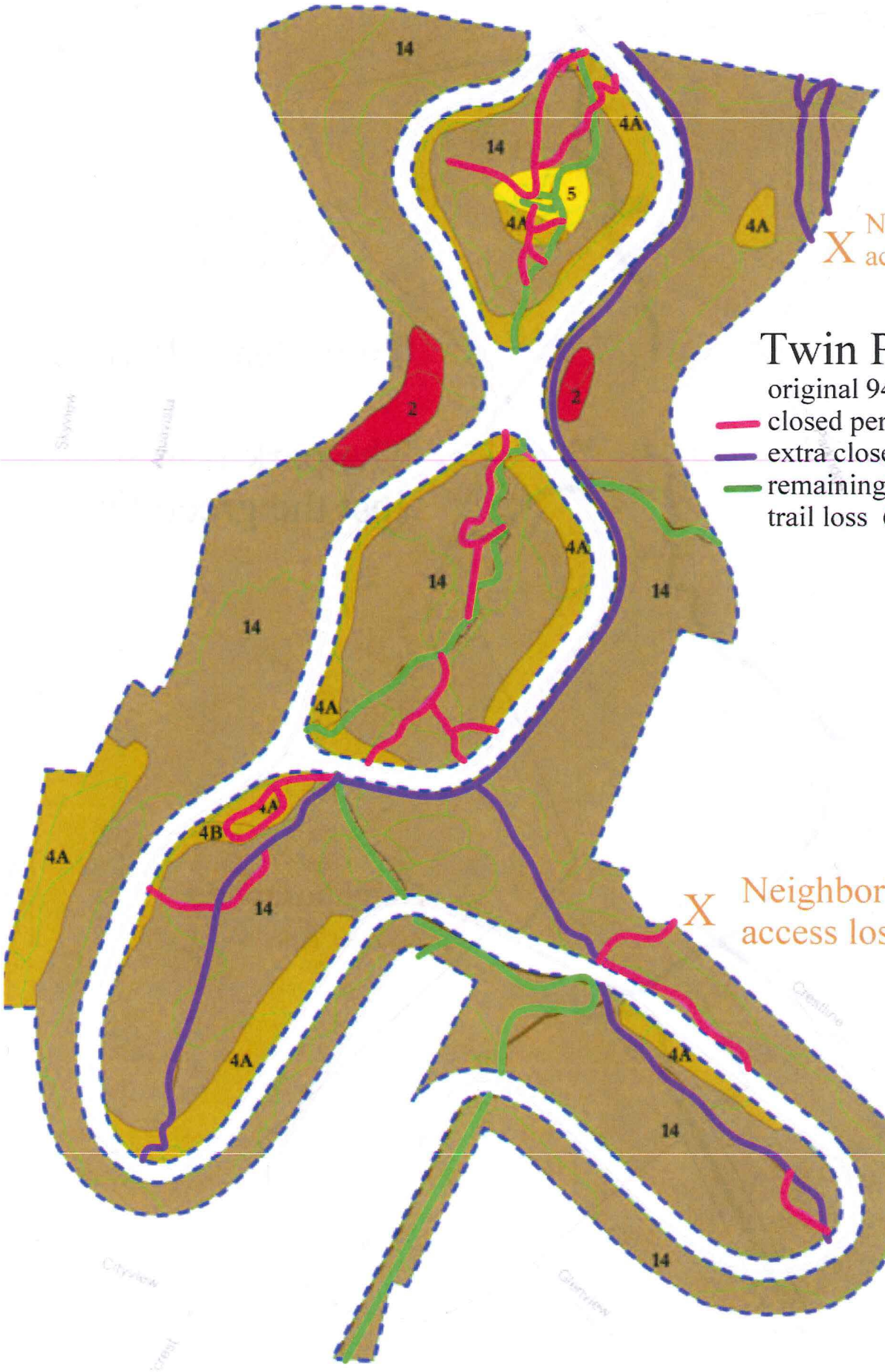
closed trail

Natural Area I

vegetation sen


Hawk Hill Park
It is not a park anymore
NAP "determined no designated trails or recreation"


Rockdale
Rex
Juanita
Chaves
Bica
Myra
4A
4A
4A
4B
16
1B
16
4A
1B
4A
5
14
4A
4A
1A
3H
12
4A
14A
Dalewood
Lansdale
Molimo
Sherwood
Hillcrest
ls, Land Features, and Trails
slopes
paths and trails
tank pad
chert
sandstone
bare ground
wet/seepage or marsh area
thin rocky soils over bedrock
earthen road
primary earthen trail
steps
secondary earthen trail
closed trail
Mt. Davidson
original
closed per SNRAMP
extra closed 362'
remaining
trail loss

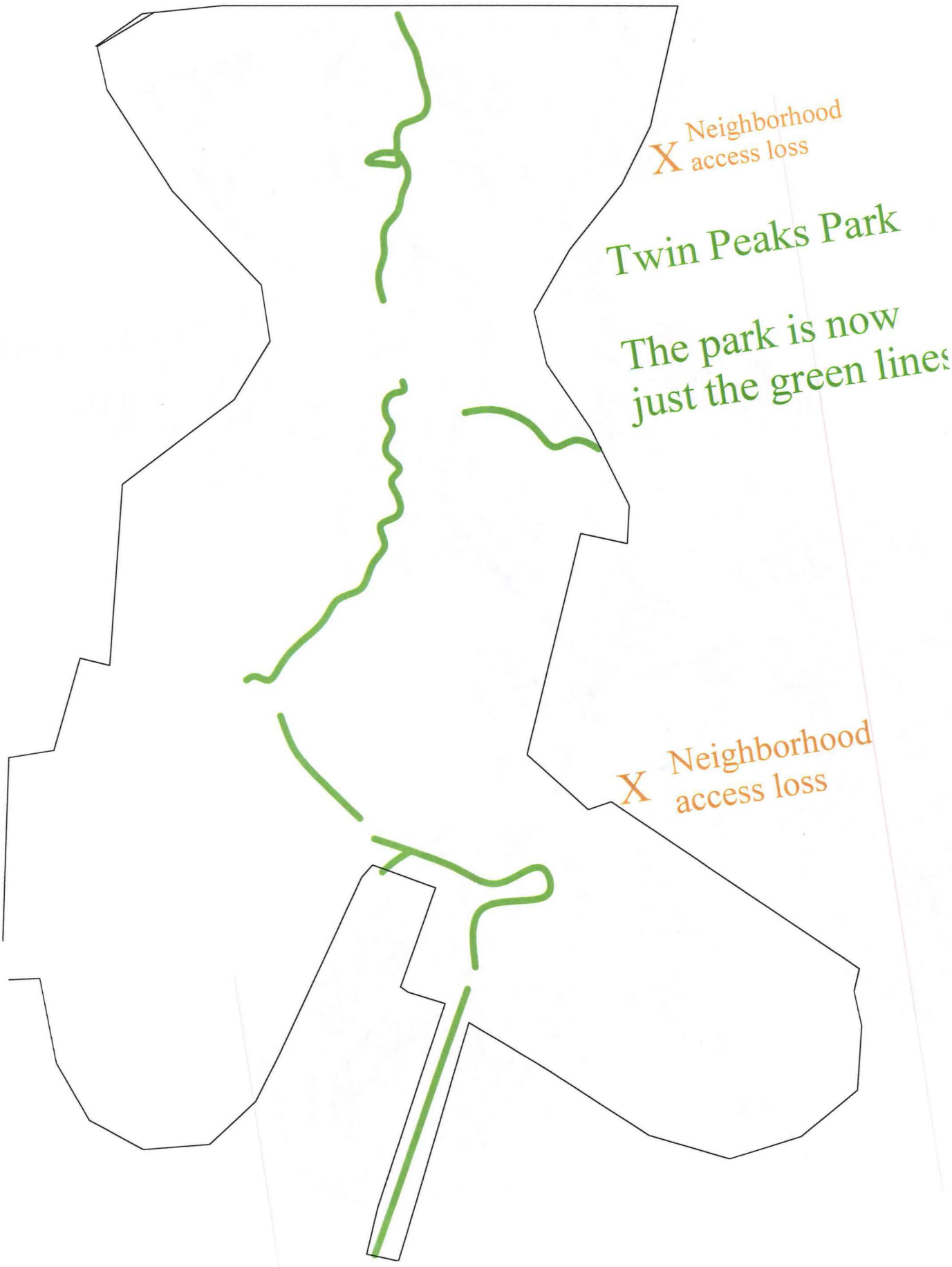


X Neighborhood access loss

Twin Peaks Trails

original 9400'
closed per SNRAMP 2779'
extra closed 3736'
remaining 2885'
trail loss 69%

X Neighborhood access loss


X Neighborhood access loss
Twin Peaks Park
The park is now just the green lines
X Neighborhood access loss

Appendix G

Natural Areas Program Cycling Prohibition **February 19, 2016**
Tom Borden

The Situation

In February 2015 RPD installed new signs in our parks. There are two types, one for regular park areas and one for areas managed by the Natural Areas Program. The NAP signs flatly state, "Stay on Designated Trails. No Bicycles." The NAP signs appear on both paved and earthen trails. The signs for regular park areas make no mention of bicycles. Needless to say, San Franciscans who cycle are extremely unhappy about the signs that now prohibit bike riding on large portions of Twin Peaks, Mount Davidson, Bayview Hill, McLaren Park and even the road on the floor of Glen Canyon.

Letters were sent to RPD and to the Recreation and Park Commission noting cyclists objections and asking for an explanation. A formal response was returned by RPD General Manager Phil Ginsberg on March 3, 2015. Critical assertions made in the email are:

-Cycling is not allowed on NAP controlled lands except for two trails
-In all other parklands, bikes are not allowed on earthen trails.
"The signs posted in McLaren Park are correct and are consistent with long-standing regulations."

This is a dramatic change in policy. The only existing cycling prohibitions are on certain trails in Golden Gate Park marked by signs at their street entrances. SFRPD currently runs a children's mountain biking program, apparently in violation of their own "longstanding regulations". Over the past 5 years, NAP invited cyclists to volunteer thousands of hours to build trails in Golden

Gate Park Oak Woodlands, Interior Greenbelt and McLaren Park. The NAP staff did not tell the cyclist volunteers it was illegal to ride bicycles on the trails they were building.
The SF Park Code contains no rules forbidding cyclists from riding on dirt trails in any of our parks. SECTION. 3.04. BRIDLE PATHS makes it clear that bicycles are expected to be on these earthen trails.

Sunshine Request 1 Alex Aldrich April 22, 2015 "Bicycle Policy"
An information request submitted to RPD under the SF Sunshine Ordinance and a subsequent hearing at the Sunshine Ordinance Task Force Complaints Committee proved that there are no "long standing regulations" and in fact, no records whatsoever that support the assertion that bikes are not allowed on earthen trails.

The Sunshine request asked for copies of all regulations that prohibit or restrict bicycle riding on paved or un-paved paths and trails in City parks. In response, RPD provided no existing documents related to regulations, rather they provided a letter written in response to the Sunshine request by RPD Operations Manager Dennis Kern. In that he says, "We post signs restricting or prohibiting bicycle riding on trails at specific park sites where we believe that such activity would either be inappropriate (*e.g.,* the trail is too narrow or not constructed to support biking activity) – or – potentially destructive (*e.g.,* creating land erosion conditions, compaction, endangering sensitive natural habitat)." This confirmed the public's understanding, that cycling is generally allowed, but that RPD might choose to limit cycling is specific areas by posting signs per Park Code 3.02. This is the logical inverse of what Phil Ginsberg wrote.

The SOTF issued Order of Determination 15087 for RPD's failure to disclose there were no documented regulations. Further, the SOTF issued a second letter to RPD, "Codification of Recreation and Park Department Policies", admonishing them for failure to follow proper process.

Sunshine Request 2 Tom Borden June 24, 2015 "information request regarding off-road cycling"
A second sunshine request was lodged to find out what sorts of problems trail cyclists were causing, who decided to put "No Bicycles" on the signs and why. RPD was able to produce some emails from gardeners working the west end of Golden Gate Park complaining about rude cyclists riding off trail and a video shot by "outlaw" cyclists from a bike event in 2008 that shows riders skidding alongside a staircase in Glen Canyon. That is all.

RPD was not able to produce any documentation about the decision making process to exclude bicyclists from NAP managed land, other than a document titled "Offroad Mountain Biking on City Parkland Trails" which was written after the signs were installed. This document claims "The language for both signs was vetted through a review process inclusive of staff participation from Operations, Capital and Public Affairs; as well, as review of existing regulatory guiding documents (i.e. Park Code, SNRAMP, etc..)." This document is clearly a fabrication. RPD was unable to produce any documents related to this interdepartmental vetting process. The documents produced under the Sunshine request show that staff in Operations, Capital and Public Affairs were unaware the NAP was putting the "No Bicycles" text on their signs. Obviously, the Park Code was not reviewed, or the bicycle references would have been discovered. The SNRAMP does not disclose any plan for the wholesale exclusion of bicycle riders. The paper erroneously claims riding bicycles on earthen trails is not considered a "hazardous recreational activity" under California Government Code 831.7.(a) and (b) and therefore a major liability concern for RPD.

The produced documents show the anti-cycling signage was a unilateral NAP initiative. This was undertaken without public input and without public notice. It was not based on a demonstrated need to prohibit cycling in the NAP areas.

Clearly, RPD is withholding documents related to the decision to post No Bicycles on the signs. Tom filed a complaint with the Sunshine Ordinance Task Force and the task force found RPD to be in violation of the Sunshine Ordinance. See SOTF Order of Determination 15159.

Sunshine Request 3 Alex Aldrich December 2015
In a third Sunshine Request, Alex asks for documents related to several topics.
Question: Please share the document(s) that show who and when the decision was made to put no bikes on the signs erected in February 2015.
Answer: The Department has no documents responsive to this request.
RPD continues their refusal to produce the documents.

Question: Is the recent no off trail bike sign a rule or a regulation?
Answer: It's neither. There are no rules or regulations that restrict or prohibit bikes on earthen trails in all parkland.
RPD finally admits that Phil Ginsberg's assertion was wrong. Why did it take so long?

Violation of BOS Resolution 653-02 and CEQA
Posting of the signs with language "Stay on Designated Trails. No Bicycles." by the Natural Areas Program violates BOS Resolution 653-02 which prohibits the NAP from imposing, "Trail closures, or restrictions on access and recreation" until the BOS has approved the natural areas management plan(SNRAMP). The BOS has not approved the management plan. The EIR for the SNRAMP has not even been released and certified by the Planning Commission. See the sister document, BOS 653-02 violation, for more information.

The closure of NAP controlled park lands to cycling violates the will of the public as expressed in BOS 653-02 and violates CEQA.

List of Related Documents:

Email from Phil Ginsberg, March 3, 2015

Sunshine Response from Denny Kern, May 1, 2015

SOTF Order of Determination 15087

SOTF Codification of Recreation and Park Department Policies

SOTF Order of Determination 15159

On 3/3/2015 2:41 PM, Ginsburg, Phil (REC) wrote:

> Dear Tom,
>
> I spoke with Dan Schneider earlier today, but am also reaching out to you
> and others copied on your email.
>
> We recognize your concerns and take all public input about our parks quite
> seriously. The Recreation and Park Department manages over 4,000 acres of
> land and over 30 miles of urban trails. Our goal is to provide
> opportunities for safe, fun spaces that welcome all types of uses
> including mountain biking. Currently mountain biking is allowed on
> earthen trails in the Interior Greenbelt and in portions of the Oak
> Woodlands in Golden Gate Park. In all other parklands, bikes are not
> allowed on earthen trails.
>
> Recently, newly designed parks signs went up in a variety of park
> locations and admittedly have created some confusion. Incorrect signs were
> posted in the Interior Greenbelt; mountain biking is permitted on the
> Interior Greenbelt trails. We are in the process of fixing those and
> expect to have that work completed in the next two weeks.
>
> The signs posted in McLaren Park are correct and are consistent with
> long-standing regulations. Many of the trails in McLaren are too narrow,
> run through sensitive natural habitat and are not constructed to support
> mountain biking. However, as we have discussed, the department is working
> to expand opportunities for mountain biking in McLaren. First, as you
> know, we are partnering with the San Francisco Urban Riders to build a
> bike park in McLaren. Second, the Department would like to work with
> SFUR and other interested mountain bikers by engaging in a park-wide
> circulation study that will help us identify opportunities and constraints
> for expanding mountain biking trails in McLaren and, perhaps, elsewhere.
>
> We recognize that mountain biking is a healthy recreational opportunity
> and pledge to continue to work with SFUR to expand opportunities for
> mountain biking throughout the city.
>
> Best,
>
> Philip A. Ginsburg
> General Manager
> San Francisco Recreation and Park Department

On Fri, May 1, 2015 at 4:34 PM, Kern, Dennis (REC) <dennis.kern@sfgov.org> wrote:

Mr. Aldrich,

I am responding on behalf of the Department to the queries in your recent Sunshine Ordinance request regarding bicycle riding on paths and trails in City parks.

Our approach to this issue has been one of park stewardship and land management, which is our mission. We post signs restricting or prohibiting bicycle riding on trails at specific park sites where we believe that such activity would either be inappropriate (*e.g.*, the trail is too narrow or not constructed to support biking activity) – or – potentially destructive (*e.g.*, creating land erosion conditions, compaction, endangering sensitive natural habitat). We have continuously posted such signage since at least 2008 and it has taken various formats. See first two attachments for examples of such signage that preceded our recent revised sign format (which you'll find at the third attachment).

Our authority for the posting of these signs is Park Code 3.02 which states *"No person shall willfully disobey the notices, prohibitions or directions on any sign posted by the Recreation and Park Commission or the Recreation and Park Department."* This Park Code section was enacted in 1981 and has been in force since then.

We recognize that bicycling and mountain biking are healthy recreational opportunities and we are actively working with SF Urban Riders to expand opportunities for this activity throughout the City.
I hope that this information is helpful.

Dennis Kern
Director of Operations
San Francisco Recreation & Parks

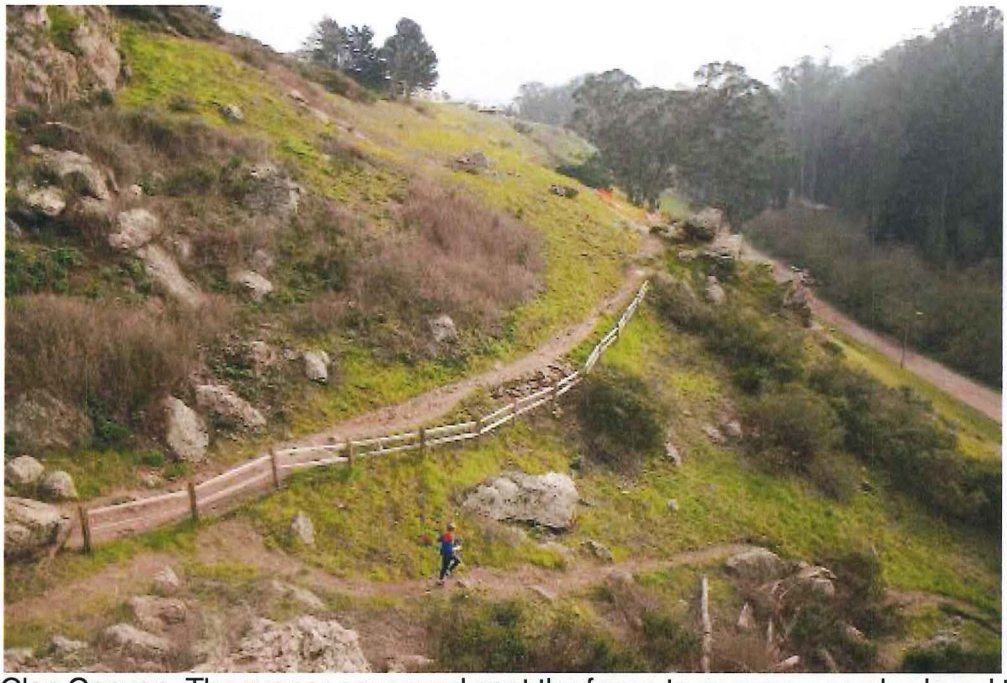
Appendix H Access Control Fence Photos

Much more split rail public access control fencing has been installed in parks than what is disclosed in the SNRAMP.

Grandview

Grandview

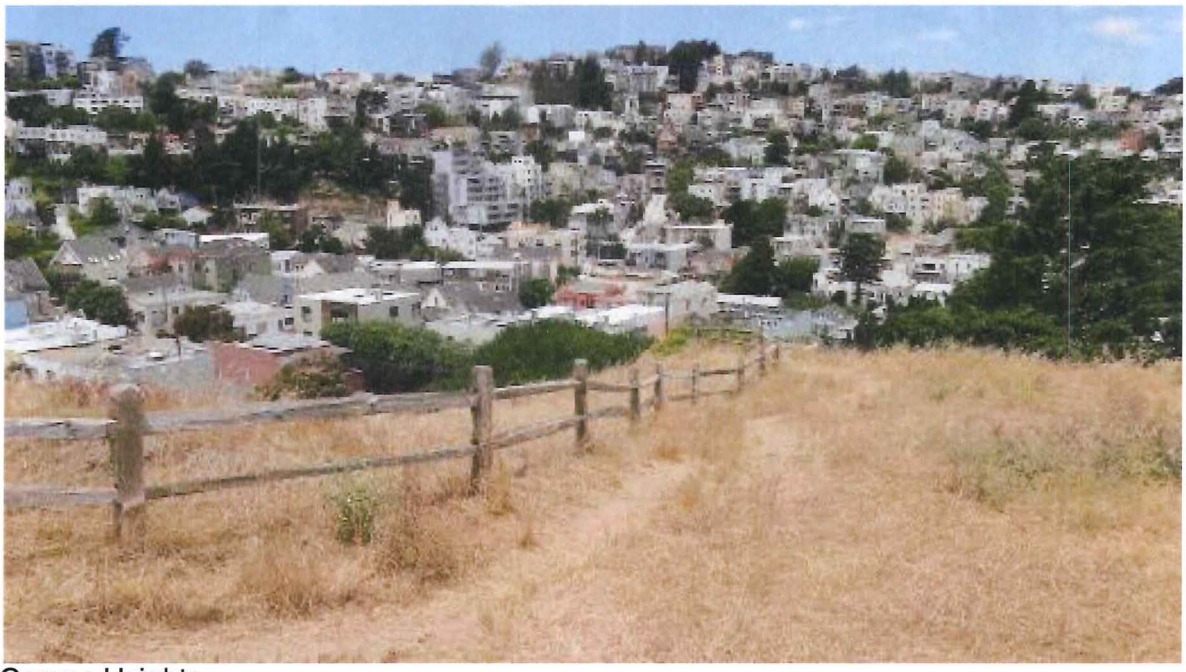
Glen Canyon The EIR claims these fences are for public safety.



Glen Canyon, The runner squeezed past the fence to access a newly closed trail.

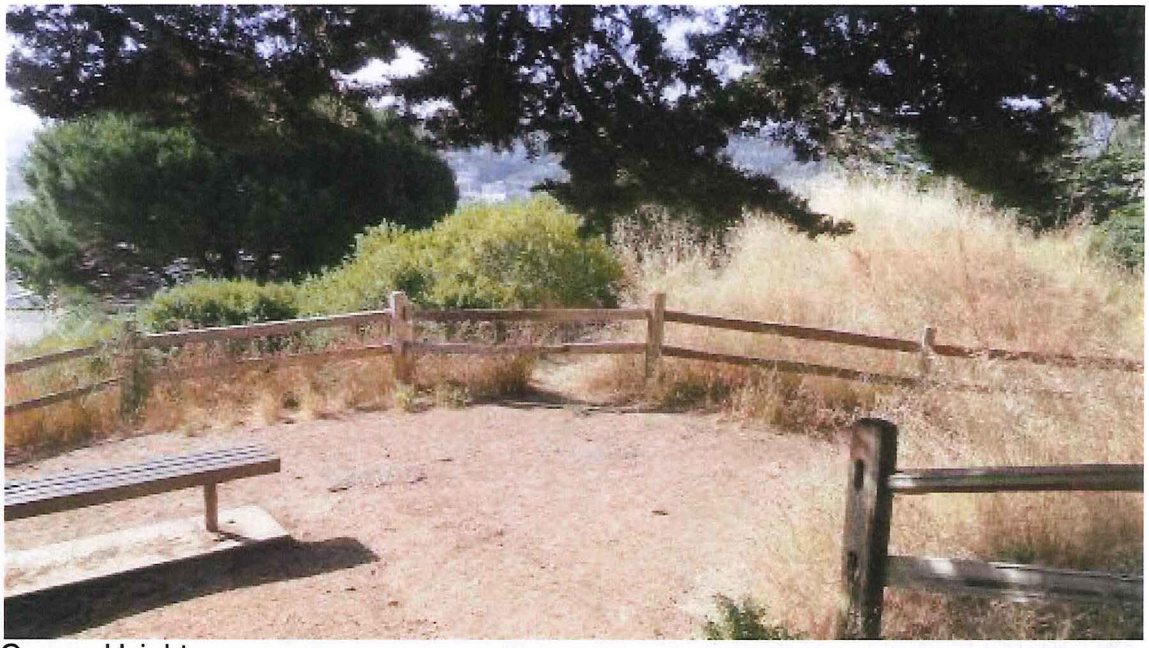
Glen Canyon Is public safety an issue here?

Corona Heights cattle pen
The steel fencing above the quarry is pre-NAP for public safety.

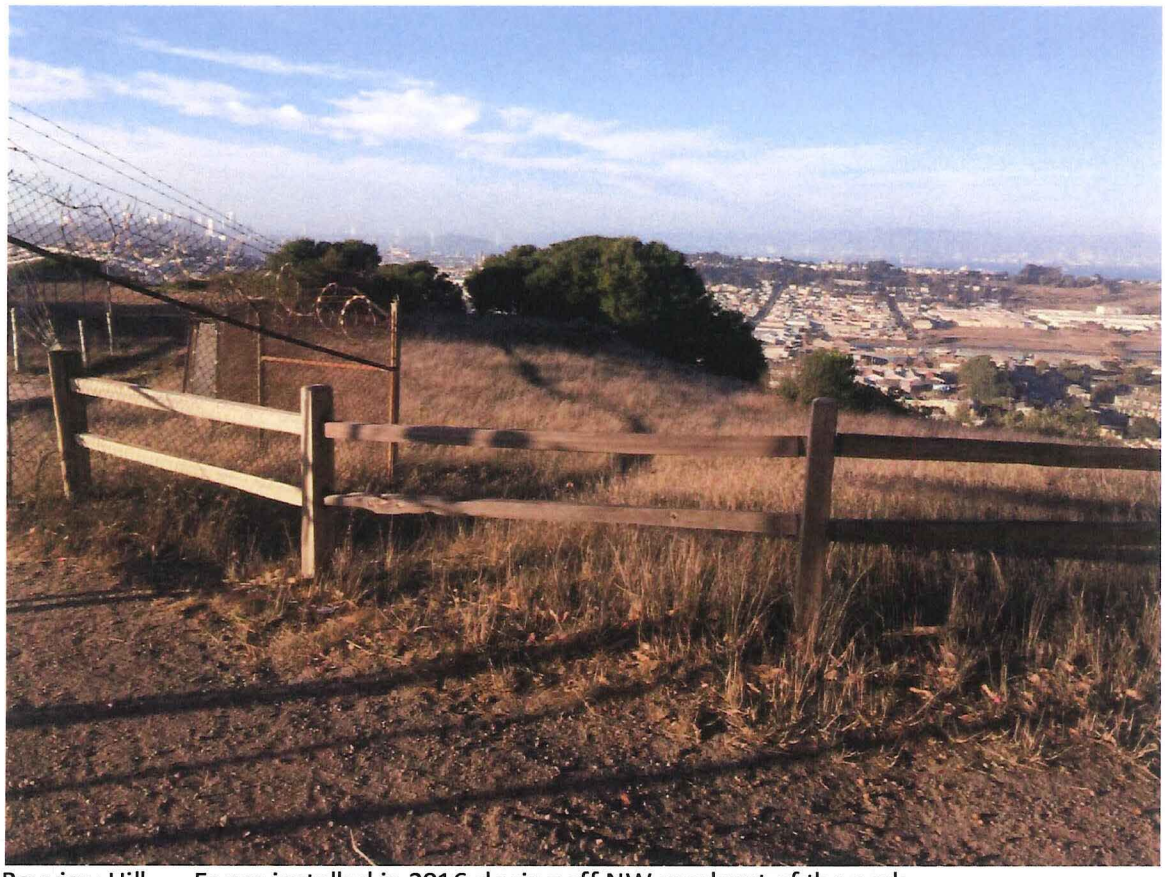


Corona Heights

Corona Heights



Corona Heights



Bayview Hill Fence installed in 2016 closing off NW quadrant of the park.

Bayview Hill This gate used to be open. Now it is locked shut, closing off the SW quadrant of the park.