Responsible Recreational Use of the South Campus Reserve

Interpretive Trail Option

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I. Trail Management in South Campus Reserve

The primary goals for this campus stewardship option (CSO) are to enhance the educational opportunities of the greater Olympia community while preserving and maintaining the natural forested conditions now present in the South Campus reserve of the TESC Campus. Our primary objective is to design and create an ecologically sound trail system, which provides a series of interpretive signs that will explain forest ecology in the South Campus Reserve. Our secondary objective is to prevent the construction of unplanned and poorly designed social trails in the area, which may be causing erosion and increased sedimentation to Houston Creek.

Our proposal is asking the campus what direction to take regarding the management of the South Campus reserve. Possible alternatives are the "no management" plan, which would include our current hands off approach. The management for "non-human values" direction would involve voluntarily or regulating the closure of the South Campus Reserve to recreation, then obliterating and rehabilitating the social trail currently bisecting the area. The most logical and cost effective direction may be to actively manage recreation in the South Campus reserve by creating and ecologically sound trail network dictated by the users. Expected conditions under the "no management" plan will be continued soil erosion and continued formation of more social trails, yet it maybe more beneficial for wildlife than the active recreation management plan. The "non-human values" plan would be the most beneficial for wildlife, and erosion would lessen as we actively rehabilitated and removed the current trail system. Under the active recreation management plan, erosion could be kept to a minimum and the increased volume of traffic to the South Campus reserve could be

consolidated to a single trail. This proposal explains the soundest environmental protection measures currently available and provides a chance to review and adapt these measures through faculty, students and community members.

In order to minimize construction impacts and increase community use we are proposing that a portion of an existing social trail from our Organic Farm trail to Houston Creek be utilized in the final construction of an interpretive trail network connecting our Organic Farm trail with a county right of way at the corner of 17th and Mix Rd. However, the proposed trail should deviate from the current social trail prior to the approach of Houston Creek in order provide an ecologically sound crossing. We are recommending, in the spring/summer of 2001, the school bring in a professional trained in trail design and construction to work with the school's hydrology and geology departments in determining the most appropriate location to cross Houston creek. The crossing would most likely include a series of switchbacks and/or steps leading into a bridge or natural bottomed culvert.

Costs of any construction or rehabilitation associated with this proposal can be alleviated through volunteers. Any work not completed by volunteers could be cost effectively supplemented by inmate or conservation corps crews. Some cost estimates have been prepared to compare the different alternatives or directions proposed here. Approximate labor costs for the 1,000 feet of trail construction involved in the "active recreation management "option would range in the area of $1,535 (based on California State Parks wages and production rates). Other costs that could be associated with this alternative would involve the construction of approximately 925 feet (estimated cost of $1,421) of fresh trail connecting the proposed trail with the current Mclane Trail. This

management direction would also involve the closure and rehabilitation of the portion of the social trail remaining after the established trail was laid out. If every foot of this 1,800ft of remaining trail were removed the estimated cost would be $1,935 (based on California State Parks wage and production rates).

Even though this alternative may have a steep initial investment, costs associated with the "management for non-human values" may quickly exceed this. Once again cost estimates have been be prepared for this alternative based on wages and production rates for the California State Parks system. The current social trail in the South Campus reserve has been measured at 4,390. If the entire trail was rehabilitated the estimated cost would be $4,719. Trail rehabilitation includes breaking up of compacted soil with hand tools, and replanting the trail surface with native plants salvaged in the area. Trail closure and rehabilitation often also includes installing drain dips and water bars to deal with the surface water that will continue to erode downhill portions of the trail. If no enforcement exists to ensure the reserve stays closed to recreation then rehabilitation cost may be incurred multiple times.

By establishing system of avoidance of sensitive and critical areas we can prevent a great deal of the impacts associated with the trail and its use. A critical element of our protection program is the pre treatment monitoring. This baseline data will provide us with the foundation to make future comparison of impacts and adapt our management accordingly. Instead of proposing a concrete and final layout of the trail we are allowing flexibility and adaptability in the location to ensure any critical areas revealed during pre construction monitoring can be avoided. This flexibility will also all the college to carefully research and the most appropriate location to cross Houston Creek. Another

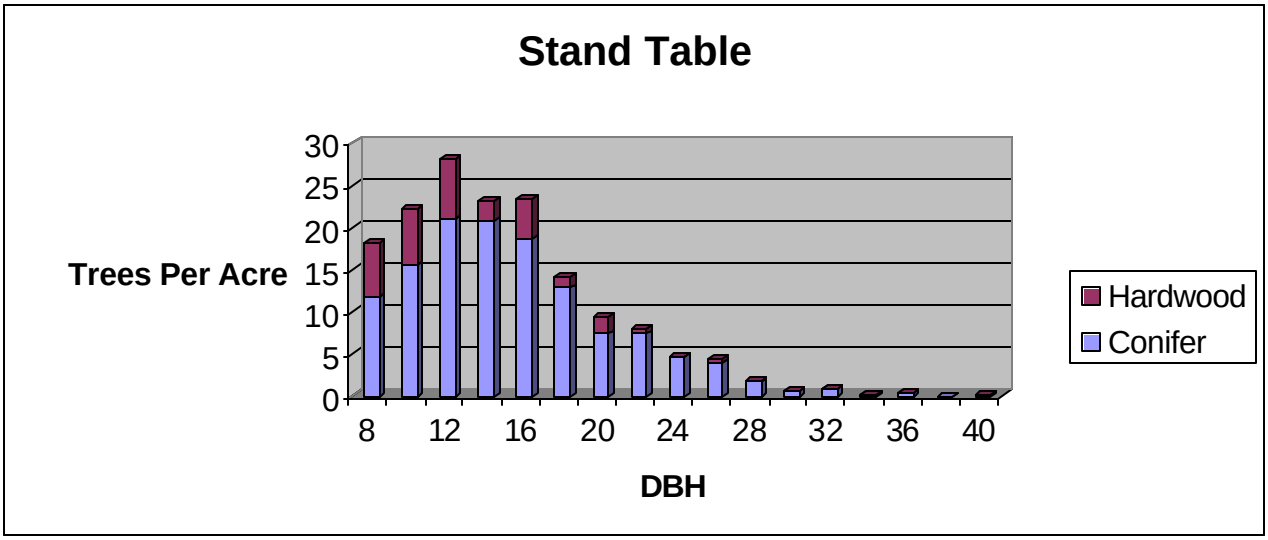
measure we are proposing to ensure the most ecologically sound trail is to consult or enlist the services of a community member or professional trained in trail layout. This experience can provide the college with further cost estimates and help to design the crossing and approach to Houston Creek. Currently the campus has no plan to deal with the management of the South Campus reserve. We are proposing that changing this hands-off policy may be more beneficial to the greater South Campus Reserve ecosystem.

As the greater Olympia community continues to grow there will be increasing pressure to develop our forested areas. This development will not only decrease the total forested area but more importantly will fragment our remaining forests. In light of this knowledge, the group is proposing the school work with local landowners and agencies in developing a community trail network that will not only provide future recreation opportunities but also provide wildlife with a relatively contiguous patch of forests that is not limited by political boundaries. The trail we are proposing would be an integral part of this network. The McLane trail begins on the far side of 17th just a few hundred feet up the road from the proposed trailhead. By joining these two trails we can assure that the area between McLane school and Main campus of TESC remain forested for wildlife and hikers. This union would greatly increase the potential for community use of the trails at The Evergreen State College.

II. Inventory of the South Campus Reserve

The first step is to assess the current environment of the South Campus Reserve. In particular, the inventories of timber and non-timber forest resources including

understory vegetation, wildlife, snags, legacy trees and downed wood. The site for this proposed trail is located in forest type 5. Forest type 5 is predominantly Douglas-fir, and is typical of the region, can be found in the North Campus reserve. The following data was collected during the 2000 school year.



The South Campus Reserve has the following inventory for forest type 5 (see appendix 8). A total of 46 plots and 111.91 acres make up the type 5 forests. A mean of 160.7 trees per acre, with a mean diameter base height (DBH) of 15.6 inches. The mean basal area of the forest type is 232 square feet. In our proposal only a small amount or possibly no amount of timber will need to be fallen.

The forest stand type 5 is predominantly Douglas-fir (*Pseudotsuga menziesii)*, which makes up approximately 75% of the trees per acre and 82% of the volume. The other trees occurring on this site are western hemlock (*Tsuga heterophylla*), western redcedar (*Thuja plicata*), red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), and true fir (Abies sp.). Red alder comes in second with 13% of the trees per acre, and

bigleaf maple is next with 8% of the trees per acre. Western hemlock also registers with 2% of the trees per acre.

A monitoring system would have to be established whereas we could take an inventory of the wildlife associated with the area. We currently are aware of many species in the South Campus reserve, but a monitoring of species richness and abundance of the forest type 5 areas will give us a better understanding of diversity of the forest. This will allow us to set aside the appropriate protection measures for the species that may be affected.

Legacy stump and snag analysis will not be available at this time. Data has been collected on both, but early next quarter the information will be processed and available to be analyzed at that time.

The understory is typical of vegetation found throughout the South Puget Sound region. Within the forest type 5 areas we have sword fern, bracken fern, red huckleberry, evergreen huckleberry, dwarf Oregon Grape, Salal, and holly. Our suggestion is to monitor for non-native species just about every year or two.

Other factors included in the inventory survey are that of riparian areas within forest type 5. Only one creek, the Houston Creek, travels through the area for the proposed trail, and we will need to construct a bridge where there will be the least amount of environmental degradation. Downed western redcedar will provide the wood necessary to build the bridge (see description and rational of chosen trail and bridge construction methods). There are also two wetlands in the South Campus reserve, and we plan to run the trail right between them.

III. Description and Rational of chosen trail management and location

Until recently this management plan only considered two alternatives when looking at trail use in the South Campus reserve. The first alternative being a "no management" and the second being the construction of a trail from our current Organic Farm trail to two possible trailheads on 17th. However, while scouting the field it became readily apparent that a social trail from the Organic Farm trail to the newly replaced culvert under 17th is being actively cleared of brush and down trees. In light of this discovery, the management plan now considers three courses of action. The first alternative still being a no management option. The second alternative has been revised to include use of this social trail in the construction of established trail in the South Campus Reserve. Finally the management plan considers going beyond no management and actively closing and preventing the establishment of this social trail.

No management

The task force first considered the no management option to be beneficial to wildlife of the South Campus. The South Campus is relatively unutilized by the college (see initial trail inventory in appendix) and we felt that a trail may disrupt local wildlife in this area. However, after the discovery of the social trail in the area (see 2,000 trail inventory update in appendix), and seeing the degree to which it is being cleared, leads us to believe that a no management option would be the most detrimental of all to the South Campus Reserve and its wildlife. It has become clear to the task force that if we don't construct a documented trail, social trail construction will continue in this area. Instead of locating a trail in the most ecologically sound location social trails often follow the path of least resistance, which may or may not be the most ecologically sound location.

In addition social trails often do not consider location as a primary mean of environmental protection. Without careful layout, trails can often exceed a 7% grade where it can begin to disrupt local surface water patterns and cause extensive erosion and sedimentation (California State Parks industry standard). Social trails also lack appropriate means of dealing with surface water flow on the trail. Such protection measures include proper tread out slope (approximately 3%, see out slope diagram in appendix) and drainage structures such as water bars and drainage dips (see appendix).

Most importantly the social trail being constructed in this area does not take the proper measures to ensure an ecologically sound crossing of Houston creek. The approach and exit of the ravine in which Houston creek sits is inappropriately laid out and constructed. The trail in it is current location and direct approach to the creek will lead to increased erosion and sedimentation into the stream. The actual crossing of the stream lacks a bridge. The foot traffic is causing the channel sides to collapse and has the potential for altering the morphology of the stream channel.

Management for non human values

If maintenance of wildlife and serenity are to become the main goals of campus for the South Campus Reserve then the college needs to consider a step beyond a no management program. Human impacts in the South Campus area are already becoming evident and with the construction of the previously mentioned social trail, impacts are only going to increase in frequency and severity. If the college values the South Campus Reserve for its lack of human impact then no management would be detrimental to its goals. If the college is to preserve these non-human values then it is necessary for the

college to actively pursue the closure of this social trail and others that may occur in the future.

Properly rehabilitating this area would involve more than simply closing the trails. Enforcement of this closure would be necessary in addition to trail rehabilitation work. Trail rehabilitation often includes breaking up of compacted soil with hand tools and replanting the trail surface with native plants salvaged in the area. Trail closure and rehabilitation often includes installing structures to deal with the surface water that will continue to erode downhill portions of the trail. Cost estimates for this alternative would include the cost of hand crews to perform the uncompaction, planting and installation of drainage control structures. In addition, the future costs of this alternative must consider enforcement if social trails continue to be constructed in the area even after closure. Trail crews are often trained in all practices of trail rehabilitation. The California State Parks industry standard for estimating labor costs of a trail crew is $ 10.75/per hour, which includes average wage per person when a laborer and supervisor are on site. The California State Parks industry standard for trail rehabilitation is ten feet/ per person hour. The data the task force gathered using GIS and GPS systems estimates the current social trail to be at 4,390 feet with a obliteration cost of approximately 4,719.25 if every foot of trail was rehabilitated (see social trail in appendix). It is also important to note that trail rehabilitation may have to occur periodically after initial closure. At this point there has been no cost estimate for enforcement of proposed closure because it has not yet been determined how the college would enforce such a closure.

Partial use of existing social trail in the construction of an established trail

The final and most appropriate alternative the management plan considers is the partial use of this social trail in the construction of an established trail that serves the greater community. We recommend the college establish a series of control points or points the trail must visit and allow a professional who has the proper amount of time and equipment determine exactly which parts of the social trail to use and which parts to be re-routed. This professional would also be partially responsible for selecting and designing the crossing of Houston creek (see below). The first and most important reason for this recommendation is that without considerable long-term cost the college cannot stop and rehabilitate the human impacts in these areas. Even with a considerable initial investment of trail construction, which can be alleviated through volunteers and the use of inmates, long-term cost will be less than continually rehabilitating and closing social trails that will form in this area. The actual cost of trail construction is dependent on our terminus options. It is at this point the task force recommends the use of the student body and surrounding community to participate in the construction, which will not only strengthen community support but also help to alleviate the costs involved with this alternative. The California State Parks industry standard for trail construction is seven-feet/per person hour. This is just slightly below the cost of trail rehabilitation, yet trail construction costs are an initial investment with post construction maintained costs a great deal less at 75feet/per person hour (California State Parks). With a good deal of the trail already constructed costs of enhancing the entire social trail would be more representative of trail maintenance costs rather than construction. The actual construction costs would be confined to those parts of the trail we deem necessary to reroute and the

portion of the trail that would be constructed from the current social trail to the new proposed terminus (see next paragraph and appendixes for proposed terminuses).

Second of all, the current terminus of this trail on 17th near Houston Drive does not serve the greater community. The current terminus only serves those community members located in the Houston Drive area. The management plan has three proposals for a different terminus for this trail. The first possible terminus would be to locate the trailhead at 17th and Mix (see trailhead option A). Approximate labor costs for the 1,000 feet of trail construction involved in this option would range in the area of $1,535 (based on California State Parks). This location would utilize the county right of way at this location (see property map in appendix) and allow for a larger portion of the community to find this location useful. This site also provides the potential for a small parking area. The second terminus possibility is to connect the current social trail to the already established McLane trail that crosses 17th just north of Mix (see trailhead option B). This option would involve the construction of approximately 925 feet of fresh trail with an estimated cost of $1,421(calculated using the California State Parks industry standard) This option would allow for a community trail system to develop. This option has would make use of the parking available at the McLane trailhead. The third option calls for the combination of the first two terminus locations. By providing a connection to the McLane trail and a trailhead at 17th and Mix we can maximize on community use and potential for parking. By supplementing the McLane trail with access at 17th and Mix, the college can also provide an easy access to Houston Creek for people who cannot hike the full length of the trail.

Any of the trailhead options proposed in this management direction would also include the cost of removing the remaining social trail not utilized in the construction of the proposed trail. There is approximately 1,800 feet of social trail between the current terminus near Houston Drive and our proposed deviation from the social trail prior to Houston Creek (see appendix). The estimated cost of removing this portion of social trail would be approximately $1,935 (based on California State Parks wages and production rates)

Construction of an entirely new trail

One option the group briefly considered, even after the discovery of the social trail in the area, was the creation of an entirely new trail in the vicinity of the current social trail. While conventional wisdom dictates trails should follow ridgelines (Hesselbarth, 1996) the current social trail strays from the true ridge top in some of the areas. However, it does not entirely leave the ridgeline and enter the wetland conditions paralleling the ridgeline. If the current social trail location experiences wetland conditions in the future then the group recommends that this portion of the trail be closed and rerouted. At this time the task force feels it would be inappropriate to close the entire social trail and create and new trail that follows the true ridge top for the entire length. Currently there are no noticeable impacts created by the social trail that would be mitigated by moving the trail to the true ridge top that may only be a few feet away in elevation. The costs associated with closing the entire social trail and creating an entirely new one would be much greater than a cost previously discussed. Not only would the number of feet to be constructed rise by more than 2/3 of a mile, but also the revegetation

costs associated with closing the social trail would be greater than all of the costs put together. Increasing access through the construction of new trail while trying to restrict access on the social trail that may be within sight of the new trail would be counter-productive.

Ecologically sound crossing of Houston Creek

Finally and most importantly the management plan calls for the most ecologically sound crossing of Houston Creek as possible. Trail design and layout must see into the future. Strategies designed to deal with ecologically sensitive portions of the trail may not be appropriate as trail use and frequency increases. This social trail existence and construction is proof in it self that trail use and frequency in the South Campus Reserve is only going to increase with time. Evergreens student numbers are on the rise and will continue to grow and any trail primarily dealing with the student body should reflect this. This is why it is imperative that any trail entering the South Campus Reserve and crossing Houston Creek must have a well-designed crossing. After a preliminary field survey and looking at topographic maps it may be difficult to descend and ascend the ravine Houston Creek lies in without disturbance. One extreme case of disturbance will come from bikers and to some extent hikers simply braking while they descend this slope. In order to prevent extreme water channelization in the trail would require a great deal of well-constructed switchbacks (see switchback diagram in appendix). The current social trail crossing Houston Creek does not reflect these concerns, which is why it is of the opinion of the task force that a professionally constructed trail leading into a bridge or open arch culvert should replace the current crossing location. We recommend that the school's hydrology and geology department work with a professional trained in the art of

trail layout to select the most ecologically sound point at which to cross Houston Creek. One costly yet wise investment into this project would be a series of steps to be constructed in the steeper portions of the descent and ascent. The standard for seven-inch step construction is one step/per person hour (California State Parks). However this type of descent would be the most ecologically sound and provide the quickest and easiest access for users.

IV. Expected Future Forest Conditions

There are many future forest conditions that can be expected to result from the proposed trail plan. Those addressed will be erosion, the impact of social trails, the use of bicycles, and disturbance due to an increased number of people that will use the trail. Also, a "no management" plan and a plan for removing the current trail in the South Campus reserve will be introduced. The future forest conditions that can be expected are as follows.

Both nature and man cause erosion. The threat of erosion on trails is imminent and is a serious consideration. It can be taken care of by restricting access to vulnerable areas, spreading use over a wider area to lessen the impact on one particular path or location, draining and improving the path, and restoring damaged areas (Agate 1983). By planting a mixture of quick-growing native plants along the trailsides, the roots systems will stabilize the soil as a preventive measure (Margolin 1975). Sloping the trail to ensure proper drainage is also important, and water bars (See Appendix 5) can divert water from the center of the trail to the edge (Margolin 1975). The trail will be monitored to determine the impact of erosion and its range. This is especially important

in riparian areas. Parts of the banks may have to be fenced off to stop physical injuries to the banks, or deflectors (piles of stone placed upstream from an eroding bank to absorb the force of the water) may be built (Margolin 1975). Banks should also be planted heavily.

Conditions expected under no management plan

The "no management" plan entitles us to do nothing at all to the current trail system on campus. The expected conditions under this plan will be continued erosion due to unregulated traffic and continued disturbance. With no remedy we could expect a formation of more social trails, which could continue to disrupt wildlife inhabiting the area. The impact of bikes would continue to have a negative affect on erosion of the trail and hillsides, as well as possible damage to any new social trails that were created as a result of a "no management" plan.

Expected conditions under a "non-human value" management plan

The expected conditions would be beneficial for wildlife if the objective were to close down and remove the current trail completely. If the area were actively managed for non-human value, which would include actively rehabilitating already present social trails and restricting access, the amount of disturbance in the area would decrease. However, if the area is closed and not actively rehabilitated, then erosion from the current social trails will continue to impact the area. Either of these objectives will most likely be beneficial to wildlife because of the decrease of human disturbance in the area. Recreational use would decrease significantly. Disturbance due to recreation in the area would increase the least.

Expected conditions under a managed South Campus Reserve system

The trail management proposal will consolidate the disturbance to a particular area. The designated trail would see an increase in the volume of traffic and disturbance, but the impacts will be consolidated onto a single trail that avoids sensitive areas and takes the appropriate environmental protection measures. The proposal suggests continued recreational use of the South Campus reserve, whereas the previous plan entails no recreational use of the area. The proposed trail would eliminate social trails, which would be replanted to prevent further usage. The trails can be blocked off with brush, logs, or rocks (USDA 1980). If these trails are not closed, it could cause a greater amount of degradation because more people would have access to them via the main trail. It is possible that the construction of the trail would lead to the building of new social trails, as people would use them as shortcuts to other places off the trail. Monitoring and maintenance would prevent these undesirable trails because they could be closed off and replanted at the first signs of human use. The absence of humans in the area would prevent nesting disturbance and soil erosion, but the threat of social trails would still be an issue.

There are other factors to consider when considering the Interpretive Trail proposal. The crossing of Houston Creek could be implemented more effectively to decrease the impact currently being imposed on the creek. There will be minimal disruption to wildlife due to biological monitoring methods to protect the biodiversity of the area. Bikes may be regulated if it is found that they are creating a significant negative impact to the trail through our monitoring system.

The use of bicycles can lead to habitat destruction, erosion, and increased soil compaction. If the trail is to be used by pedestrians only, signs will be noted at each end of the trail. Bikes can cause a lot more damage than foot traffic because they can cause gulleys and turn the soil, especially in wet areas. Bikes also gouge deep furrows that hinder drainage (USDA 1980). These are significant factors in erosion (Margolin 1975). If bikes are allowed on the trail, measures will be implemented to protect the trail and its surrounding area. An appropriate surface cover must be laid down and maintained. It can range from soil to cement, and consideration will be made to determine which is most feasible and cost efficient (Ryan 1993). The trail can be closed to bikers at certain times if deemed that the bikes are severely impacting the habitat.

With a designated trail, the amount of traffic to the proposed trail area will increase. Education is important because it will provide resources to the public so the area can be used for recreation and respected simultaneously. Parts of the trail may be closed or moved if found to interfere with sensitive plants or animals in the area. The trail will also be monitored for erosion and may be subject to closure, permanently or seasonally, if signs of significant loss are noted. Rails may also be put in place to prevent widening of the trail, or a boardwalk can be put in an area that is continually muddy to avoid increased habitat destruction along the sides of the trail.

Adaptive Management will be implemented in the future if necessary. Because the needs of the species involved may change, as well as the needs of the people, it is important that the plan be flexible and takes into consideration that the landscape is constantly changing.

V. Description and Rational of Chosen Trail and Bridge construction methods

Our management plan calls for partial construction and full maintenance of a trail extending from our current Organic farm trail to a location on 17th (see previous section three for terminus possibilities). We have two means of construction to consider. The two options are trail construction by heavy equipment supplemented by the use of a hand crew or trail construction using only a hand crew.

Use of heavy equipment for trail construction

The first consideration is the use of heavy equipment supplemented by a hand crew. The exact cost of this option was not considered because we did not feel this was conducive with our goals of minimal ecological impact and adaptability. Heavy equipment would provide an inappropriately large and fairly permanent tread. In addition to compaction, the treads of heavy equipment often provide a disturbance suitable to invasive plant species. Seeds of invasive species are often embed into the treads of this type of equipment. The noise and air pollution resulting from this type of trail construction is disruptive to local flora and fauna. Most importantly the type of trail created by this type of construction would be much harder to remove it in the future, if need be. It is for these reasons the groups recommends against the use of heavy equipment even if the labor is provided at minimal cost or even free.

Use of hand crew for trail construction

Previously mentioned before, the task force feels a hand crew would provide a construction method most conducive with our management goals. A hand crew would be

able to work within the appropriate tread width and cause considerably less compaction and erosion. In addition, a trail crew would create a minimal amount of noise or other forms of pollution that may disrupt wildlife. Construction with a hand crews also provides a chance for communities members to participate and connect with the project. Some potential sources for labor that are regularly used in trail crews are volunteers, private industry contract crews, inmates, Washington Conservation Corps, Student Conservation Association, and the Washington Trails Association.

Most importantly, the finished trail provided by a hand crew gives us the adaptability that is necessary to ensure that this is as ecologically sound as possible over the duration of the stewardship. The management plan calls for a trail that can be rerouted in case of future changes in sensitive species or habitats, or even be rerouted if a sensitive species or soil is encountered during construction. Even though the management plan is trying to provide a location that is as ecologically sound as possible, a reroute maybe appropriate if future monitoring of the local hydrology indicates extreme sediment erosion. Trails created by heavy equipment are costly and often extremely difficult to rehabilitate. Hand-crew created trails are of minimal impact and compaction and if diagnosed soon enough they can often be rehabilitated within a season or two.

Bridge vs. arch culvert over Houston Creek

The final consideration of this section would be the construction of a small footbridge located over Houston creek or the installation of a natural bottomed culvert. The management plan calls for a bridge or culvert at this location because foot traffic provides the potential to greatly increase sediment load into the stream and greatly disrupt stream channel morphology. A bridge would provide the most appropriate means

to cross the channel without causing the before mentioned damages. While natural bottom culverts allow the stream bottom to remain undisturbed, they often involve channelizing and directing of the flow of the stream channel. The stream channel of Houston creek ranges between three and four feet often migrates. While the channel may only move a few inches every year, but we may be restricting its long-term migration if we install a culvert. A bridge that is significantly wider than the stream channel would allow for the stream to migrate to a much greater extent than would a culvert. In addition, the act of installing or removing culverts increases the sediment loads to the stream during and shortly after the process. Bridges can be constructed and removed with minimal impact to the stream. Like all aspects of the proposal, the crossing of Houston Creek must be adaptable in case future conditions warrant the removal of the trail. We feel a bridge has a far greater potential to be adaptable than a culvert. Materials for the construction of the footbridge could come from two locations; lumber yard or our campus' forests.

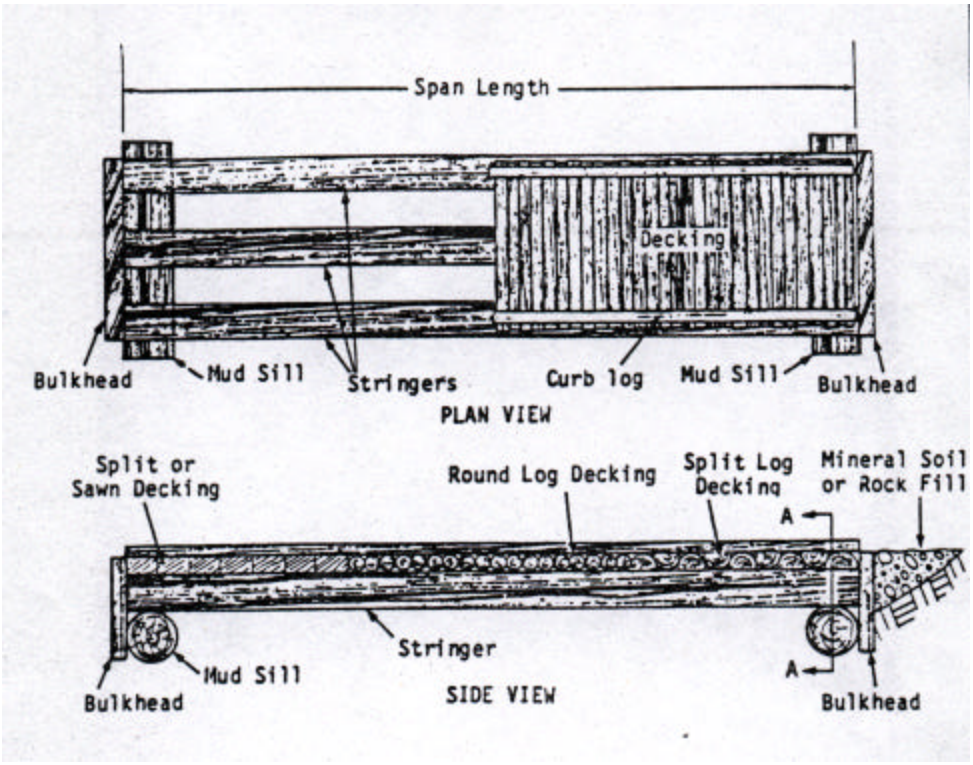
Use of milled wood for bridge

Many times the length of materials needed to construct a bridge is much longer than a lumberyard could provide. However, the length of the proposed bridge would be minimal and well within the means of a lumberyard. Material costs for this option have not been calculated because exact bridge length is yet to be determined. In addition this method may not be the most ecologically appropriate. For safety and longetivity reasons the bridge would have to be constructed from pressure treated timber. Without the pressure treatment, the bridge would be highly susceptible to decay and rot. Even though

pressure treated timber can be relatively safe there is the possibility of introducing foreign chemicals into Houston Creek.

Use of downed cedar trees for bridge

The campus forests can provide the appropriate materials free of economic costs and through minimal ecological impact. Native unmilled cedar trees can provide us with the appropriate length wood that is already extremely decay and rot resistant without the chemicals involved in pressure treatment. However, the most appropriate material for the bridge may be the combination of native cedars logs for the sills and stringers while using milled planks for the decking, where they can easily be replaced as they rot. This combination would limit the use of cedar to approximately two logs (12-18inch diameter and up to 15ft in length) for the sills and stringers.



The management plan would call for the material to be downed cedar trees sporadically harvested throughout the campus, which would lessen the impact in any one given area. In addition to being more ecologically appropriate this option provides the chance for students, faculty and community members to be involved in the entire process of construction. We feel this opportunity may provide good chance for individuals outside the management plan to become connected to the project. Future drafts of this management plan will include a benefit comparison of the downed cedar tree in it current location versus the benefits of using it in a bridge over Houston Creek

VI. Trail Use and Monitoring

The Trail Use and Monitoring Plan is an important foundation in the trails group adaptive management plan. Because the trails group is using adaptive management, the monitoring plan would reflect which areas of the trail are getting damaged and what the methods of damage are, then assess what adaptive changes could be made in the original plan to compensate for the current problems occurring.

There are many potential situations pertaining to the Interpretive trail that would need to be monitored for. Monitoring would have to take place seasonally to evaluate the use of bicycles on the trail and whether or not they are damaging the flora and fauna surrounding the trail. Bikes have been associated with soil compaction as well as erosion and sediment damage (USDA 1985). Erosion of the trail will need to be monitored, specifically on down hill areas near Houston Creek, which has a 10-20% slope (see Appendix, map 6). Trail surface erosion results from three things: soil type, velocity of water, and distance that the water is moving down the trail (USDA 1985). Anywhere that

the trail exceeds a 12% grade would have to be monitored (USDA 1992). Also, monitoring would have to take place at spots on the trail, which have a 0% grade, because puddles form in the center of the trail forcing people to walk around them, thus widening the trail (USDA 1985). Monitoring must take place to be certain that excessive erosion does not occur within the area of Houston Creek.

Trails branching off of the main trail would also have to be surveyed, as some of these social trails may lead to riparian areas (see Appendix, map 1). Tread creep will also have to be monitored. Tread is the actual travel surface of the trail, and tread creep occurs when the tread surface has been eroded and compacted by travel along the lower edge of the trail (USDA 1992). Exposed bedrock or roots along the upper side of the tread can indicate this. Biological monitoring will be included in the biological monitoring protocol.

Monitoring Techniques

There are many different monitoring techniques that could be used to find the necessary data. Available experts in the fields of hydrology and geology on campus and in the community could help to sample soils for erosion and monitor the riparian area of Houston Creek for sedimentation and damage to the creek bed.

Another suggestion is for a trailhead box requesting information, which would monitor the number of people using the trail, the frequency of use, and what kind of use they plan in the future (see mail-in survey). Requesting people to record their use of the trail and where they came from to determine where in the community users are from and why they use the trail, i.e., bike use, bird watching, nature walking, etc. This will then help to make the trail more accessible to specific use and cater the information to be

displayed on the interpretive signs, and would hopefully incur less damage. Local landowners would also need to be monitored to find the impacts of the trail before and after rehabilitation. In previous studies of rail-trails it was concluded that trail neighbors had experienced few problems, and the most reported problems consisted of unleashed or roaming pets, illegal motor vehicle use, and litter on or near their property (Moore et al 1992).

The Interpretive trail could also be utilized as an educational tool for students of Evergreen and McLane school, as well as other local high schools or regional StreamTeam. Evergreen programs, such as the Recreation and the Environment group contract sponsored by Jovanna Brown could possibly monitor creation of secondary trails. Evergreen students who are involved in a program or an independent contract could develop GPS and GIS skills to record information from and on the trail. Local schools could use the trail for recording data or monitoring specific activity as a teaching device. StreamTeam could use Houston Creek as a model and educational tool for restoring creeks and streams in the South Puget Sound.

VII. Protocol for Biological Monitoring

With the active management option there will be some disturbance to the wildlife and vegetation. We need to be sure while constructing the trail we know what potentially could be disturbed and how to avoid it. There are some guidelines that we will follow for biological monitoring. We will be monitoring for breeding, roosting and other critical nesting areas for amphibians, fish, birds, and mammals. Also, we will monitor for snags, downed woody debris, and live vegetation.

Monitoring will most likely be done along the trail, within the buffer zone, and other areas that are sensitive, such as, the area by Houston Creek and near the wetland (see appendix). Before we begin construction we should know what animals and vegetation would most likely be affected. Then we will have to do surveying to determine population sizes or density indexes for species along the proposed route of the trail.

It is important that we know a rough estimate for these populations so that we can have baseline data to compare with future survey work on the trail and not cause a great disturbance. We must also be familiar with how the populations are dispersed along the trail. By knowing this prior to construction we can avoid disturbing critical habitat. We will have to continue doing the surveying on the animals each year so that we know if they are declining or stabilizing.

Once the trail is finished and in use, we will need to keep track of the population sizes to see that none of them are declining. We would like to continue surveys to see if any of the populations have moved, or declined as a result of the high amounts of traffic. If wildlife is suffering the trail may have to be removed, which would then provide a chance to monitor the comeback of any declined populations or encroachment by invasive species.

Monitoring the vegetation will be pretty minor as long as there's no erosion. If erosion sets in we will have to plant more vegetation or add more soil (Proudman et al.).

It is possible we will encounter endangered species near the trail, which is why we will be surveying for them before hand. The trail may have to be removed or relocated to protect their habitat.

Since certain species are dependant upon the wetland, if there is deterioration caused by the lookout that may be connected to our trail, we may have to remove it, or relocate it.

Monitoring stations will be set up along the trail to survey species. Wildlife monitoring stations will be set up at the wetland. As usage of the trail progresses, more stations may be set up. Faculty can help create appropriate survey techniques. Possible potentials for doing fieldwork might be the class members, or contracts. These people will be trained in the most correct way to do the surveys. We will also monitor one year prior to construction of trail, if it is required to monitor certain species in different seasons.

VIII. Description of Environmental Protection and Restoration Strategies and Measures

Our primary environmental protection and restoration strategy is to establish preservation and maintenance of the natural forested conditions in the South Campus Reserve as a portion of our management goals for the area. By doing so we are ensuring that any activity brought about by this proposal is done to either protect or restore the area. Beyond this we have developed a series of strategies to guide campus when dealing with any issues, concerns, or unforeseen events that may arise before, during or after any management activities arising from this proposal.

Adaptive Management

Trail management planners should recognize that a need for adapting current management policies or more planning may arise if there is conflict between users, resource conditions change, recreational opportunities change or arise, or as public

opinions or issues change (USDA, 1985). Campus currently has no plans or strategies to deal with the management of the South Campus Reserve. We are proposing the college adapt this hands-off management policy. By allowing the college to decide what they value this portion of Campus for we can change or adapt the direction of our management. If the college decides to obliterate the current social trail in the area, adaptive management may be employed in the future if obliteration of the trail and closure of the South Campus Reserve to recreation fails. Once such adaptation may be the reconsideration of the proposed trail.

Adaptive management will also be reflected in the layout of the proposed trail if the college decides to take this direction. In the next two sections we will discuss our recommendations for who will oversee and direct the construction. By establishing a series of control points and areas the trail must go, (i.e. the selected trailheads, designated point of crossing Houston Creek), we can allow flexibility in the actual layout of the trail in between the control points. This flexibility enables the selection of the most ecologically sensitive layout between these points (California State and National Park, 1989)

Finally adaptive management will be employed in the future if the college decides to construct the proposed trail. Any impacts, concerns or issues brought about through either of the monitoring programs will be dealt with in accordance to our established goals and objectives. One such adaptation the school may want to consider during the initial layout and construction is limiting the type of use permanently or seasonally. As previously explained in the expected forest conditions section, bike use can quickly degrade a trail. If a policy of “no bike use” is to be adopted then the layout and

construction design would be more conducive to hikers. In fact, certain trail structures like steps and tight switchback can be employed to deter bike use. A realistic compromise may be to limit bike use during the raining season when bike traffic can do the most damage. Bike use can be seasonally limited through bike barriers, which could be unlocked during the summer and early fall months (unable to provide diagram). If degradation of the area becomes too severe the college could adapt the direction of the management of the South Campus Reserve and close the area off to recreation.

Avoidance Policy

The easiest and most effective way to minimize disturbance along the user and nature interface is to avoid areas of concern. Rather than trying to bring the user to sensitive areas, in an ecologically sound way, we are proposing the trail avoid all areas of that have the potential to end in negative impact. The avoidance policy is particularly applicable to wildlife habitat and wetlands in the South Campus Reserve. By overlaying wetland maps with our proposed trail location and field truthing the location we can avoid the wetlands that lie on either side of the ridge that the proposed trail descends along. By avoiding these wetlands we are avoiding the impacts and construction costs associated with bringing trail users to these sensitive areas.

Avoidance of wildlife habitat is more difficult. This portion of the avoidance policy is highly dependent on the results of pre-treatment monitoring. Areas we would like to avoid are active den, nesting and roosting sites. Other areas that are to be avoided are potential den, nesting and roosting sites in addition to feeding and watering areas. If it all possible parts of the forest with developed structural diversity and significant downed and standing dead wood not covered by any of the previous avoidance should

also be avoided. Examples of this include areas surveyed to have legacy stumps or larger diameter snags.

This policy should also be extended to mean the avoidance of changing the native ecosystem. Thereby, extending this policy to deal with encroachment by invasive non-native species. Soil disturbances caused by trail construction and trail use can be favorable for many opportunistic invasives. Any intrusion of invasives will be documented and brought to attention by our monitoring programs. In accordance with our goals these invasives brought in by trail construction or trail use will be removed in order to preserve and maintain the natural forested conditions in the area. If the problem persists management direction may have to be adapted to remove the trail that the invasives are migrating along.

Proper Layout

The key to low maintenance and operation costs is conscientious pre-construction planning (USDA, 1985). A lack of maintenance and operation cost reflects a trail that has very little degradation. Areas of environmental impacts along trails are associated with the areas of trail degradation. Hence, if we keep maintenance cost down through a conscientious pre-construction layout we should be able to keep associated environmental impacts down.

In addition to working with a specific set of criteria governing trail location, a trail locator must have a "feel" for the process of turning a set of trail location guidelines into a finished usable product. This "feel" is generally gained through the repetitive field experience of locating and constructing trails (California Sate and National Parks, 1989). The locator must also be knowledgeable of local terrain, vegetation, soil types and

moisture conditions (California Sate and National Parks, 1989). This is a diverse field of knowledge for one individual to be extremely capable in. This is why we are recommending the school assemble a group of faculty, students, and community members knowledgeable in the different science fields to work with a professional in trail layout and construction (see below sections).

Once this group is assembled they can begin to work through a set of criteria governing trail location. Two fairly comprehensive sets of criteria exist. The first is assembled by the California State and National Park system. The second is assembled by the Forest Service (USFS). In order to provide the most pertinent and comprehensive set of already established criteria, we combined the two different sets to form one more exhaustive set. The following set of criteria should be provided to and amended by the locating committee. Then included in the trail construction packet (see below).

Criteria for Trail Location:

1. Use as much existing trail as possible.
2. Keep trails on ridges and benches avoiding low and flat wet areas.
3. Trails should avoid paralleling bodies of water or riparian zones. When water is crossed it should be done on a descending and ascending grade perpendicular to the stream or body of water to avoid water running down the trail.
4. Keep number of stream crossings, bridges, culverts and switchbacks to a minimum.
5. Avoid extreme elevation and terrain changes (trail grade should never exceed 10%).

6. Avoid area of zero grades they can result in puddeling on the trail.
7. Trail grades should contour rather than climb up over steep topography.
8. Location should be suitable for all seasons of use.
9. Avoid major down logs and snags or area of high snag density.
10. Provide loops systems as well as access at varying distances along the trail so users can have variety of different hiking distances.
11. Locate trail on stable soils. Avoid fragile, talus and color contrasting soils.
12. Avoid known and potential nesting, roosting, feeding, watering, wallowing, calving or bedding areas. Trails should avoid any known areas of high wildlife concentration.
13. Avoid any listed or threatened plant species and their associates.
14. Provide adequate visibility when approaching any roads or parking lots
15. Avoid areas prone to thick under story vegetation, which requires high maintenance.
16. Avoid areas prone to windfall or lighting.
17. Avoid any known cultural sites.

Formation of the South Campus Reserve management committee

One way the college can ensure ecologically sound management of the area is form a multi-disciplinary group of knowledgeable faculty, students and community members to oversee the layout and construction of the trail, the monitoring of the current social trail (if we can continue with our current hands off approach) or the obliteration of the social trail and the closure of South Campus Reserve to recreational trails. If construction of the proposed trail is to occur this committee could select the proper

location to cross Houston Creek or employ the use of faculty if this committee does not reflect the appropriate knowledge to determine a sound crossing area. Throughout construction this committee would make sure that the construction crew was adhering to a set of established guidelines provided in the Trail Construction Packet (see below).

This committee would also be responsible for making any adaptations to the management plans if either of the monitoring programs reflects a need for such changes. Trails often develop a set of core users who establish a bond with their trail (Moore et al, 1992). Although there was now preliminary surveying for such a committee we feel there is enough interest that a group of these core users, interested faculty and students could indeed serve as stewards for the area.

Use of trained professional

The South Campus Reserve management committee could either include a professional trained in trail layout and construction or the committee could employ the services of such an individual. We recommend the committee bring in such a professional regardless of management direction. This type of field experience could be incredibly insightful as to the feasibility of keeping hikers/bikers of the area in addition to providing a more thorough cost estimate of each management alternative or direction. If the college takes the direction of constructing the proposed trail this individual could be employed to help select the crossing point of Houston creek and finalize the layout.

Trail Construction Packet

This strategy will be employed if the college decided to construct the proposed trail or obliterate the entire social trail. Management objectives and environmental

considerations are effectively conveyed to construction crews through a trail construction packet (USDA, 1985). The creation of this document would fall into the hands of the management committee. A trail construction packet typically is a collaboration of maps and documents that include the trail's final location, a construction log (record where hours and jobs completed are accounted), complete drawings of any structures, time schedule and most importantly a list of specifications regarding tread width and brushing limits. We are proposing that construction packet assembled for any management activates resulting from this proposal also include a list of potential sensitive species or habitats that may have been overlooked by the monitoring program and specific guidelines for dealing with Houston Creek and sloped portions of the trail.

Much of the information needed for this packet is provided by this proposal. In order to alleviate the responsibility placed on the committee to create this packet we are suggesting that tread width, brushing limits, and the frequency of drainage control structures, such as water bars and drain dips be dictated by USFS standards.

Illustration of Brushing and Clearing limits

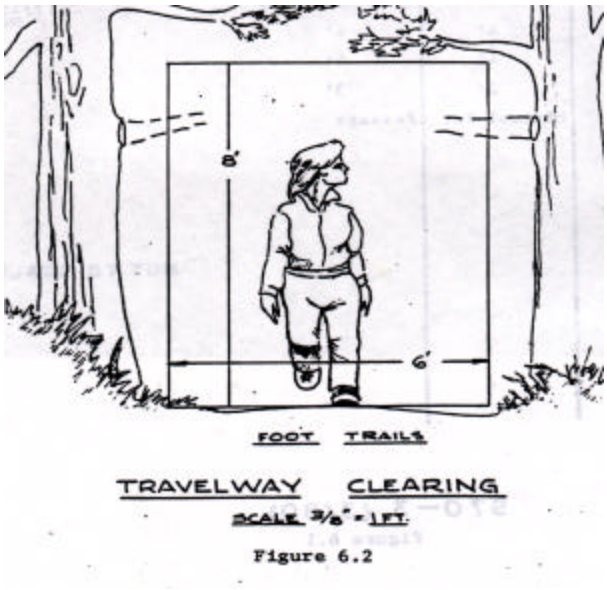
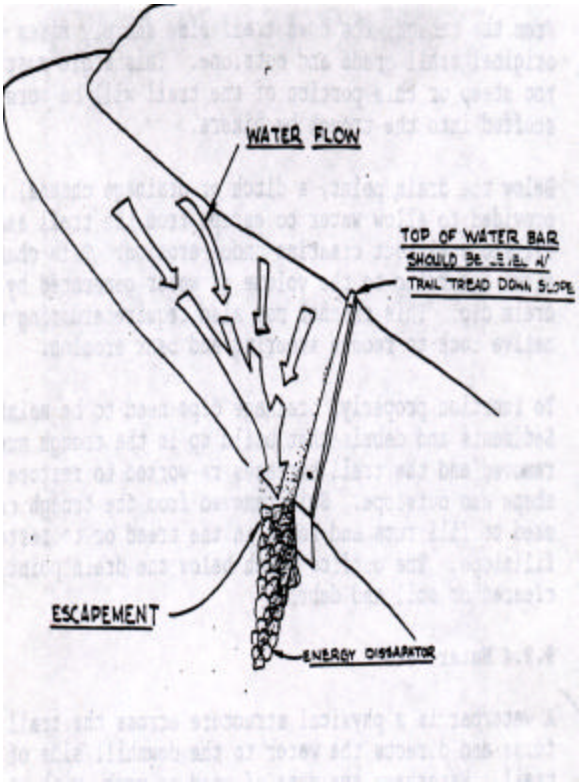


Figure 6.2

Illustration of Waterbar and Drain Dip



Although the below table makes reference to the frequency of cross drains it also applies to water bars.

WO AMENDMENT 2309.18-91-2
EFFECTIVE 11/8/91

2309.18.3
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3.12b - Exhibit 02

Frequency of Cross Drains

Material Type	Grade (percent) 2	4	6	8	10	12	15
Loam	350'	150'	100'	75'	50'	*	*
Clay-Sand	500'	350'	200'	150'	100'	50'	*
Clay or Clay-Gravel	-	500'	300'	200'	150'	100'	75'
Gravel (rounded rock)	-	-	750'	500'	350'	250'	150'
Shale or Angular Rock	-	-	800'	600'	400'	300'	250'
Sand	Varies with local amounts of fine clay and silt. Drainage diversions generally are not required in "pure" sand because of the fast rate of water absorption. For sand with appreciable amounts of fine binder material, use "clay-sand" distances as shown above.						

* Grades not recommended in this material.

- Generally no diversion required for soil stability.

Trails are generally constructed and maintained for their most demanding user (USDA, 1985), which would be bikers on our campus. Even though, hiking maybe the primary mode of transportation on this trail it may create unsafe conditions for bikers if the trail is created to hiking standards but allows bikes. Therefore tables for both types of use have been provided.

FSH 2309.18 - TRAILS MANAGEMENT HANDBOOK
WO AMENDMENT 2309.18-91-2
EFFECTIVE 11/8/91

2.31a - Exhibit 01

Hiker Trail Guide

	Easiest	More Difficult	Most Difficult 1/
Grade			
Max. Pitch Grade	20%	30%	+30%
Length	100'	300'	500'
Clearing 2/			
Width	48"	36" to 48"	36"
Height	8'	8'	8'
Tread 3/			
Width	18" to 24" Obstacle-free.	12" to 18" If needed, depending on volume and drainage.	12"
Surface	Spot gravel surfacing.	Not surfaced--leave roots, imbedded rocks, and some logs.	No graded tread except on side slopes over 50% where safety or resource damage is a problem.

1/ Upper limit of grade and pitch length for most difficult trails depends on soil type, amount of rock, vegetation type, and other conditions affecting stability of the trail surface.

2/ Curve alignment to avoid cutting large trees.

3/ Increase tread width 6 inches on switchbacks or where side slopes exceed 60 percent.

FSH 2309.18 - TRAILS MANAGEMENT HANDBOOK
WO AMENDMENT 2309.18-91-2
EFFECTIVE 11/8/91

2.31c - Exhibit 01

Mountain Bike Trail Guide

	Easiest	More Difficult	Most Difficult1/
Grade			
Max. Pitch	10%	30%	+30%
Max. Sustained Pitch	5%	10%	15%
Length	100'	300'	500'
Turning Radius	6'	3'	2'
Length of Trip			
Day	10-20 mi	20-40 mi	40-50 mi
One-half Day	5-10 mi	15-20 mi	20-25 mi
Clearing2/			
Width	48"+	36"-48"	36"
Height	8'	8'	Max. 8'
Tread3/			
Width	24"+	12"-24"	12"
Surface	Relatively Smooth	Sections of Relatively Rough Surface	Varied--Some Portage Required

1/ Upper limit of grade and pitch length depends on soil type, amount of rock, vegetation type, and other conditions affecting stability of the trail surface.

2/ Curve alignment to avoid cutting large trees.

3/ Increase tread width 6 inches on switchbacks or where side slopes exceed 60 percent.

IX. Restoration Timeline

Starting in spring of 2001 a management direction will be determined, either by continuing a "no management" plan, "managing for non-human values", or establishing trail in the South Campus reserve. Formation of South Reserve Management Committee

will take place at this time. Also during this time the gathering of data, such as, wildlife, invasive species, vegetation, and habitat surveys will be done. We must allow up to one year to complete surveys to provide a chance to monitor in four seasons. In Fall/Winter of 2001-2002, finalization of trail layout will be done if the proposed trail is approved. In the winter gathering of volunteers for construction and/or negotiations for contracts to supplement volunteers will begin to obliteration of the current social trail.

In summer of 2002 construction of the trail will begin depending on management direction.

If the trail is constructed, one area that is going to need restoration are the small social trails that people make that will lead away the new trail. They will have to be removed once they are introduced. The removal of the remaining portion of the current social trail should be done as the new one is made. Depending on the amount of people that decide they need to make another trail, we may or may not have to do this regularly.

Restoration on our trail as the years pass by will also have to be done. We will monitor the trail erosion due to the high volume of traffic and bikers. Another item that will need some attention is the vegetation as it starts to grow back (Hesselbarth). It is crucial that we control invasive species from returning or introducing themselves (Smartwood).

Some people may cause destruction on the vegetation or habitats of wildlife or possibly even to the wetland. If this occurs it will be in our responsibility to fix it in a timely manner.

When or if erosion occurs, more water bars or drainage dips may need to be installed or the trail may need to be relocated or closed. Depending upon the type of

traffic that uses the trail erosion may vary. Down slopes on the trail have the potential to erode much quicker than the other areas. One place on the trail for this is the area near Houston Creek (see Appendix). Possibilities for erosion control will be tended to, as we know more about the people who are going to use it.

With the regeneration of vegetation, the trail will be maintained as the vegetation grows back and becomes hindrance and a safety hazard. This may not need to be done as often, depending on the varying species along the trail (Proudman et al.). If invasive species aren't removed completely or start to grow back, they will be removed again and seen to that no new species are introduced. This may not need to be done that often either, because some invasive species grow faster than others.

If destruction of vegetation or wildlife habitat occurs, we must be there to fix it by replanting vegetation, reconstructing the habitat, or moving the trail. There is no way to tell when this might happen, so it will have to be done as it occurs. If destruction to the wetland happens, it is of utmost importance that this problem is fixed rapidly. It may be necessary to move the trail all together if the destruction cannot be fixed.

All of these areas will be checked on a year-to-year basis, except for the wetlands and critical habitat or vegetation. These are more crucial areas and need to be checked more often. They will be checked more like every 2-3 months.

X. Education: A tool for Restoration

In areas where preservation and wildlife are objectives of the landowner, education can be, perhaps, the greatest tool in preserving those values. Public information provided through signs and displays are effective aids in management (USDA, 1985). The focus group is proposing that our objectives can best be met through a series of two

sets of signs. The first would include a trailhead kiosk or sign at both ends of the proposed trail. Trailhead displays should, at a minimum, reflect user types allowed on trail (if any restrictions apply), an explanation of the user or season restrictions (if relevant), management objectives and some data about trail location and conditions (USDA, 1985). Most importantly signs for the proposed trail should educate the visitor about sensitive habitats and species that may be encountered or visible from the trail. These educational displays focused on protecting sensitive features should be supplemented with a list of places the hiker should visit as opposed to which should be avoided (USDA, 1985). By highlighting areas to be visited the land manger can funnel hikers to parts of the forest that are capable of handling the types of impacts associated with trail use.

The second series of signs proposed would include one or more interpretive themes to be presented to the users as they visit the length of the trail. Interpretive signs can be effective at trailheads, but secondary signs offer a wealth of information about local flora/fauna not visible at the trailheads. A set of signs depicting native plants and communities would be conducive with the group's goals and objectives. Educating users about native species may aid in there preservation and/or use in the future. A primary reason for this theme would be the availability of students and faculty to complete such a sign system. Students and faculty could provide the information to be presented, while students of the woodshop could construct the signs.

Another theme we would like to see offered is briefly discussed in the next section and it includes highlighting the ability and process of the community to work together in the formation of a community directed trail system. This theme would be

dependent on the proposed trail officially linking to the McLane trail. This depiction of teamwork and community can be a valuable lesson for our future leaders and provide an example of how communities can work together to resolve issues associated with development and economic pressures.

Finally, an educational or interpretive trail should reflect the needs of the user. What information does the users want to receive? What type of media is this best presented in (signs, brochure, audio)? If these types of questions can be answered by the user they can provide the framework for the development of interpretive themes (USDA, 1985). At this point the group recommends that the designation of the interpretative themes come from the users and then be evaluated by the proposed multi-disciplinary task force the school assembled to oversee the construction. The evaluation process should consider if the selected features of interpretation could be displayed and enjoyed by the user with minimal disturbance. A professional trail crew boss would be an excellent resource for the task force in determining the feasibility of getting users to a certain location and would be knowledgeable of structural strategies that can be employed to protect the displayed natural features (i.e. fences, railings and bridges).

XI. Beyond Evergreen State College: a community trail network

As the population of the greater Olympia area, in particular the Cooper Point peninsula region, continues to grow it will be increasingly more difficult to prevent the fragmentation of our remaining local forested areas. A community trail network could be one way to ensure a contiguous path of forest that crosses

political boundaries. We are recommending that the school work with local landowners and agencies on establishing a community trail network. The trails on campus could be accessible by trail from McLane School if the proposed trail is established. Linking the McLane Trail and the TESC trail system together could be the first step in the creation of a community group focused on linking more trails to the system.

Other areas in Washington have been successful in the development of a community trail networks. In 1999 the Mt. Baker Steering Committee worked with the Whatcom Council to Governments to develop a successful grant proposal for Federal Highways Administration funds. The project is called "Chain of Trails". The community is now working on establishing a plan to link many of the already existing trails to local recreation, commercial and residential areas. Much of this plan development is taking place through a survey asking community members to highlight areas of interest and reasons for use (see appendix for survey). This example could be relevant due to the amount of already existing trails in the Olympia region.

Developing a community trail system takes careful planning and responsibility. The development of such system will now doubt lead to increased use and frequency in more central parts of the network. Users may need to be provided with restrooms, trash receptacles and drinking water (Moore et al., 1992). Moore et al. reported that trailside residents in three different studies had experienced relatively few problems since the development of their local

community trail systems. However, the types and frequencies of the disturbances varied. Roaming unleashed dogs, litter and illegal motor vehicle use on the trail we the most commonly reported problems (Moore et al., 1992). Even though, there were negative aspects to living trailside, the rates of occurrence and seriousness were low while the advantages were high (Moore et al., 1992). The same study also conducted an economic analysis of the impacts of a trail system on its neighboring property owners. The majority of the real estate agents interviewed reported that the nearby trails increased the value of the trailside property (Moore et al., 1992).

Perhaps the greatest benefit of project like this would be to strengthen our sense of and commitment to a healthy community now and in the future. Community trail networks tend to develop a core set of users (Moore et al., 1992). This core set of users could be tapped into as a resource for the upkeep of a local trail system. Even though, there may be too many barriers presented by fragmentation and political boundaries, bringing local private and public landowners together maybe beneficial regardless of the result. If the development of such a network were to begin it would be fitting to create an interpretive theme discussing the community and how it came together to create this trail. This project could serve as an example for future community issues that may arise, which may require local landowner's and agencies to work together to be resolved.

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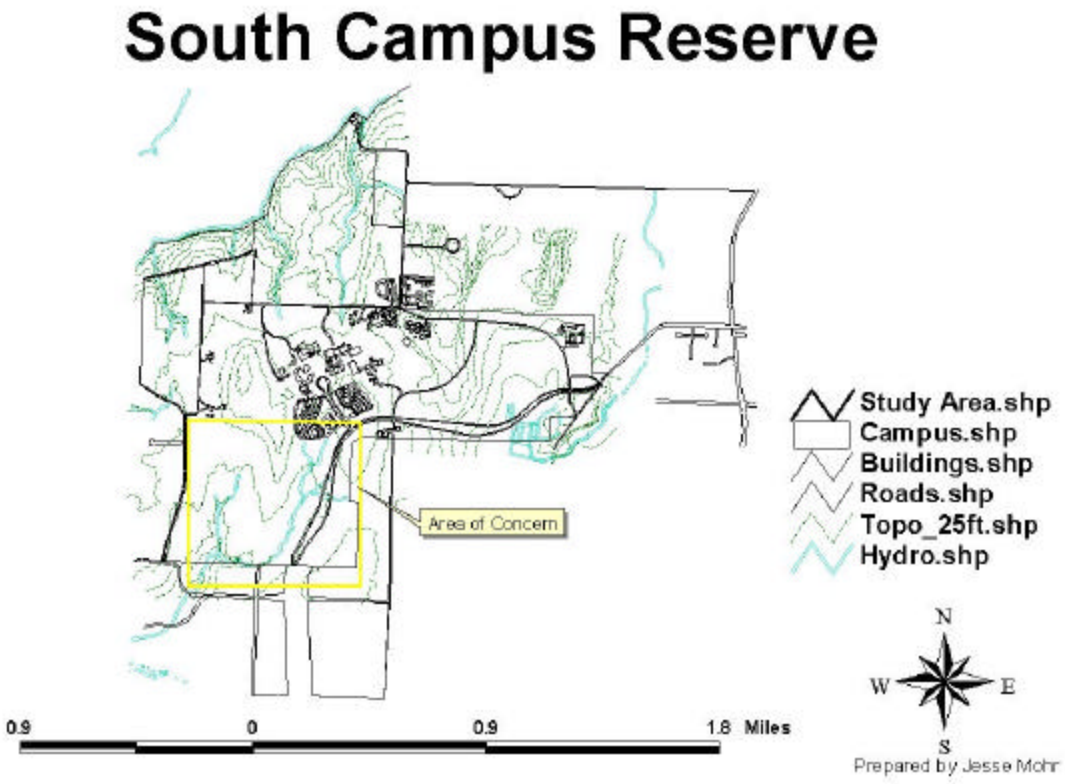
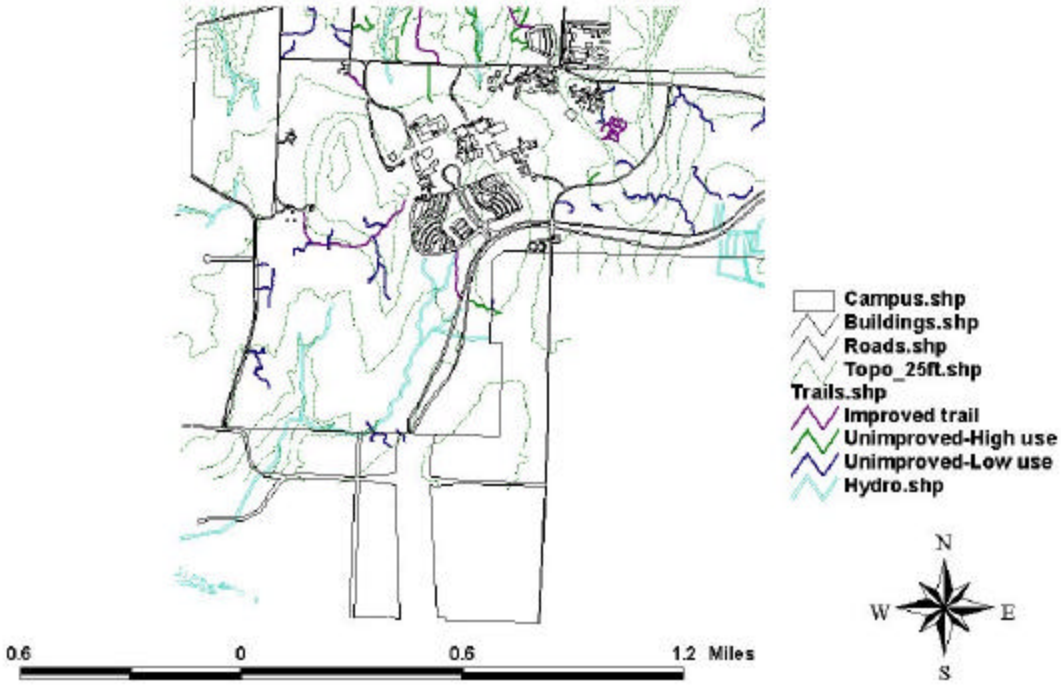
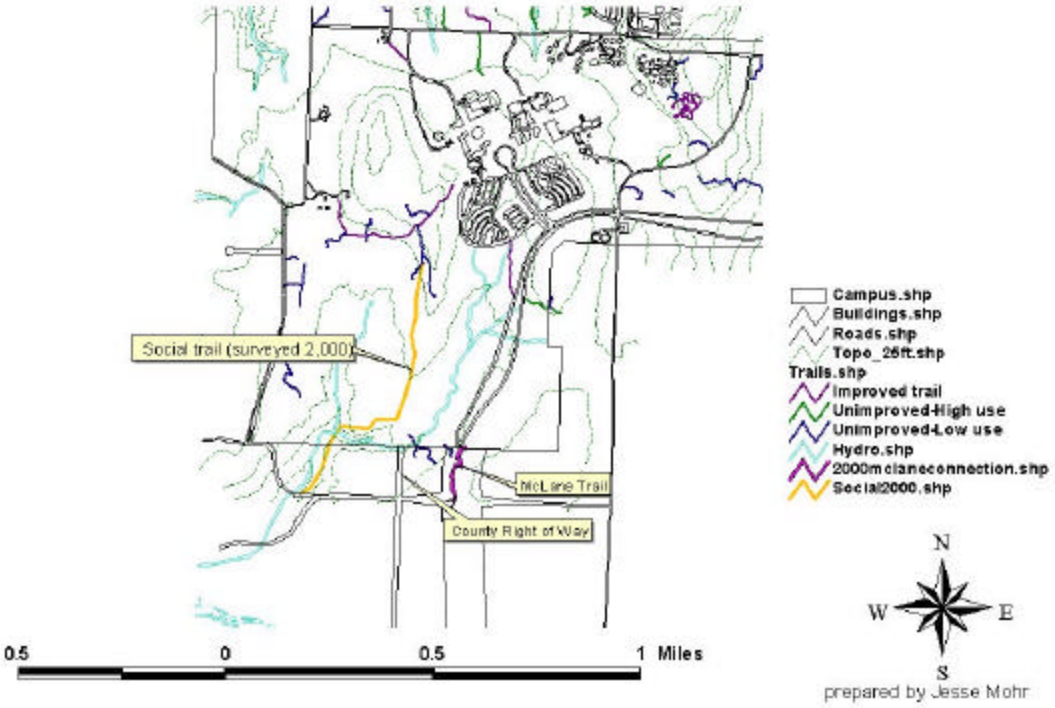
XII. Appendix



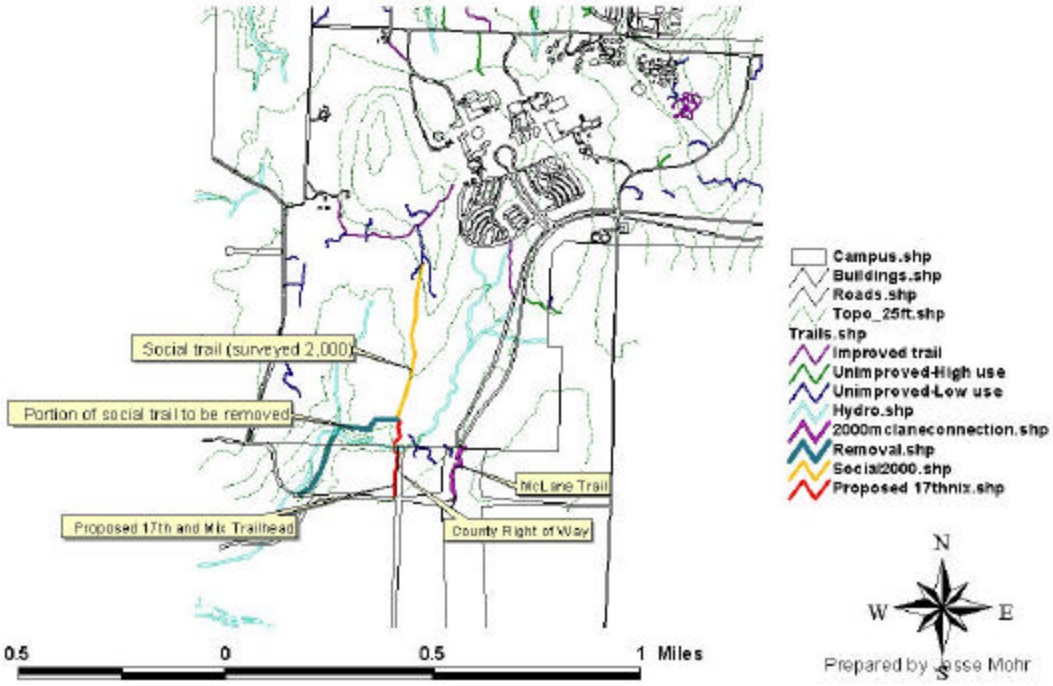
Previous Trail and Stream Survey



Social Trail Survey (2000)



Trailhead Option A



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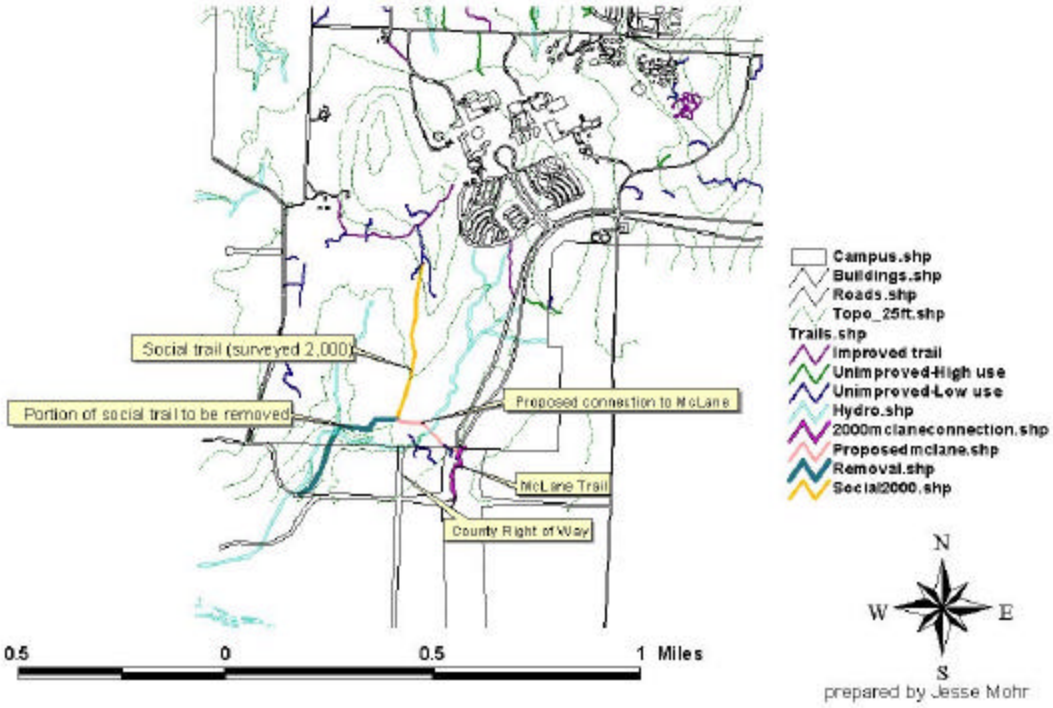

Trailhead Option C