Supplement to the Environmental Assessment
For
Lift 21 at Mt. Hood Meadows Ski Resort

March 2002

Hood River Ranger District
Mt. Hood National Forest
Hood River County, Oregon

Comments on this supplement should be addressed to Kim Titus, District Ranger, Hood River Ranger District, 6780 Highway 35, Mt. Hood/Parkdale, OR 97041. Comments are due by May 1, 2002. For additional information please contact Doug Jones at the Hood River Ranger District (541) 352-6002 ext. 682, or dgjones@fs.fed.us.

Introduction

This document is a supplement to the July 2001 Environmental Assessment (EA) for Lift 21 at Mt. Hood Meadows Ski Resort. The District Ranger issued a Decision Notice and Finding of No Significant Impact for the project on December 18, 2001. Several organizations and individuals filed administrative appeals of that decision. The District Ranger withdrew the decision after reviewing the appeals and meeting informally with the appellants. The decision was withdrawn because she felt there was additional information available about the project that had not been in the EA that would address several of the appeal issues. This document, prepared by an interdisciplinary team (ID Team, see page 7) will supplement the EA with that information.

Specifically, the District Ranger decided to provide more information about:

- Further details on where and how soils excavated from terminal and tower sites would be placed.
- Monitoring reports about the agency's experience with new erosion control and re-vegetation technology used on the Meadows Access Road and other projects to display the credibility of these treatments. The same treatments are proposed for the Lift 21 project.
- The monitoring plan for this phase of the Mt Hood Meadows Master Plan implementation.

Fill Placement

After reviewing the appeals it appeared there was confusion or uncertainty concerning the source and placement of the excavated soil from the construction of the lift. The following discussion provides additional details about the excavation and placement of the fill material.

The EA discussed (p.6, 11-13) that approx. 8,000 cu. yds of soil would be excavated for the two lift terminals and 18 towers. That figure was a rough estimate without having detailed construction designs to further refine excavation amounts. That figure has been refined by the ski area using a computer assisted drawing program (see Appendix C, 3/11/02 letter from Steve Warila). The total estimated soil excavation for the lift project from this computer model is approximately 2,400 cu. yds. Therefore, the amount of excavated material would likely be much less than the 8,000 cubic yards estimated in the EA.

At each tower foundation, soil is removed and spread on the ground immediately around the tower footing where it is stabilized and re-vegetated in the vegetation zone. The exceptions are two towers in riparian reserves. Here the soil would be moved with low ground compaction tools to the nearby temporary access road, spread on the road as restoration fill, and stabilized/seeded with the road when the project is complete. The amount of material excavated from these 2 towers would be approximately 22 cu. yds.

At 4"- 6" deep, this would cover about 100 lineal feet of the temporary access road in the vegetation zone just above Daisy. (see diagram at end of Appendix C)

The major earthmoving is at the terminal sites. In those locations, an engineered "cut and fill" would be utilized. This means excavated material is removed (cut) and placed (filled) in the immediate space surrounding the terminal to level the ground for skier loading and unloading areas. At the lower terminal, the fill is on the south side toward Mitchell Creek. The upper terminal fill is on the southern side for skiers to unload toward White River canyon. Diagrams of the terminal grading plans and a "typical" tower foundation are found at Appendix C attached to this supplement. Final engineered plans would have more refined details once the chairlift manufacturer designs the lift.

In all cases, the soil fills would be stabilized and re-vegetated (EA, p. 11-13). The discussion on erosion control in this Supplement provides more details on the methods listed in the EA and another mulching system using blown-in organic soil surface compounds that the Forest has had success with. The method used for Lift 21 would include the use of soil tackifiers in addition to mulches, soil treatments and fertilizers on the steeper slopes. Both techniques would include the stockpiling of topsoil to be re-applied over the disturbed ground.

Erosion Control and Re-vegetation

A concern was also raised in the appeals about the effectiveness of the proposed mitigation measures for this project. In the EA the terms 'project design criteria', and 'mitigation measures' were used synonymously. The purpose of these measures is to meet a soil productivity standard contained in the Forest Plan which is to attain 75% effective ground cover in the first year following a project (FWA-025) (EA p. 5). Effective ground-cover is defined as a physical barrier (plants, mulch, mats, etc) that protects soil particles from erosive movement caused by rainfall or other water (J.Dodd). These measures are part of the design of the proposed action to attain consistency with management requirements. These measures are also being used on other projects on the District and are part of the standard operating procedures to control erosion and re-vegetation in these kinds of environments. The measures are not being developed to bring predicted impacts below a threshold of significance that would require the preparation of an Environmental Impact Statement. The EA disclosed (EA p. 59) that recent experiences with the erosion control methods proposed for this project have been successful. The following discussion provides additional information about these methods and their success.

Since 1998, the District has been experimenting with new technologies available for erosion control and re-vegetation of disturbed sites. For the Mt. Hood Meadows Access Road project, the Federal Highway Administration (FHA) contracted with the Forest Service to perform the erosion control/re-vegetation work on approximately 25 acres of disturbed soil. The District learned of new hydroseeding techniques that utilize organic soil stimulants, mulch fibers and soil tackifiers. The tackifiers are used to hold soil

surfaces in-place until new vegetation is established to accomplish the same thing. This system worked very well on the overpass project, so Mt. Hood Meadows began utilizing the same methodologies for treating disturbed soil at the ski area. This technique was successful in attaining the 75% effective ground cover standard on the North Canyon access road for a new well site. The hydroseeding done at the base of Mt. Hood Express and Shooting Star Express chairlifts was effective in meeting the soil stabilization standard, but less effective with re-vegetation. In the lift areas, the emulsion was applied on top of several inches of snow, which reduced the effectiveness of the plant growth by roughly 50%. Where applied correctly (access road and well site) the resulting soil stabilization and re-vegetation were very effective in meeting Forest Plan standards. See Appendix D for reports and details about the hydroseeding work. The reports are from FHA and the Forest Service.

Another soil treatment, proposed for the Lift 21 project, that has been successful and proposed for various Meadows' projects is a blown-on compost amendment, described in the attached Mulch Application Summary, Appendix D-1. It too has been successful in meeting ground cover standards. Additional information on the materials used in the techniques, is found at these websites: http://www.kiwipower.com/ or http://www.expressblower.com

The ID Team, through the experiences listed above and documented in the appendices, predict the erosion control and re-vegetation techniques proposed for Lift 21 would be successful in meeting management requirements. These measures have proven themselves effective on the MHM access road, the Clear Branch fishery project, and the MHM water well projects where the objective of 75% ground cover the first year was attained with minimal soil movement. The treatments went beyond the objective in that we realized good vegetative growth the first growing season and the native plants came in strong by the second season. The Team is incorporating this state-of-the-art information into the existing Mt. Hood Meadows Erosion Control Plan. Erosion control science is very dynamic and as new methodologies and materials develop in the industry, they can be tried and adapted to situations at the ski area.

Monitoring Plan

The 1997 Record of Decision for the Mt. Hood Meadows Master Plan requires that a monitoring plan be developed for each phase of master plan implementation. Because the only element of the Master Plan being implemented at this time is Lift 21, a monitoring plan for the lift project has been prepared and follows.

MT. HOOD MEADOWS SKI RESORT
MONITORING PLAN
FOR
LIFT 21 PROJECT, 2002

Pursuant to the 1997 Master Development Plan (MDP) for Mt. Hood Meadows, this monitoring plan is developed for the **Lift 21 project** – a phase of development authorized by the MDP. Required monitoring measures include: activities in areas of geologic instability, revegetation and restoration of disturbed areas, water quality and Best Management Practices (BMPs), cumulative visual effects, wilderness use, summer use LAC, traffic and road improvement project effects.

This site-specific plan focuses on the Lift 21 project. The Special Use Permit Administrator (PA) would act as the District Ranger's representative in this project and would enlist the assistance of various resource specialists listed below to monitor the project during implementation and for post-development monitoring. The Confederated Tribes of Warm Springs Indian Reservation (CTWS) and Oregon Department of Fish and Wildlife will be invited to comment on the monitoring plan and to participate in field monitoring trips. Key public stakeholders may also be invited to participate in at least one field trip as a "show-me" tour.

Elements of monitoring: This includes implementation and effectiveness monitoring wherein the PA ensures that various prescribed resource treatments are taken by the ski area, and determining whether they are effective. When a question arises, the PA contacts the appropriate specialist for follow-up review and guidance. At a minimum, all monitoring would consist of pre-construction photo points of a good range of sites including terminals, temporary roads and the tower footing closest to the stream. Photos and reports would document effects to the project area during construction and post-construction periods into the first growing season after the project and subsequent seasons during which the successfulness of restoration efforts would be judged. Staff should include narratives of monitoring visits that are submitted to the permit administrator's master files. When any aspect of restoration/revegetation is deemed to not be as successful as desired, the ID Team would document any proposed follow-up work needed in future years to enhance the restoration effort. The Forest Tramway engineer would monitor lift construction plans and implementation

The PA would do the photo points including a view from Barlow Pass/Hwy 35 before and after construction. PA would review construction plans with MHM prior to starting to ensure all design elements are included. He would make site visits to the project weekly or more frequently as needed, and would prepare standard monitoring reports distributed to the IDT. PA would invite the IDT for a field trip near the end of the project, and may make a similar invitation to stakeholders.

MONITORING ROLES AND RESPONSIBILITIES

Area of Concern	Monitoring Specifics	Who/Specialty
Geo Hazards	None involved in this action	
Restoration/Reveg	Project Area w/ particular focus On soil stabilization at term and tower sites; Hyrdoseeding, mulching treatments & reveg. Temp road obliteration & stabilization.	PA/Soils/Hydro/Botany
Water Quality	Project Area track before/during/after Water quality at Mitchell Cr monitoring station for Temperature and sediment changes that may be Attributed to the project. Track erosion control Measure implementation & effectiveness of updated Erosion control plan. Ensure the two riparian zone towers Are well-protected against erosion	PA/Hydro/MHM
Scenery Impacts	Towers/Upper Terminal viewed from Hwy 35, Barlow Pass area	PA/Rec Staff
Wilderness	Noise impacts on users Document any complaints from wilderness users	PA/Rec Staff
Summer Use LAC	N/A this phase	
Traffic	N/A this phase	
Road Improvements	Temp Road Obliteration ensure road is Returned to as natural a state as possible visually, Stabilized against erosion and revegetated in the veg zone. Ensure power line trench is stable w/ minimal erosion potential Start erosion transects at road looking for soil movement	PA/Soils/Hydro
Vegetation Impacts	Project Area track the actual acreage of tree removal In lift corridor/terminals including the number of white Bark pine removed at top terminal	PA/MHM
Calamagrostis brewerii	Project Area monitor impacts and buffers for Brewers Reed grass	Botanist
Timberline Trail	Trail crossings monitor for any unusual trail impacts Or effects to hikers on the trail	PA/Arch

Interdisciplinary Team
Hood River Ranger District

Doug Jones, Team Leader/Permit Administrator; BS Outdoor Recreation, Utah State University; 25 years with Forest Service with experiences in recreation, winter sports, mining, special uses/lands. He has worked on 6 Forests in Colorado, Oregon and California. Doug is a "professional generalist" having gained on-the-job exposure with all resource specialties.

John Dodd, Soil Scientist; BS Soil Science and Land Use, Oregon State University; 14 years in the Forest Service with extensive restoration experience for road obliteration, fish projects, timber sales and ski areas.

Mark Kreiter, Hydrologist; BS and Masters work in Geology, Eastern Washington University and Washington State University; AAS Water Resources, Spokane Community College; 10 years as a professional geologist in private industry and 13 years experience as a hydrologist for the Forest Service. He has had experience in a wide variety of projects throughout the Western United States.

Gary Asbridge, Fish Biologist; BS, Montana State University; MS, University of Idaho; One year with US Fish & Wildlife; 12 years with the Forest Service.

Susan Nugent, Botanist; 12 years with Mt. Hood National Forest

Rich Thurman, District Wildlife Biologist, BS Wildlife Management, Oregon State University; worked for the Forest Service for 26 years with experiences in fire management, cultural resources, fisheries and wildlife. Rich has worked on four National Forests in Oregon and Washington.

Mike Dryden, Archaeologist; BS in Anthropology, Oregon State University; 17 years with Forest Service experience in archeology including 3 years experience in recreation, special uses/lands. He has worked as an archeologist on 4 Forests in Oregon, Missouri and Arkansas, and also worked on excavation and survey projects for private contractors in Oregon, California, Nevada, Arkansas and Texas.

INDEX OF APPENICES

APPENDIX C

Lift tower and terminal grading plans from Mt. Hood Meadows Ski Resort

Mt Hood Meadows
PO Box 470
Mt Hood OR 97041

MT. HOOD MEADOWS
SKI RESORT

March 11, 2002

Doug Jones, USFS

Dear Doug:

I've recently completed the grading plan for Lift 21. I used AutoDesk's Civil Design software to calculate cut and fill quantities to ensure that the design balances so no material will need to be imported or hauled off site. I found that the total quantity of material to be excavated is much less than my initial estimate. The total volume of excavation will be approximately 2392 cu. yards. I have attached drawings detailing the grading design.

I reviewed the EA document with the following comments: (please make sure that quantities are qualified as approximations.)

Page 6. first paragraph, I would recommend removing the last sentence since we are not planning to install off-line storage for all of the chairs, some chairs will probably be visible from the Timberline trail. If needed you could state that some chairs would be removed so they would not be directly above the trail, this would still be subject to maintenance activities.

Second paragraph, *16* towers outside and 2 inside riparian reserves.

Fourth paragraph, *Cuts and fills would be balanced on the temporary road so no soil would need to be transported onto or off of the site.*

Fifth paragraph, *...approximately 0.77 acres of undisturbed ground and 0.87 acres of previously disturbed ground. An estimated total of approximately 2392 cu yards of material, most (approx. 1643 cu yards) at the bottom terminal, would be excavated. This material would be placed adjacent to the excavation sites as fill to provide the queuing and unloading platforms for the lift. The indicated ground disturbance area includes the area where fill would be placed. Each tower location would require an excavation of approximately 11 cu yards, this material would be back filled against the tower footing within an approximately 17ft radius, except at the 2 towers in the riparian zone, where excess material would be transported to the nearby temporary road and used as fill.*

Page 11. last paragraph *The footprint of the terminal itself is primarily on previously disturbed ground....*

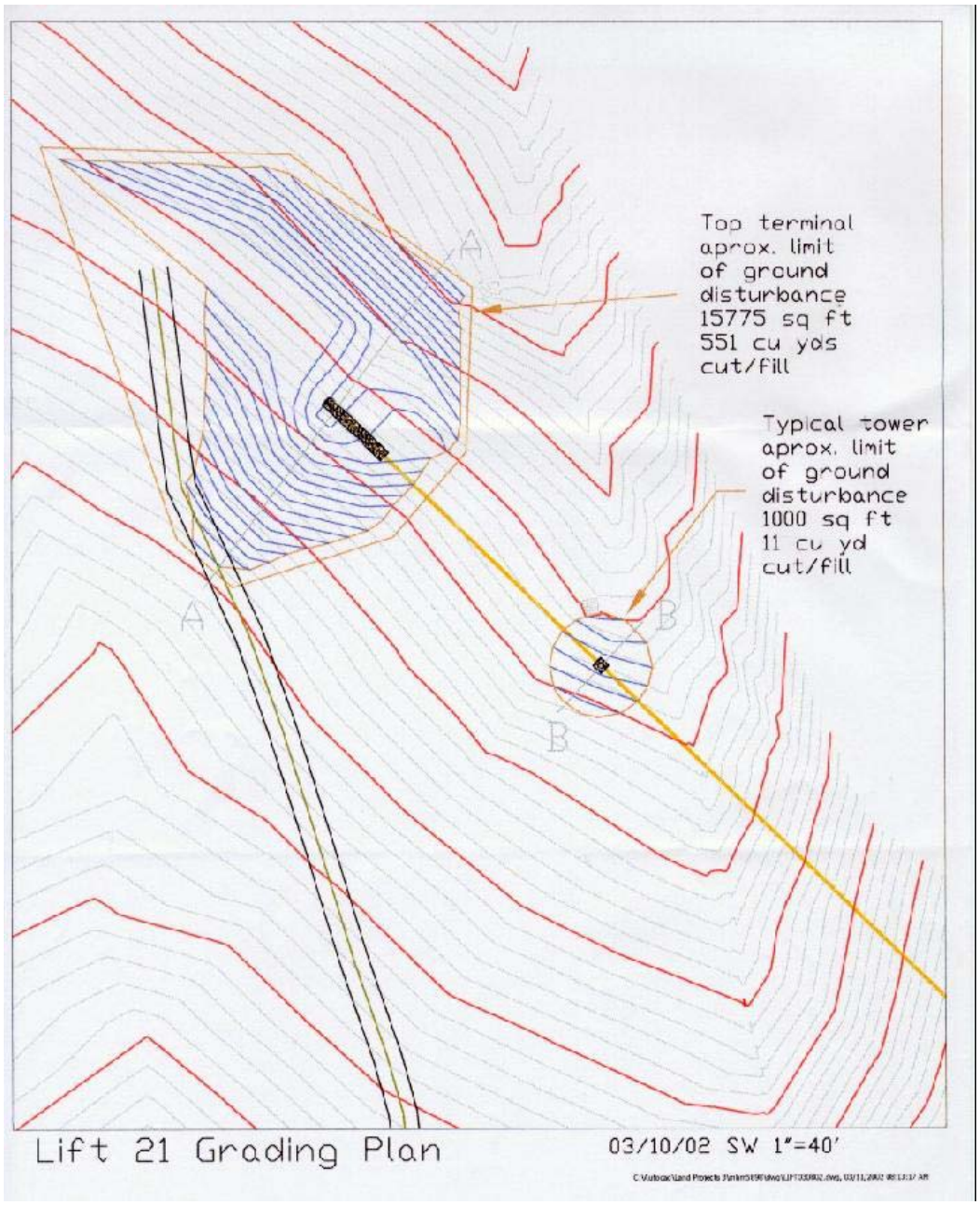
Page 13. Upper terminal construction - *... approximately 551 cu yards of material...* The fill slope would be approximately 8' high.

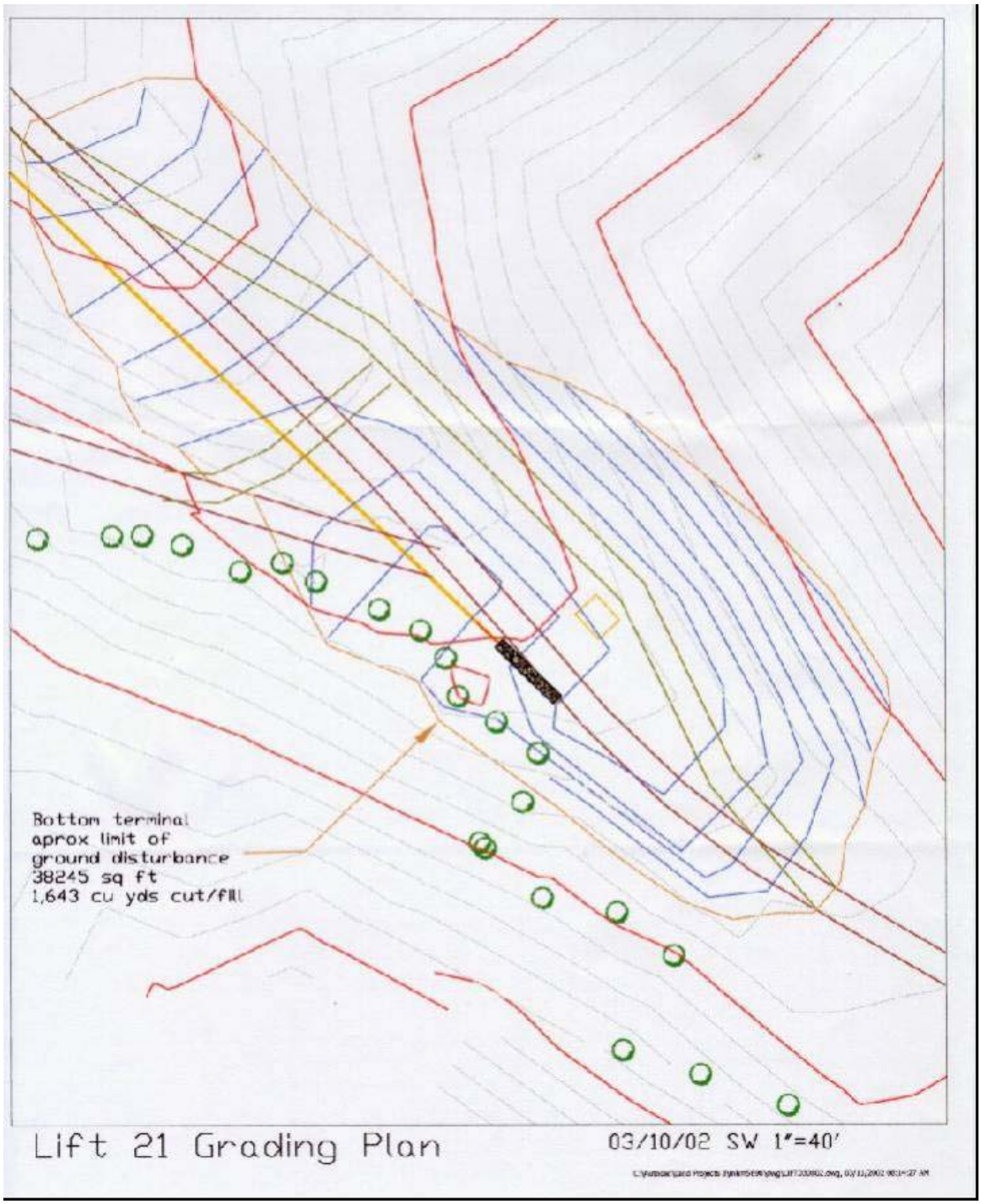
Sincerely,

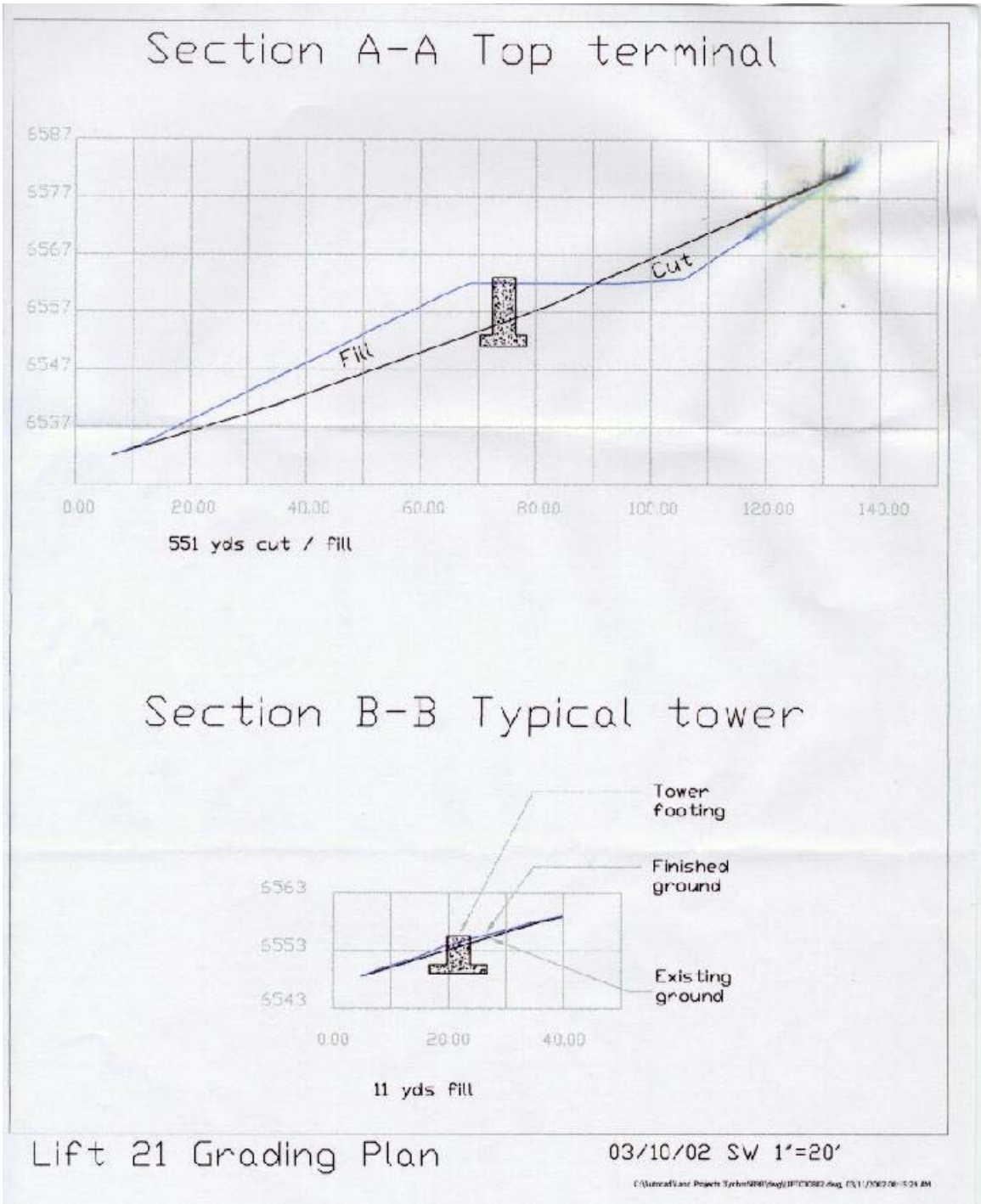
Steve Warila

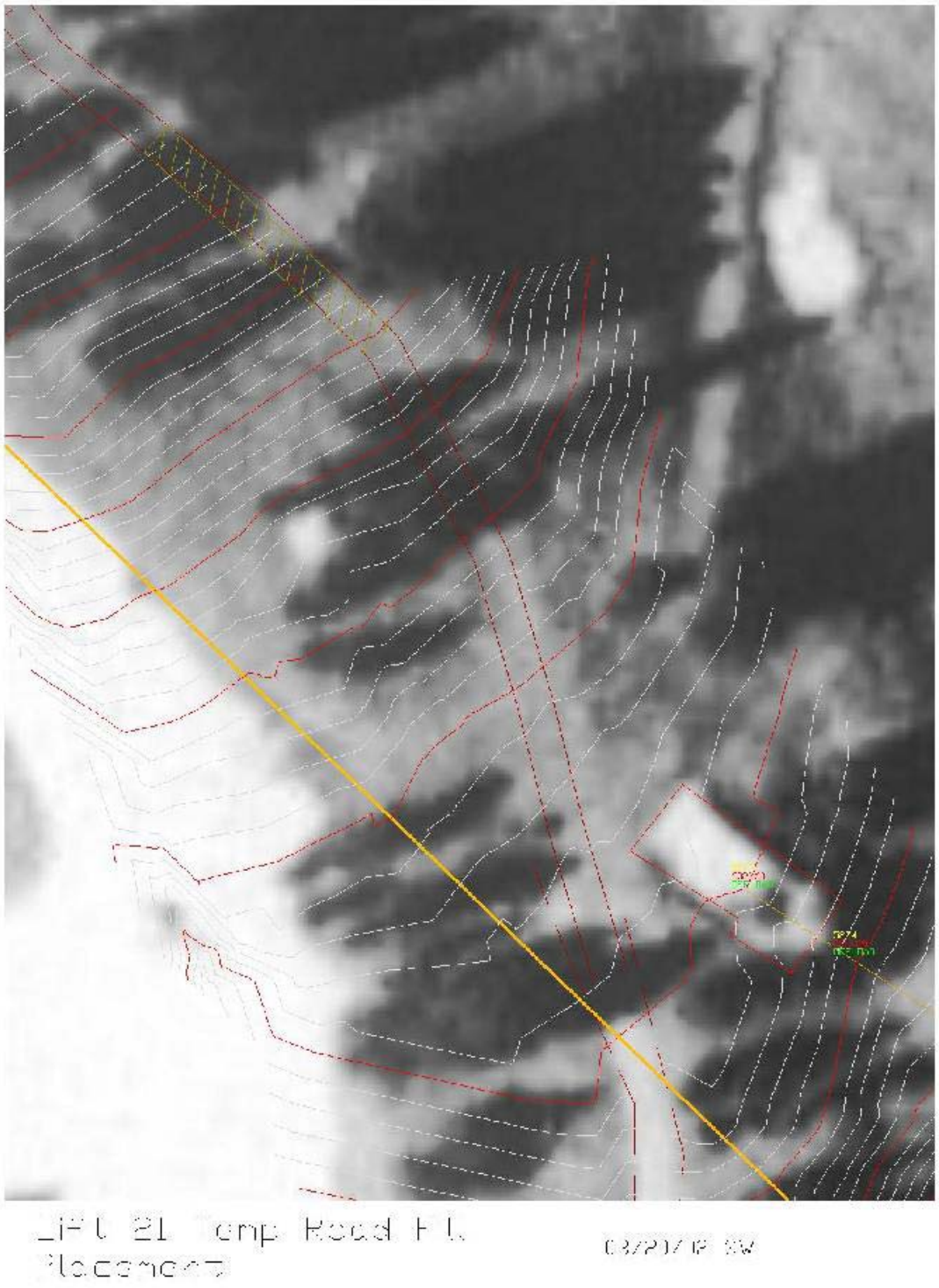
Director of Mountain Operations and Planning

cc. Dave Riley


Top terminal
aprox. limit
of ground
disturbance
15775 sq ft
551 cu yds
cut/fill
Typical tower
aprox. limit
of ground
disturbance
1000 sq ft
11 cu yd
cut/fill
A
A
B
B
Lift 21 Grading Plan
03/10/02 SW 1"=40'


Bottom terminal
aprox limit of
ground disturbance
38245 sq ft
1,643 cu yds cut/fill
Lift 21 Grading Plan
03/10/02 SW 1"=40'


Section A-A Top terminal
6587
6577
6567
6557
6547
6537
Fill
Cut
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
551 yds cut / fill
Section B-B Typical tower
Tower footing
Finished ground
Existing ground
6563
6553
6543
0.00
20.00
40.00
11 yds fill
Lift 21 Grading Plan
03/10/02 SW 1"=20'



Yellow hash marks on temporary road above Daisy indicate disposal area for riparian tower excavated material. Approx. 100 ft segment of road. Solid yellow line is Lift 21. Faint yellow line is Daisy chairlift and top terminal.

APPENDIX D-1

Mulch Application Summary of Hood River RD Projects

3-12-2002

Mark Kreiter, Hydrologist
John Dodd, Soil Scientist

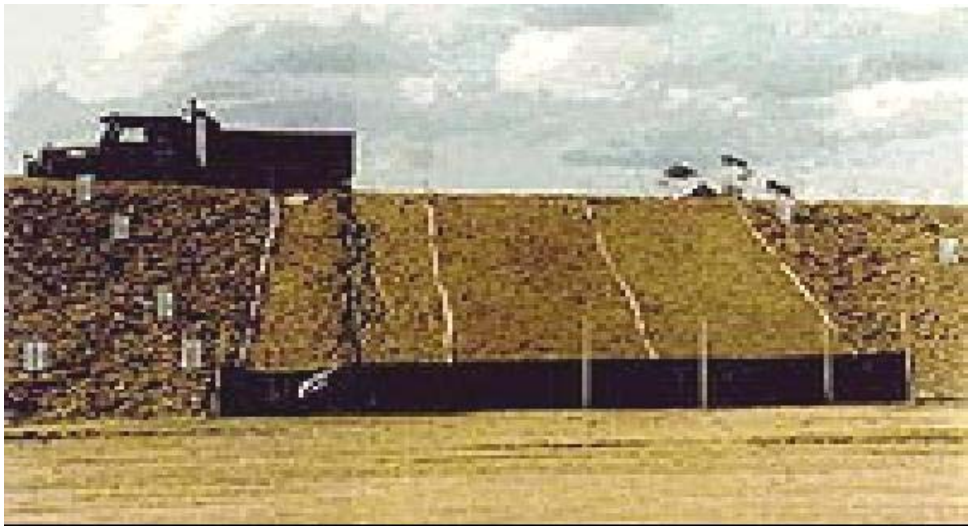
Recent advances in soil treatment for erosion control are providing many new effective strategies and products. In the past, most erosion control treatments centered on application of fertilizer and seed by hand or with a hydro mulching truck. Many of the vegetation treatments at Mt. Hood Meadows utilized this method. This strategy provided a short-term boost to plant growth, but ignored benefits of "rebuilding soil" to provide long-term recovery. Fertilizer must be applied with several applications to truly be effective in harsh sites that have lost the top organic layer. Improving soil addresses the self-sustaining health of plants; making soil sufficiently rich that eventually they get all the nutrients they need in a natural and sustained manner.

"Rebuilding soil" is proving to be very important for long-term recovery of disturbed sites that have had topsoil removed. McRae and others (2000) found that "growing soil", is important as a strategy for establishing "sustainable native plant growth on drastically disturbed (sterile) soils" and is proving to be both "successful and consistent in its results". The strategy recognizes that the key to establishing plant growth is to re-build sterile soils into soils that are rich in living organisms. The objective is to speed up the natural cycling processes of the soil's "biological engine". Rather than merely growing plants per se, this strategy amounts to setting the stage for the natural re-establishment of mycorrhizal fungi, soil bacteria and other beneficial soil organisms necessary to grow early seral stage plants -- pioneer species that act as soil builders. This is accomplished through the incorporation of certain organic complexes of enzymes and bacteria, and protein-rich organic fiber nutrients into the seedbed.

Products such as compost, biostimulants and wetting agents provide these benefits and are now readily available for large-scale use. Research has shown that compost supplies nutrients, retains moisture, and helps establish vegetation on sites with harsh growing environments which in turn reduces erosion and sedimentation. Sort and others (1996) found that application of biosolids reduced erosion by more than 90% when compared to an untreated plot. Even when the vegetation was well developed, the erosion was also lower in the plots where biosolids had been applied. Soil loss was inversely proportional to the biosolids dose, and when biosolids were applied directly on the soil surface the erosion rates and particle mobilization caused by raindrop impact were minimal. According to this research, biosolid amendments also increase infiltration rates and improve soil structure.

Similar results to those in Sort's study, have been found in erosion studies in Connecticut by Block, where sites treated with variations of compost, mulch, hay, and straw showed erosion reductions of more than 90 percent in comparison to the control plot.

The photos below show the effectiveness of "soil lock" products similar to those that have been recently used at Mt. Hood Meadows ski area. These photos are from a test site in Australia and compare an untreated block on the left of the photo, with 2 treated blocks. Note the rilling erosion in the untreated block, as well as vegetative recovery after 5 weeks. The rill erosion can still be seen on the untreated block (far left) after vegetation recovery



On a more local level, the photos below show an application of compost along Clear Branch Creek, a tributary to the Middle Fork of the Hood River. The goals were to reduce erosion risk while facilitating the revegetation process on the creek. The bottom photo is one year following the application. Cedar was planted on a five-foot spacing. However, numerous volunteer native plants are filling the gaps in between the planted trees. No surface erosion occurred on this site.

APPENDIX D-2

Form FHWA - 137
(08-99)

U.S,DEPARTMENTOFTRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

FIELD TRIP REPORT

TO		FROM
George Fakaris,	DOE	Diane Spencer, Environmental Specialist

INCLUSIVE DATES

FROM 3 Aug 2001 TO 3 Aug 2001

ITINERARY

Travel WFLHD, Vancouver, WA to MHM project office, ODOT maintainence yard, Government Camp, OR
Field review, Mt. Hood Meadows access road project

PURPOSE

Review environmental/mitigation compliance and revegetation on Mt. Hood Meadows access road project

PRINCIPAL CONTACTS

Diane Spencer, Environmental Spec; Shawn Jones, Erosion Control Spec; Gary Wrightman, Project Engineer

ACCOMPLISHMENTS OR RESULTS

Purpose of visit:

Shawn - reveg methods & accomplishments
Diane - compliance with applicable environmental permits & EIS/ROD mitigation measures (**see attached map for inspection locations)

Discussed early May visit by Barrows et al & Forest Service to look at reveg "failure" along "A" road & their recommendation to apply a rock blanket on the cutsiope to protect the slope from further erosion (pictures 1-3).

> On-site, plant composition & growth along A road looks good at this time (pictures 4 & 5). It has been my experience that early May is too early in the growing season to judge the success or failure of revegetation because the growing season at this elevation doesn't begin until late May, June, or even later, depending on the weather. There were some small random spots of erosion along the back slope, which seem to coincide with areas where water seeps are surfacing, but for the most part, the vegetated portions of the slope do not show signs of wide-spread erosion. There is a thin layer'of the gravel/sand used for traction in winter road maintenance throughout the vegetation in this area; this could potentially effect the success of revegetation, however, this is normal along highly used routes having heavy snowpack & is something we'll have to live with. Since plant growth is doing well, I would not recommend removing the vegetation to lay a rock blanket over the entire slope; instead, I recommend that small riprap be placed around each seep & that vegetation be left on the remainder of the slope, because it blends better with the natural surroundings & is functioning well as ground cover & erosion control .

Looked at reveg along the "C3" road & highway 35 & discussed the differences between vegetation seeded in 1999 & 2000. There are obvious differences in veg composition between the two years as evidenced by the "horizontal striping" (picture 6) on the slopes due to differences in the seed mixture used from one year to the next. The reveg contractor & inspectors should take more care in maintaining the same % mixture of each plant species from one year to the next on these multi-year seeding projects.

The contractor is using a steel rod fastened to the front of a backhoe bucket to "pound" top soil into the steep cut & fill slopes, It looks like this method has worked will so-far in keeping the topsoil from migrating down-slope. The large wood & stumps anchored in some of the revegetated areas looks very natural. With more natural blowdown in the years to come, the revegetated cut/fill slopes should continue to take on a more natural "forest edge" look. We discussed the following variables for seeding success on road projects:

> Seeding mix - consistency in ratios of species, year to year & site to site
> Seed storage - length of time stored & storage conditions (dry/moist, etc); seed stored for 2 years or more may not be viable
> Seed source - viability & purity of seed purchased
> Year planted - precipitation & temperature during the growing season
> Years since planting - native seed seems to take at least 2 years to reach its growth potential > Planting Site - aspect, slope, topsoil
> Elevation - the higher the elevation, the later the growing season begins
> Contractor & Inspectors - the skill & consistency of the people performing the planting & the people inspecting the work make a big difference in success

Looked at reveg along MHM access road, "AC" road & snow storage site. The silt fences & waddles on the south end of the snow storage site appear to be holding up well & serving their purpose of keeping sediment out of the adjacent wet area & stream.

Looked at the two wetlands identified in the NEPA resource survey.

> Wetland A (picture 6) is a small wetland located within a pocket of land at the intersection of the "B" road and highway 35. The wetland was probably formed when runoff patterns were cut-off by construction of the original MHM access road & HWY 35. Currently, there are some tall willows & wetland vegetation in the wetand, however, gravel/sand from winter road maintenance is being side-cast into the wetland & will eventually fill it in. We looked at the culvert & sediment manhole system built above & below HWY 35 at this site. It seems to be a good way to separate sediment from runoff water prior to its discharge into the wetlands, however, it will not prevent the eventual demise of wetland A.
> Wetland B (picture 7) is on the east side of Hwy 35, directly across the road from wetland A. This area was identified in the survey as a natural wetland; turbidity readings for Mitchell Cr. are taken at this site. The wetland appears to originate from seeps coming to the surface in numerous locations along the northwest edge of the wetlands The water has an orange tint as it comes out of the ground in this location & has a slight rusty or musty smell; it also leaves an orange residue on vegetation & rocks (picture). The color looks like iron or some other mineral deposit (unknow whether the source is natural or man-made). It is unknown how far the wetland extends, since only a limited area outside of the road construction limits was surveyed; however, this area appears to be part of a larger wetland complex. I walked downhill from the turbidity measuring site for approximately 50-75 yards & continued to observed water channels & wetland characteristics over the entire area. The silt fences along the edge of the road construction site appear to be functioning to keep sediment from construction out of the wetland; however, I observed gravel/sand from winter snow plowing operations in the wetland for at least 50 feet beyond the edge of the road.

At the project office, I reviewed the turbidity tests that were done by the contractor above & below the construction site, as required by the state. I also reviewed the NPDES reports, which are required after precipitation events of 1/2 inch or greater. All reports appeared to be complete. They are kept on file at the project office, as required.

All of the erosion control & mitigation requirements that I observed appear to be installed & maintained properly & are performing their function. I complement the Project Engineer on his conscience work in fulfilling the environmental requirements of the project.

Footnote: I spoke with a friend who is a geologist with the USGS about the possible cause of the orange water in the springs in wetland B. He said that when a spring source and surrounding vegetation is buried (by the original road construction or possibly volcanic activity), the decomposing organic matter from the buried vegetation will tint the water orange. This is probably the situation with wetland B.

APPENDIX D-3

UNITED STATES DEPARTMENTOF AGRICULTTJRE **NATURAL** **WASHINGTON** STATE UNIVERSITY
RESOURCES **P.O. BOX 646410**
CONSERVATION PULLMAN **WA 99164-6410**
SERVICE
(509)335-7093

DATE: August 11, 1999

SUBJECT: Observations on ML Hood Meadows highway interchange seedings, 8/10/99

TO: Art Lemke
FHWA
Vancouver Washington

The following information is front field observations of the 1998 hydroseeding above Highway 35 at Mt. Hood Meadows. Observations were made on August 10, 1999.

Plants seeded on the east side of Highway 35 observed were broadleaf lupine *(Lupinus.v* latifolius), pearly everlasting *(Anaphalis margaritacea),* and greenleaf fescue ***(Fesluca*** viridula). Identified two lodgepole pine ***(Pinus contorta)*** and one white pine *(Pinus monticola)* seedlings on the site, but could not determine if these plants established naturally or were intentionally planted. Other native plants adjacent to the roadside include wooly lupine ***(Lupinus*** leucophyllus), manzanita, lodgepole pine, *Senecio* sp. and native fescue.

Plants seeded on the west side of Highway 35 observed were broadleaf lupine, California brome *(Bromus carinatus),* streambank wheatgrass *(Elymus lanceolatus***),** and western yarrow *(Achillea millefolium***).** Above this site was a wet meadow with native plants including mountain alder, mountain hemlock, beargrass, Idaho fescue, elk sedge, goldenrod. wooly lupine, and Phacelia sp.

Bluewildrye(Elymus glaucus) was seeded at the ski area, but not on the highway sites. In my opinion, this is usually one of the best grasses for initial establishment on sites like the Mt Hood Meadows roadside.

The seeded plants were evenly distributed and surviving, with good vigor, on both sites. The application of SoilLok appeared to help stabilize the seeded slope.

Recommedation: The seeding mixtures seem to be establishing during this first growing season, Future highway seedings with the same conditions should use similar plant species of grasses, legumes, and forbs, On woodland sites include a rapid establishing grass like blue wildrye, slender wheatgrass or mountain brome, and legumes like big deervetch, and forbs such as ***Penstemon*** sp. On drier sites include thickspike wheatgrass, big bluegrass, or bluebunch wheatgrass, and legumes like *Lupinus sericeus.*

The NRCS plant materials program has been testing, evaluating and growing native conservation plants for many years, Many of the successfully seeded on this site were initially tested at **a** Plant Materials Center. The program can be an important resource for FHWA in future highway projects.

SCOTT M. **LAMBERT**
Plant Resource Specialist for Washington and Oregon

Art,
My quick thoughts on the Mt. Hood revegetation test site.

What is there

The revegetation activities appear to be successful. The plants showed good germination and even distribution throughout the area. The banks showed that the SoilLoc or Morpac was working.

The extent to which the late season and heavy snowfall has helped or hindered development of the revegetation is unknown at this time. For example, while the growth is not as developed, the extra moisture may be contributing to a better development of root systems and the long term survival of the plants. Even on the undisturbed flatter sites there was not a 100% ground cover-so the extent of the ground cover that was achieved appears to be excellent.

Species mix for the grasses and forbs looks good now-question now is how much native species invasion will you get as the short term perennials die out. A greater mixture of the different varieties of lupine might be useful. The broadleaf lupine was successful and it appears that either the mixture had a small amount of another lupine (wooly lupine-not sure of the name?) or it was seeding itself naturally. It appears that yarrow *(Achilles milaflorum)* was in the seed mixture and was very successful on the drier aspect of the banks. Yarrow was not listed as art of the mixture. The mixture of naturally occurring plants above the banks may suggest some other seed sources e.g. strawberries, goldenrod (may or may not be natural), and more grass, Goldenrod was in the seed mixture and did not appear on the treated banks yet was on the top with the exception of one plant at the toe of the bank, Does it occur naturally there or did the seed from the application blowup onto a wetter microsite where we found it?

Naturally established sedges, especially where the geology appeared to create a wetter microclimate, were very successful in establishing and retaining materials. Attention to these species in the future may be warranted.

The shrubs and the tree seeds did not appear to be as successful. On the flatter fringes next to the natural forest some ceanothus and huckleberry may have been established from the seeding. There did not appear to be any establishment on the cut banks of shrubs and trees from the seeding activities. (There were naturally established pines and mountain hemlock.)

Future Activities

Tree seedlings didn't seem to be establishing from the seeding. However, wild tree seedlings were establishing. It is probably a waste of seed and money to broadcast tree seeds, if nearby natural sources are available to repopulate the area. I would suggest that if young trees are desired that 2-0 seedlings be planted in specifically selected pockets of topsoil, Trees that are two years old would have sufficient root structure and height to compete for water, whereas, grass will often out compete and smother seedlings emerging from seed. I would look at using mountain hemlock on the wetter banks in the project area.

I question the cost benefit of salvaging common tree species such as pines and the **firs** rather than buying from a nursery. Provided that the genetic provence (local genetic material) can be acquired. Nursery trees would be disease free, have better root systems and would probably be more viable than trees whose root systems and general condition is likely to be damaged from the uprooting. I don't fully understand your cost structure but it looks to me like it is costing you about $3.00 or more to salvage a tree and the last time I looked a 2-0 nursery tree was about $0.35. These may not be as big as the salvage trees but would quickly establish and become as big, The salvaged trees may be quite a bit older and less responsive to planting than a robust nursery plant.

Site that was re-seeded is more dry and difficult to re-vegetate than the banks along the parking lot area being developed. That area looked more moist, the topsoil being placed over the bank was better and as a result these banks will probably revegetate much faster. It also suggests that the successful plant composition may be different around the parking lot. For example, the pearly everlasting-very successful in the drier sites-may be less important than ensuring that the beargrass, and native grass *(Bromus carinatus)* and the shrubs are in the seed mix.

The south facing cutbanks of the ongoing work will be similar to the test area. Though even those sites may be wetter. I base this on the evidence of pines at the test site and firs along the worksite. I would anticipate a similar success to the test area on these cutbanks.

Placement of the logs appeared to be too vertical to me. I am unclear as to the amount of water which will be coming off the paved parking lot. The banks below the parking lot may be channeling more water than those on the uphill banks. The logs have the potential to channel water and create gullies if water is running directly off the parking lot onto the banks rather than being channeled away. I am wondering if logs place more horizontal to the slope or together in a more herringbone fashion would slow the flow of water across the slope.

Sheila Helgath

Hwy 35 slope during construction, 1999

Hwy 35 Slope Before Hydroseeding, 1999
Slope Was Treated October 1999

Hwy 35 Slope Second Growing Season, May 2001

Hwy 35 Slope, August 2001
Very Good Native Plant Establishment

APPENDIX D-4

History of Revegetion Study Plot - Mt Hood Meadows

Initial Application at "Test Slope"

FHWA and Hood River District of the Mt. Hood National Forest entered into a Reimbursable Agreement to complete the majority of revegetation efforts associated with construction of the Mt. Hood Meadows Interchange. As a predecessor to the construction, the Forest Service tested their erosion control procedures on an existing "test slope" just north of the construction site.

All erosion control methods incorporate the technology recommended by Mr. John Steinbacher, president of Summit Company. That technology is incorporated into the revegetation plan as Attachment "B", revised June 29, 1998. (Copy follows this page).

The original "test slope"was an existing east facing 1.5:1 slope on Oregon State Highway 35, at the elevation 4600. The slope contained a small patch of vegetation consisting of Sitka Alders and little else. The slope was relatively smooth but was without topsoil. The composition of the existing soil is volcanic ash, and decomposed granite intermixed with various sizes of rocks and boulders.

The first application of erosion control products was applied on October 7, 1998. The total area covered was about 1 acre. The material was applied with a hydro seeder under the direction of the Forest Service in late morning. The day was relatively warm @ 70 degree, so drying and curing of the SoilLok was a certainty.

The total application of erosion control material consisted of 4 grasses, 4 forbs, 3 shrubs, Kiwi Power, Fertil-Fibers, SoilLok, and Takifibers. Rates per acre of the application materials are shown in Appendix "B". The native seed mix was selected by the Forest Service and the erosion control components are those recommend by John Steinbacher.

Second Site Visit

A second site visit was made on August 10, 1999 to determine the progress of the erosion control application. Accompanying FHWA was Scott Lambert of Natural Resources Conservation Service (NRCS) and Sheila Helgath, with HLA, on assignment to FHWA. Their observations of the "test slope" follow this overview. Photos taken during the second visit at comparable sites as the initial photos, show the success of 10 months of plant growth and establishment. The grasses and forbs appear to establish quite well. There was no evidence of shrubs having sprouted from seed.

The site will be revisited in August of 2000 to reassess ongoing success of revegetation.

reveg_lp

ATTACHMENT "A"

I. **Scope of Work**

Work to be performed by the FS shall consist of the following:

Implementation of the Mt. Hood Meadows Access Road Revegetation Plan, dated June 7, 1998. Preconstruction activity includes salvaging plants from proposed cleared areas, cultivating plants for revegetation uses, and storage of plants. Upon completion of project construction activities or as notified by the WFLHD through the project engineer, implement the remaining specifications of the Revegetation Plan. These specifications include visual enhancements (visual quality objectives), planting and seeding, site monitoring and maintenance. All revegetation activities shall be coordinated with the WFLHD project office and/or the project's contractor. See Attachment B.

Any significant modifications to the Revegetation Plan shall be submitted to the WFLHD for review and approval. The WFLHD will provide a response within five working days of the submitted modification request. Significant modifications are defined as changes that affect the scope and scheduling of the Revegetation Plan. Minor changes of a day to day nature do not require prior approval.

Estimated Cost Not to Exceed $182,000.

II. **Delivery Schedule**

The slopes that have received the temporary application of SoilLok or other temporary erosion control measures shall be revegetated prior to the end of each construction season (October 15).

Once a year and not later than September 30, the FS shall submit a report of work performed and/or monitoring results to the WFLHD. The report should include any significant information pertaining to the revegetation efforts and indications of success or difficulties.

If for any circumstances that the revegetation activities can not be commenced or completed, the FS shall notify the WFLHD in writing and by phone immediately.

The implementation of the Revegetation Plan and Monitoring shall end on September 30, 2003, unless otherwise mutually agreed to by the FS and WFLHD.

Reimbursable Agreement No. 98-A-17-0045, Amendment No. 1

ATTACHMENT "B"

Mt. Hood Meadows Access Road Revegetation Plan
(Revised June 29, 1998)

SCOPE

Access Road Revegetation

This plan details the activities of revegetation and maintenance of disturbed ground from construction activities associated with the Mt. Hood Meadows Access Road. Two important objectives are to establish a vegetation cover over the disturbed areas to reduce soil erosion and to utilize the native vegetation to conserve the ecological integrity of the area. Construction of the overpass is anticipated to begin in the fall of 1998, with the bulk of the work occurring in 1999 and 2000. Approximately 25 acres will be revegetated on the access road, and approximately 4 of the 6 acres will be revegetated in the White River Pit disposal site.

The access road construction contractor will be responsible for initial soil erosion and stabilization activities, including silt fencing, geotextile, check dams, and the application of Atlas SoilLok at the rate of 50 gallons per acre.

The Forest Service will be responsible for application of additional SoilLok, Takifibers, Fertil-Fibers, Kiwi Power soil treatment, and seed each fall on acres that have been accepted by the COR on the access road. In addition, the Forest Service will conduct one or two trials of the products to be used in 1998 to evaluate effectiveness of application rates and seed mixtures.

The Forest Service will salvage plants from the area to be cleared, store them in beds, and plant them back into the planting pockets created on the access road by the contractor. Plants will be grown from cuttings and seed if the contractors' progress schedule indicates that longer than 18 months will elapse between the clearing phase, and when some planting pockets are ready to plant.

White River Disposal Site Revegatation

The White River Pit is the designated spoil's disposal site, and is estimated to require 4 acres of revegetation. The Contractor will be responsible for a silt fence, and applying a mixture of 50 gallons per acre of SoilLok as spoils are placed in the White River Pit. A Forest Service representative will work with the Federal Highways contracting officer to leave a 10-foot wide pathway up the existing access road to the end of fill with a maximum of 10% grade so that a hydroseeder can access the area with the assistance of a crawler tractor.

A test application will be done in 1998 at a site near the project.

Soils must be saturated to 1 inch below the surface prior to the application of the hydroseeding mixture. If necessary, this will be accomplished using the hydroseeding unit with a mixture of water and a non-ionic surfactant, such as a dishwashing detergent.

SUBSEQUENT ORGANIC SOILS TREATMENT

When foliar growth has been achieved, approximately 2 gallons per acre of Kiwi Power (OST), and 2 gallons per acre of Kiwi Power+ will be applied to areas previously seeded. The reapplication will not occur on the White River disposal site.

PLANTING

The contractor will establish planting pockets during the construction of the access road cut and fill slopes. These pockets will be filled with topsoil salvaged during the clearing phase of construction. The Forest Service will plant shrub and tree species in these planting pockets that are salvaged from the construction area, or grown in a nursery for the project.

Tree and shrub species will be planted in selected sites in the cut and fill slopes outside of planting pockets, to achieve visual diversity.

Tree species selected, and tree placement will assure long term stability and safety with respect to the road.

MAINTENANCE

The Forest Service will re-treat any areas that do not show successful vegetation (and are not solid rock), the following fall season.

SEED MIXES

Seed mixes are adapted to the local soil and moisture conditions, as well as resilience to areas affected by road sanding materials. The seed mixes specified below may be modified based on success of the several test applications, and the first years of large scale application.

The Forest Service will hire a private contractor to perform seed collection of forb and shrub species. This contractor will also provide seed cleaning, germination and purity testing, and scarification for all collected species. The locally collected native grass, Bromus carinatus, is being grown in a seed increase contract such that the bulk sufficient for this project will be available. The remaining grasses are non-native grass species which will be purchased from private grass seed vendors. Locally collected Pinus contorta seed will be purchased from the Working Capitol Fund (WCF), a Forest Service account.

Mix for ditches, retaining pools, and seeps

Grasses		Species in lbs./acre
Bromus carinatus	California Brome	12
Elymus lanceolatus	Streambank Wheatgrass (Sodar)	16
Elymus trachycaulus	Slender Wheatgrass (Primar)	8
	TOTAL POUNDS PER ACRE	24

Mix for upslope areas

Grasses		Species in lbs./acre
Bromus carinatus	California Brome	7
Elymus hispidus	Pubescent Wheatgrass (Greenleaf)	7
Elymus lanceolatus	Streambank Wheatgrass (Sodar)	5
Elymus trachycaulus	Slender Wheatgrass (Primar)	5
		24
Forbs		
Achillea millefolium	Yarrow	.5
Anaphalis margaritaceae	Pearly Everlasting	.5
Lupinus latifolius	Broadleaf Lupine	1.5
Solidago canadensis	Canada Goldenrod	1.0
		3.5
Shrubs		
Ceanothus velutinus	Snowbrush	2
Vaccinium membranaceum	Big Leaf Huckleberry	.5
Xerophyllum tenax	Beargrass	2
		4.5
	TOTAL POUNDS PER ACRE	32

Mix for White River Pit

Trees		Species in lbs./acre
Pinus contorta*	Lodgepole Pine	.8
Shrubs		
Pensternon davidsonii	Davidson's Pensternon	.3
Grasses		
Bromus carinatus	California Brome	7.5
Elymus hispidus	Pubescent Wheatgrass (Greenleaf)	7.5
Elymus lanceolatus	Streambank Wheatgrass (Sodar)	5
Elymus trachycalus	Slender Wheatgrass (Primar)	5
	TOTAL POUNDS PER ACRE	12

★ Lodgepole pine will be omitted from the mix near recreational sliding hills and near the wetland.

SALVAGED PLANTS

The Forest Service will hire a private contractor to salvage trees, shrubs and forbs from the project area prior to the beginning of ground disturbing work. The list below is only a partial list. Any native species which is the appropriate size may be salvaged. These plants will be bound in burlap and stored in holding beds for transplanting until the project sites are ready for planting. Approximately 25 10'x10' holding beds will be built by the Youth Conservation Corps during the summer of 1998. These holding beds will be located near the project area where there is high canopy cover and will hold approximately 200 plants each. The Forest Service will be responsible for maintaining adequate moisture in these beds until they are emptied.

Planting of the salvaged plants will occur in the fall, after all of the work has been completed in an area, but before the final application of soilock and seed occurs. One private contractor will be hired by the Forest Service to both salvage and plant. This contractor will also be required to move the plants to and from the holding beds. Due to the storage life of the salvaged plants, planting pockets that are created more than 18 months after the salvaging occurs will be planted with plants grown from cuttings or seed of the species listed below. Watering of holding beds will occur every two weeks or as necessary with a contracted water truck.

Approximately 18 planting pockets of 2 square meters in size will be created per acre. These pockets will be planted with the general species composition of 1 tree, 2 shrubs, and 2 forbs. The remaining plants will be planted in selected sites in the cut and fill slopes outside of planting pockets to achieve visual diversity. When planting the salvaged plants, the soil amendments Kiwi Power and Fertil-Fibers will be added to each planting hole to assist in their establishment. Tree species will be avoided in areas where they may limit sight distance or where they may cause a safety hazard with respect to the road.

Some Possible Species to be Salvaged	Density per acre
Trees	
Pinus contorta	50
Pinus monticola	
Shrubs	
Ceanothus velutinus	40
Arctostaphylos nevadensis	
Pensternon spp.	
Forbs	
Achillea millefolium	40
Anaphalis margaritaceae	
Lupinus latifolius	
Solidago canadensis	
Grasses	
Festuca viridula	10
TOTAL PLANTS PER ACRE	140

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