Date: November 24, 2009
To: Environmental Studies Steering Committee
CC: Gary Brickman and Jon Jensen
From: Cory Pilling, Jason Knapp, and Stuart Wheeler
Subject: Luther's Sod Issue

Intro

The main focus of this proposal is to raise questions about the treatment of the sidewalk edges on Luther's campus and whether or not there are sustainable alternatives. We will assess Luther's current land use practices with regards to sodding along sidewalks and winter snow and ice removal. The issues that we have encountered along with the causes will be addressed. Specific alternatives that we have researched will be suggested and could be used for the future.

Problems

1). The main problems that our group has recognized with laying sod every year on Luther's campus are the following; a lot of labor is spent inefficiently laying and relaying sod, this includes having to remove the old dead grass before new is placed. Some years sod is placed and then it is improperly cared for (eg. lack of watering). Sod is not cheap either costing anywhere from $0.50-$1.00 per square foot, when you multiply this by the tens of thousands sq. feet of sod that is replaced every year plus the labor involved, Luther ends up with a pretty hefty bill. Fortunately for the sod companies Luther doesn't even have a set budget for sod expenses. They are told to do whatever it takes for nice grass.

2). The main problem with replacing sod every year is that it is by no means sustainable. By replacing it every year we are wasting many resources, water (from planting and then transplanting the grass), gasoline used by trucks to transport the sod to Luther, as well as the small engines used to cut out the new and old sod. Coal is also used indirectly by all of the watering that takes place, the water must be pumped up to the water tower which requires energy, so basically the energy used to move the water to the grass is generated by burning coal. All of these issues have environmental impacts that contribute to Luther College's emissions. Overall these practices are unsustainable and really have no benefit to any of the Luther students or faculty except that the grass aesthetically pleasing.

3). There are many factors that contribute to Luther's current sod issue. These factors include: the use of salt, exposure to the elements, Luther's snow removal practices, and insufficient care of the sod. Salt damage occurs during the absorption process of plants. Typically plants absorb water through its roots. However, when salt is used on driveways and sidewalks, the melting ice causes the salt to wash into the soil. As the salt content of the water in the soil continues to increase, the imbalance causes the water to flow out of the plant’s roots. The loss of water causes the roots to dry out. Eventually, the plant will die from what is called 'root burn'.

4). It is important to plant sod during the right time of the year. In this area, sod should be planted in the spring in order to utilize the cool weather while the sod establishes its roots. Although it is possible to plant sod in the summer it is not suggested due to the hot weather and mass amounts of water it takes to keep the sod from drying out and dying. Sodding in the fall is
not suggested either because the roots will not have enough time, before winter, to become established which does not yield good results.

5). In the winter snow provides a critical layer which protects grass against the elements. Exposure to the elements could be a key reason why Luther's sod does not survive well. Currently, Luther plows both the sidewalks and approximately a 4-5 ft buffer strip along the edges of the sidewalks. Much of this extra plowing on top of the grass exposes it to the elements. We have also observed that the plows tear up the grass themselves. It's been explained to us that Luther plows these buffer strips strictly for safety reasons. When ice builds up on the sidewalks and then melts, it has to have somewhere to run-off. The buffer strips provide a place for that water to go which keeps the sidewalks clear for students.

6). Through our observations of Luther's sod issue we have noticed that often times the freshly laid sod is not allowed to establish itself for two reasons, the amount of time given before winter and the grounds crew cannot provide the specific attention that is needed to establish the grass as they are spread thin working on many different tasks. At first, the roots are very shallow and cannot access the deeper water. To keep the lawn hydrated it must be watered 3 times per day for short periods of time. In the second week, the roots have begun to penetrate deeper into the soil and can be watered less often (2 times per day). In the third week the roots are even deeper and can be watered once per day. We feel that Luther does not provide the sod with sufficient care during this crucial part of its growing process.

**Alternatives**

1). One of the possible alternatives to salt that we have found is alfalfa meal. This product can be used as an environmentally safe, organic substitute for salt. A thin layer is applied on icy areas and provides traction while melting the snow. The high nitrogen content of alfalfa meal allows for the melting of the ice as well as its use as a natural fertilizer. There are possible side affects of using this product as there are usually viable alfalfa seed within the mixture that may begin to grow in the area that has been treated. With the application of alfalfa meal there is the possibility that much of the product could be tracked into buildings and create somewhat of a mess. When the snow and ice melt in the spring there would also be organic material left over. Another downside of replacing salt with alfalfa meal would be the cost. Alfalfa meal can cost between $13 - $15 for a 20 lb. bag whereas road salt, on average, can cost $30 - $50 a ton.

2). Another substitute that we came across in our research is a mixture called GEOMELT, a concoction of salt and sugar beet extract. This particular product comes from Illinois-based SNI Solutions. The addition of beet extract to the salt has allowed for the mixture to produce better results. Traditional road salt works best at or above 25 degrees, but with the addition of beet extract it allows the product to work down to -25 degrees. Cities such as Akron and Cincinnati, Ohio have begun to use products like this on their roadways as it has a lower freezing temperature and is less corrosive than ordinary road salt. One downside of using this product is that it can leave a brownish stain on areas where it is applied and this could affect the aesthetic appeal of the walkways. This product costs around $8 more per ton than regular rock salt.

3). Another option is to widen the sidewalks by roughly a foot on each side, such as the sidewalks between Ylvisaker Hall and Sampson Hoffland Laboratories where the paths are extended. If the snow was removed only from the center sections of the sidewalk and left on the newly extended areas it could possibly eliminate the effects of exposure on the turf that butts up against the concrete. The plows and brushes that are used to remove snow and ice from the
sidewalks would not come into contact with the turf. This would allow the previously established grass to winter under the protection of several inches of snow. This would definitely be a costly investment factoring in the cost of labor, time and materials.

4). The most obvious alternative to sod is good ol’ fashioned hand seeding. The cost of seeding per square foot can be as low as $.01. The pros to seeding is that it is a cheap alternative and the usage and production of the seeds is much more sustainable than sod. Some disadvantages to grass seed is that it takes a lot of daily maintenance (watering) to maintain good health of the seeds. Sod also requires this maintenance, but seed does take more time to become established. Good seeding practices require daily watering as well as hay/straw or peat moss to absorb the water to keep the seeds hydrated. The typical germination period is around 3-4 days. Normal growing time takes anywhere from 10-15 days to establish a healthy looking grass, and 3-4 weeks till the grass can be walked upon. The major drawback of this is the aesthetics aspect. The reason way Luther College has not yet adopted these practices yet is because of the 15 days needed for the grass to become established. If it would be possible to find a 2-3 week period where there would be no prospective students visiting, this would be the perfect time for these new practices to be implemented.

5). Another alternative that we have came across is the practice of hydroseeding. Hydroseeding is a way to spread seeds, typically over a large area. It uses a slurry of mulch and seed and can have fertilizer included in this mixture. It is spread via a hose that is connected to large tank on a truck. Hydroseeding costs anywhere from $.06-$1.5 per square foot. When comparing the effectiveness of hydroseeding mulch to the use of straw as an absorber it is the case that straw actually carries what are called 'weed seeds', which are basically seeds that aren't desired in that area. Hydroseeding mulch does not carry any 'weed seeds' which creates a lawn with less weeds. Another aesthetically pleasing characteristic of hydroseeding is that non-toxic green dye is added to the slurry strictly to make it look like you have a green lawn instantly. Hydroseeding is much cheaper than buying sod. On average sod can cost between 3-5 times more than hydroseeding. Hydroseeding becomes established quicker than regular dry seeding. With the addition of the mulch it retains moisture much more efficiently than that of regular seeding. With proper care and consideration hydroseeding could be possibly be one of the best alternatives to sod.

Recomendation
There is not just one simple solution to this problem. A combination of things need to be implemented in order for Luther College to see noticeable changes. We recommend that all of these alternatives are taken into consideration and analyzed as a way to end the viscous cycle of planting sod in the summer only to have it die again in the spring and start the process over again. We would like to put specific emphasis on planting basic grass seed, even though it is not always an aesthetically pleasing solution, and reducing the width of that which is plowed off of the walkways as a way to reduce exposure. What we are proposing, as a step towards this sustainability goal is that Luther first recognizes that the sod is an unsustainable solution, change is not going to come over night. Then if we do continue to lay sod, it should be properly cared for and laid in the right growing season and conditions so it can establish a hardy root system. Also we feel that it would be a positive change if Luther was to set a budget on the amount of money spent on sodding, this might mean only sodding necessary areas. It would also be an improvement if Luther could find a sod company that was near by or possibly local to the area. It might also be possible to grow our own sod and transplant it in the needed areas. In the winter
months we propose that instead of using the large amounts of sand and salt that contribute to ‘root burn’, facilities could run tests on beet juice and alfalfa meal to see if it would be a good alternative.