



September 13, 2005

Mr. Dan Mauer  
San Francisco Recreation & Parks  
30 Van Ness Avenue, 5<sup>th</sup> floor  
San Francisco CA 94102-6020

Subject: Disc golf course  
Golden Gate Park

Dear Mr. Mauer:

In December 2003, Recreation & Parks and the San Francisco Disc Golf Club signed a Memorandum of Understanding (MOU) for the installation of a disc golf course in Golden Gate Park. An initial trial period of 18 months was established. You asked that I examine trees and shrubs in area of the course, assess whether or not any damage has occurred due to play, and make recommendations on how the area might be managed to minimize any impacts. On June 3, we met with Ross Hammond from the Disc Golf Club to tour the site. This letter summarizes my observations and assessment.

To assist in my assessment, you provided a record of information and exchange regarding the course. Included in the package of information was the MOU, follow-up memos from Recreation & Parks staff and the Disc Golf Club, and a proposal from the Club for management of the course.

***Observations at the Site***

Located between John F. Kennedy Drive and Fulton Street, the course was established in an unmanaged area of the park, adjacent to Marx Meadow (Photo 1). The woody vegetation is a mix of mature and semi-mature trees with scattered shrubs. Prior to the course's establishment, English ivy was one of the dominant groundcovers. This has been removed and, in some areas, replaced with annual grasses.



The Club has tried to limit traffic through the area by delineating paths. While this reduces wear in other locations, it increases the amount of traffic on the paths themselves. Traffic along the paths has removed pre-existing groundcover, leaving bare ground.

**Photo 1.** General view of disc golf course from one of the "fairways."

The dominant tree species in the area of the course were those typical of Golden Gate Park: blue gum (*Eucalyptus globulus*), Monterey pine (*Pinus radiata*) and Monterey cypress (*Cupressus macrocarpa*). I also observed coast live oak (*Quercus agrifolia*), plum (*Prunus* sp.) and Brisbane box (*Lophostemon confertus*). Shrubs included acacia (*Acacia* sp.), cotoneaster (*Cotoneaster lacteus*), and myoporum (*Myoporum laetum*). This is by no means an exhaustive list but rather illustrates the commonly present species.

Some of the trees and shrubs in the area of the course have been damaged by the play of disc golf. Damage appeared to occur in three ways:

1. Indentations confined to the outer bark. For lack of a better term, I thought of these as nicks (Photo 2).
2. Gouges through the outer and inner bark, exposing the cambium. On pines, these wounds result in sap flow along the trunk (Photos 3 & 4).
3. Mechanical injury to twigs and leaves, essentially shearing by the passing disc.

A precise count of the number of trees and shrubs damaged is beyond the scope of this investigation.

**Photo 2.** Nicks in bark of mature blue gum.



**Photo 3.** Gouges (red arrows) in trunk of semi-mature (10" diameter) Monterey pine.



We discussed the possible differences in response among tree and shrub species. For the trees, I think the extent of damage is associated more with tree age than species. As a general observation, mature trees, whether they are pines or blue gums, have nicks in the bark. In contrast, young trees are gouged, creating deeper wounds that could kill twigs and stems. Thus, the damage is greater to the thin-bark young trees than to the thick-bark mature ones.

**Photo 4.** Gouges in myoporum trunk. **Photo 5.** Pine on 1<sup>st</sup> tee with screen (red arrow).



On young Monterey pine trees, gouges to the bark from the disks may increase the susceptibility of the tree to red turpentine beetle (*Dendroctonus valens*), an important insect pest already present in Golden Gate Park. Large amounts of pinkish-white frass are present at the base of several trees. This bark beetle is attracted by the volatile chemicals that are emitted when pines are wounded. I expect that these pines will eventually die due to feeding action of the beetle. Other species do not appear to have insect or disease pests associated with wounds from the discs.

One of Recreation and Parks' concerns involves damage to trees associated with pruning by the Disc Golf Club. Some trees and shrubs have been pruned in order to facilitate play. Some removal should be expected as a new use is placed in the existing forest.

The Disc Golf Club has erected screens and barriers on the trunks of some trees, particularly pines, as a way of reducing injury (Photo 5). Both appear to be effective in preventing the disc from hitting the trunk.

#### **Assessment and Recommendations**

From my observations, it is clear that the disc golf course has impacted the woody vegetation in this area of the park. This should not come as a surprise to users and managers. The course was installed in an unmanaged, previously unused location. Increasing traffic in the area is bound to have some impact on existing groundcovers. It seems only logical to expect trails to develop as players move from hole to hole.

Over time, I expect that the course will create a more open, less densely vegetated space. Young trees and shrubs will be absent from the "fairways." The course will be comprised of mature trees with a high canopy, but without an intermediate layer of small trees. Some shrubs will be present but these will be away from flight paths. This conclusion is based on the following observations:

- The more trees are impacted by discs, the greater the damage. There is clearly a dose-response to the problem. One nick, gouge or lost twig will not adversely impact a tree or shrub but thousands of the same will.
- The extent of damage is related more to tree age than to tree species. There may be some trees and shrubs that are more tolerant of the discs than others but I don't believe that clear conclusions can be drawn at this time. For example, Mr. Hammond pointed to cotoneaster as an example of a species tolerant of the discs. In some areas, this species was injured; in others it was not. A young coast live oak near one of the greens (i.e. baskets) has only nicks to the bark.
- Trees with thin bark will continue to be damaged by the discs. The gouges in the trunk will eventually result in the death of branches and/or the entire tree. This process will be accelerated in pines by the action of the red turpentine beetle.
- Health of mature trees does not appear to be adversely impacted by the discs. The canopy is high enough above the ground so as not to be hit by flying discs. The bark is thick enough to restrict damage to the surface.
- Replanting within the flight paths of discs will not be successful without significant protection. My observation is: young plants are damaged when hit by the disc. Planting outside "fairways" should be successful and will act to restore any loss of screening value from areas outside the course.
- Screens and barriers do protect trunks of trees. While the current installations might seem jury-rigged, the structures appear to work.
- Defining paths with tree limbs and other indicators appears to confine most traffic to one area.

In light of my observations and conclusions, I recommend the following:

1. Continue the trial period for the course. Use of this area as a disc golf course will, over time, change the composition and structure of woody vegetation. I have no recommendation about whether the course should be enlarged.
2. Develop a monitoring program for trees and shrubs. Monitoring should include reference photographs taken at specific locations and or individual trees, so that future impacts might be compared to past condition.
3. Provide routine maintenance for mature trees. Dead and dying trees should be removed, noting if removal is due to impacts from play. Trees with significant structural defects should receive abatement treatments such as pruning and/or removal.
4. Continue use of screens, particularly in front of young and semi-mature trees. Screens should be taller and moved further away from tree trunks than at present. I do not think screens are needed in front of mature trees.
5. Apply wood chip mulch to paths, outside tee boxes and around greens. Doing so will reduce erosion and compaction in each of these areas.
6. Redesign tee areas to limit erosion and loss of decomposed granite from the tee box.

7. Set up out-of-bounds areas along the course, to limit the area impacted by play.

Thanks for the opportunity to review the disc golf course. Please feel free to contact me with any questions regarding my observations and recommendations. I look forward to hearing from you.

Sincerely,

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