



## ZERO-WASTE FOOTBALL INITIATIVE:

Waste Receptacle Distribution in Scott Stadium

Global Sustainability, Fall 2011

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## ABSTRACT

The Zero-Waste Football Game Initiative has been a combined effort over the past two semesters between student groups and community partners to revise unsustainable practices at Scott Stadium and to reduce waste produced up to 90%. The initiative was kick-started by Matt Boegner and Ashley Badesch in the spring of 2011, as a community engagement project for the Global Sustainability class. Since then, the project has continued into the fall semester of 2011 by an additional group of students collaborating with community partners, to provide Facilities Management with a comprehensive “zero-waste” plan for game days. Other universities such as Colorado University at Boulder and Ohio State University, much larger than the University of Virginia, have implemented sustainable practices during zero-waste football games, which has inspired the initiative to press forward. The wasteful practices at football games, such as not recycling bottles, using products that cannot be diverted from waste, poor signage explaining recyclable waste, and fans’ indifference about sustainable practices, all result in unnecessary consumption of resources and massive amounts of waste trucked to the landfill every Sunday. The wasteful practices observed at Scott Stadium including trash cans full of recyclable bottles by the end of the game, the Hill littered with plastics, recycling bags with openings too small to fit plastic cups, and contamination in recycling receptacles have all lead to the development of this report’s concentration.

Facilities Management at Scott Stadium, the organization that runs football games and all activities within the stadium, is willing to implement sustainable strategies if they are presented a report of “best practices” that is affordable and stream-lined to reduce waste on game days. Scott Stadium and Housekeeping has limited access to a map of receptacle locations and data on when waste is collected throughout the game, therefore before we could propose a plan for improvement we had to gather information on current practices. To provide our partner in Facilities Management, Eric Dadmun, with a comprehensive plan for locating receptacles in optimal locations for appropriate and convenient disposal, we needed to tour the stadium, observe game day practices and processes, and locate cans and barrels throughout the concessions areas. After interviews and tours of the stadium with Eric Dadmun, interviews with Sonny Beale of UVa recycling, conversations with Jess Wegner, the Environmental Projects Manager at UVa, and observations of waste and traffic flow during home games, we were able to comprehensively compile a map of the stadium, illustrating current receptacle locations and their use as observed during four games.

Our results indicated that trash cans by the entrance of concessions on the side of the Student Section from the North Gate is a “high traffic zone” and fills up before the game has even begun. Therefore we recommend two additional trashcans at the entrance. Furthermore, other major concerns are the lack of recycling receptacles, relative inconvenience to place bottle through small, poorly labeled holes in the recycling receptacles, and the impractical design of temporary bags outside the stadium which do not fit some recyclables, including Solo cups. To resolve these observations, we advise converting trash cans to recycling opportunities inside the North Gate turn-styles, adding two additional recycling bags inside the East entrances, placing temporary recycling bags outside the South Gate and North Gate for tailgating waste collection, and four additional recycling opportunities under the portico behind the Hill besides the columns. Where recycling should be added, we observed heavy traffic and relatively low disposal opportunities; this resulted in litter or recyclables simply being trashed for convenience. With additional coverage of both trash and recycling in “heavy waste zones”, Housekeeping will be afforded more time between collections and have the ability to reallocate receptacles that are currently located out of sight and out of the way of fan-traffic will be a zero-cost solution. To maximize the impact of the Zero-Waste Initiative, additional recycling opportunities in high volume areas are critical. The efforts of converting to more recyclable products and while create more awareness and access for fans will be crucial in the development of the Initiative. Collaborative efforts and an alteration in lifestyle by the University and other stakeholders are all essential in producing sustainable results in order for Scott Stadium to truly become zero-waste.

## INTRODUCTION

Every year, Americans throw away enough paper and plastic cups, forks, and spoons to circle the equator 300 times (Clean Air Council). According to the EPA, Americans generated about 243 million tons of trash in 2009 and recycled or composted 82 million tons of this material; equivalent to a 33.8% recycling rate. In terms of plastic, the United States produced 30 million tons, 13 million of which were plastic containers and packaging. Of the 30 million tons produced, only 7% was recycled. These numbers are indicative of particular mindsets that the United States has continued to perpetuate for centuries: an out-of-sight out-of-mind policy.

The excessive use of plastic products is problematic not only because of the limited amount of space available to store waste but also because of the finite resources used to produce these plastics. According to "Plastics the environmental and human health: current consensus and future trends" by R.C. Thompson and C.J. Moore, 4% of world oil resources are used directly to produce plastics, and another 4% is used as energy in the process of production. The additives in these inexpensive and durable plastics products include phthalates, bisphenol A, and BPA areal each of which provides cause for environmental and humanitarian concern. The continued use of plastics will only be sustainable if products and packaging are redesigned to use less material, and are easier to recycle at the end of their life.

However, despite these statistics, we have the opportunity to be proactive. Each American has the opportunity to reduce his or her household waste and help contribute to a more sustainable planet with a higher quality of life. Reducing the amounts of waste produced and increasing the rate of recycling would have significant and noticeable impacts on many facets of life. Air and water quality would be enhanced as fewer by-products would be produced through overall reduction of pollution. In addition, increased recycling would help keep waste out of the ecosystem while creating more jobs. Raw materials would be preserved, as fewer products would need to be extracted from the environment to meet the needs of the American public.

So the question arises, why does this pertain to us at the University of Virginia? The answer is simple, times are changing and the University needs to not only compete locally, but globally to reduce its carbon footprint on the world. Thus, as a response to the growing environmental concerns that our waste consumption produces, our team is attempting to lessen these impacts on a small scale at the University of Virginia with our Zero-Waste Football Initiative.

The Zero-Waste Initiative, which began in 2010, is working towards drastically cutting the municipal waste created at Scott Stadium during home football games to 90% diversion of waste. The project's goal is to divert the waste produced in Scott Stadium from the landfill to recycling and composting compounds or facilities in the area so that all products sold and consumed at games would be properly managed. This would be achieved through awareness campaigns to all stakeholder involved, strategic recycling receptacle placement, and implementation of behavioral changes, quantifying wastes, and transportation with a new strategy for waste removal. Specifically, in order to address receptacle distribution, our team has gathered current data on receptacles at the stadium (number, locations, and contamination), collaborated with community partners to build on the current recycling efforts, as well as researched the feasibility of adding a third waste stream in the form of compost. As we have completed our research we now understand that this is a process that needs to be conducted in small steps over a period of time, but we remain optimistic that with a collaborative effort from all stakeholders, Scott Stadium can truly achieve "zero-waste".

## QUESTION/PROBLEM STATEMENT

Because of the recent trends in our out of sight, out of mind thinking, it has become evident that a solution must be produced to alleviate our impacts on our natural environment. As a team, we were faced with the question of producing a sustainable solution for the distribution of receptacles within Scott Stadium during the University of Virginia's football games. Thus, our research question is: what are the impacts of reallocation of trash receptacles within Scott Stadium to maximize recycling opportunities during home football games? The results that we set out to find were twofold: to produce tangible statistics for Facilities Management, UVa Recycling, Matt Boegner, Ashley Badesch, and other community partners and to compile a report in the hopes of disseminating the information that we find through our collaboration with all parties to produce a sustainable solution for the University.

## GOALS AND OBJECTIVES

Our team had three main goals for our portion of the Zero-Waste Football Initiative. Our first goal was to establish and continue relationships with community partners. In doing this, we wanted to create an open form of communication between those who had a stake in sustainability at the University and our group's endeavors. This allowed us to establish critical relationships in which both sides could collaborate to meet the needs of all parties in order to reach a sustainable solution. Our second goal was to co-produce a sustainable strategy to the University's expressed need of sustainability and recycling at football games. This was achieved through our team's use of Participatory Action Research (PAR). Within this type of research, our team focused on constant engagement through our activities and interactions with our stakeholders and community partners. We kept in contact with our partners through sit down interviews with UVa Recycling, phone interviews with Black Bear Composting, email interviews with Facilities Management and the architects of the addition of Scott Stadium, as well as through multiple walk-throughs of the stadium before, during, and after home games. The third goal was to actively engage in the collecting of data of receptacle distribution/contamination during and after football games. To accomplish this goal, our team collected and conducted an analysis of the empirical data that we collected of the receptacles this semester. In doing this, we attended four home football games (Idaho, Georgia Tech, North Carolina State, and Duke) and collected visual data of receptacle distribution and contamination before and after collection. Our fourth and final goal is to find an opportunity to disseminate our findings to our community partners as well as next year's students. This will be achieved through not only our written findings but also through our presentation to the class and other key stakeholders at the end of the semester.

## METHOD

The goal behind our methodology and process of obtaining results was to act in way which would allow us to get a full view of the current situation and to clearly see what could and needed to be done in order to move the waste program forward. The end goal was to create a new plan or map to give to Facilities Management. However, there was no existing plan, and thus we initially started with no map. So gathering enough information about certain practices to create a current map was needed. The most important part in our method that we had to consider was that we had to translate thoughts, current plans, and current behaviors into a practical map. Our main point of reference was through suggestions from last year's group, specifically Matt Boegner, and Ashley Badesch. After touring with the stadium and observing current behavior of patrons, we were able to adopt a feasible plan, which led to three maps of the stadium.

The bulk of gathering data came from interviews with community partners, stadium tours from the University facilities staff, and from observation. These methods were used because they allowed us to interact with the staff and grasp an understanding of why things were set up as they currently are and gave us enough knowledge about what needs to be change. During the interviews with the different community partners and on the tours, different perspectives were seen and a variety of results were shared with us. By using these two methods, we developed a strong understanding on what needed to be changed and in what manner

would be best for the situation. Observation served as a strong tool in this process because it gave us firsthand experience. On game days when our team would scout out the trash and recycling conditions, we would see how the crowd threw away its trash and other behavioral issues which could only be observed in real time during the game. As for gathering data, the tours and interviews allowed us to get a handle on the thoughts and current set up of the waste program; the observations on game day allowed us to see the application of said plans.

After data collection, we discussed and designed the maps, which would be used as the way to present our findings. We created three maps: a current map of the trash layout, a model showing the post kickoff trash collection, and a final suggestions map. These maps use the ground floor plan of the stadium as a basis for plotting on the map where the receptacles are currently placed (Image 1), how full the receptacles were post kickoff (Image 2), and the final suggestions on the future placement of the receptacles. (Image 3) We used Adobe Illustrator to generate these maps. Finally, we compiled all of our notes and maps into a final report to be presented and disseminated to our community partners.

## TIMELINE

### September 2011

9/18: Group met for the first time to discuss project topic and definition

#### 9/21: Project Definition Due

9/23: Met with Justin Armistead from UVA Athletics, director of facilities and operations, for a stadium tour  
- This tour gave us a better understanding and handle on the inter-workings of the stadium. As a first tour, this allowed us to see the way that the receptacle system in a non-game setting. Also, we saw the facilities team setting up for the game. This gave us insight into the game day operations

### October 2011

10/3: Email interview with Michael Stroud of Facilities Management (Appendix 1)

- The purpose of this interview was to see where the University stands in regards to recycling and waste during games, and to see its goals for Zero-Waste Football.

10/4: Sit down interview with Sonny Beale, Recycling Superintendent of UVA (Appendix 2)

- Allowed us to gather and gain insight into the UVA recycling program and any initiatives they have for future sporting events

10/4: Email interview with Bob Moje

- Moje is from Office of the Architects, this is how we obtained the full floor plan of Scott Stadium

10/4: Group Meeting to discuss/finalize Conceptual Design

#### 10/5: Conceptual Design Due

10/5: Phone Interview with Craig Coker, Consultant for Black Bear and Royal Oak Farm (Appendix 3)

- Mr. Coker is a consultant for these composting companies, one direction in waste management that will be examined is composting the waste. The phone interview allowed us to learn the concepts behind composting

10/14: Transect walk through the stadium with Eric Dadmun, Intern with Facilities Management (Appendix 4)

- Another pre-game tour of the stadium. We began working with Eric Dadmun from this point out. This tour allowed us to see how the stadium prepared for a bigger game against Georgia Tech. We also learned about the products sold at the game, and that the majority of them are not recyclable. From this we discussed if they could be converted into compostable products, which is feasible only from a long-term standpoint and to make short-term changes to impact sustainability Facilities Management wants to focus on improving the existing recycling program before switching gears to introduce composting.

10/15: Transect walk through the stadium with Eric Dadmun

- This was a post-game tour which allowed us to see the stadium after the football game. We walked around with Dadmun and were able to see the state of the trash cans/recycling receptacles post game. From this tour, we were able to recognize that many of the receptacles were contaminated such as recyclable products in trash bins and vice versa.

**10/22:** NC State Game: Transect walk of the stadium, Chris and Michael: Top-level trash collection, visual audit, visual on traffic flow and distribution of receptacles, Maddy and Kathleen: Lower level trash collection, visual audit, visual on traffic flow, and distribution of receptacles

- Another game for us to examine the receptacles, the personal behaviors, and see the placement of the bins. Also, we gathered a rough estimate on the number of receptacles throughout the stadium.

**10/25:** Compiled data from the NC State game, began working on preliminary report

**10/25-10/31:** Email Contact with Sonny Beale, Michael Stroud, Eric Dadmun, Victor Martin, John Clark, Jason Bauman, Jess Wenger, Matt Boegner, and Ashley Badesch.

- Used as an update for community partners and collaborators. For the project to move forward, communication with the big players will need to occur occasionally.

November 2011

**11/1:** Group meeting to gather data and create preliminary report

- From here on out we began to meet once a week to create the preliminary and final report

**11/2: Preliminary Report Due**

**11/11:** Transect walk through the stadium with Eric Dadmun, Intern

- This tour was mostly meant as a wrap up with facilities and Eric Dadmun. On this tour, Scott from the waste audit group came with us, which was beneficial because we got to look at the situation from another perspective. At the end of the tour, we presented Eric Dadmun with our maps that we had created.

**11/12:** Duke Game: Transect walk through the stadium before and at the start of the game with Victor Martin and John Clark of UVa Recycling

- This was the last game we observed any receptacle procedures, traffic flows, and distribution. We told Victor and John about our maps and other findings we had for them.

**11/15:** Meeting to begin final report and tying up loose ends

**11/30:** Began to bring the final report together

December 2011

**12/10: Final Report Due**

**12/12: Final Presentation**

- Community Partners will be invited

Colors Code:

**Due Date**

**Group Meetings**

Stadium Tours(Not Game Day)

**Interviews (Email, phone included)**

Game Day Tours/Observations

## DESIGN

After our tours of the stadium and interviews with community partners, we first created a receptacle maps. The receptacle locations were observed at the October 1st Idaho game, and then double-checked at the October 22nd NC State game. This initial check of locations revealed that trash receptacles were sparse on the Hill area and are not located in a balanced manner throughout the stadium nor determined directly by traffic flow. See (Image 1) in the appendix.

Our second map shows the trash and recycling receptacles that were full or contaminated as observed at the beginning of the October 15th Georgia Tech game. Because this was the Homecoming game and therefore was highly attended, these observations demonstrate the “worst-case scenario” in terms of what receptacles fill the fastest during football games due to traffic flow and concession locations. There also is a possibility for a minor discrepancy between the map and actual practices because after kickoff the house-keeping services take a sweep around the stadium and collect trash bags from any receptacles that are full, and housekeeping might have reached the South side of the stadium before our observations were made. See (Image 2) in the appendix.

The third map is a plan of Scott Stadium, which illustrates our suggestions for additional receptacle locations and conversion trash receptacles to recycling opportunities based on accommodating for the observed behaviors and practices. See (Image 3) in the appendix.

Additionally we have included in the appendix the notes from our tour of the stadium on October 14th and 15th with Eric Dadmun, these tours of the stadium allowed us to look at game day practices, receptacle placement on upper levels, and product recyclability (Appendix 4). These notes will hopefully be beneficial to Matt Boegner and Ashley Badesch in reviewing what information we have been already been given by Facilities Management and will lead to questions for further research as the initiative progresses.

The rest of our analysis and proposed solutions to more effectively distribute receptacles for customer use and convenience is based off of observed practices as documented in (Images 5, 6, 8, 9, 12).

## RESULTS/ANALYSIS

In order to gather data and make general assumptions about the use of the trash receptacles our group chose to create maps of the stadium with receptacle placement indicated through the use of symbols. We have included a basic map denoting the placement of each receptacle, separated by type as well as a map indicating the relative use of each receptacle before kickoff. In addition to these maps, which are purely observational, we have created a map that proposes a new configuration of receptacles in order to both better serve the game day patron as well as enhance the use of recycling within the stadium. This map (Image 3) indicates a number of changes that we feel would be beneficial.

At the East and West Gates, which are generally trafficked by Alumni who are tailgating in the parking lots surrounding the stadium, our observations show that it would be prudent to include more temporary recycling receptacles outside the stadium in order to make it easy for said fans to dispose of the recyclable items that they have been using for their tailgates. For the most part these items consist of glass and plastic bottles as well as plastic cups. Specifically, two temporary recycling bins at the South end of the stadium should be added, near the parking lots where patrons tailgate, in addition to two of the same container outside both the East and West Gates would create an opportunity that patrons would take advantage of. We are also proposing that two additional large recycling receptacles be added to the inside of the West Gate entrance due to the amount of contamination that we saw in the trash receptacles before the start of the game. This area has a large number of concession stands and therefore generates a fair amount of waste, both recyclable and non-recyclable. This contamination is indicated on our Pre-Kickoff map. (Image 2) and includes for the most part recyclable bottles and cups procured inside the stadium being thrown into trash receptacles.

Another place that we saw major contamination had occurred was after the game at the North Gate. As patrons left the stadium many of them used the trash receptacles that line the turnstiles to discard plastic bottles which could have easily been recycled. Images 8 and 9 reflect the amount of recycling that was tossed into trash receptacles. In order to remedy this of contamination we propose that every other receptacle at the turnstiles be transitioned into a receptacle for recycling so that patrons have the option for both trash and recycling disposal as they're exiting the game.

In addition to the transition to recycling at the turnstiles we propose that four addition recycling receptacles be added under the portico at the north end of the field near the columns. This area is highly trafficked throughout the game and would be an ideal place for patrons to easily discard recyclable materials. Because of the busy nature of the portico, as it is also the first thing that students encounter as they're leaving the Hill after games, the Hill itself often becomes a depository for trash because of the lack of receptacles located there (Image 13). The logistics of adding receptacles to the Hill would be too costly in terms of time and money because of the sloped nature of the area as well as the potential safety risks it

could present to patrons. While receptacles on the Hill seem imprudent, if receptacles were placed at these designated spots on the colonnade, students may be more inclined to carry their trash to the receptacles because they would be more visually accessible.

Moreover, there is an opportunity for two more receptacles dedicated to trash at the entrance to the stands near the student section. The exact placement is indicated on the proposal map (Image 3). This is an especially high traffic area and we found that the majority of the trash receptacles in the area were full or near full before the game started. The inclusion of these receptacles for trash will help to take some of the pressure off of the facilities staff as they try to keep up with the waste disposed of by patrons. Having enough receptacles to dispose of all waste properly will mean that there is less of a burden on the trash receptacles, which will make the sight of overflowing trash receptacles less common (Image 5).

Our analysis of the data we collected led to a number of additional conclusions about the current effectiveness of the receptacles themselves. The first thing that we observed is the potential for more ideal receptacles. Outside of the stadium, especially at the North Gate there are a number of wireframe receptacles which are devoted solely to recycling. This is an optimal location for recycling receptacles, as fans are waiting to enter the stadium and being forced to discard any drinking containers, which are generally recyclable, before being granted entrance. The issue with these wireframe receptacles deals mostly with the design of the lid. There are two holes which are relatively small to discourage contamination from general trash. Unfortunately the holes are not wide enough for certain types of containers which are often discarded at this entrance, specifically Solo brand cups do not fit easily through the holes which leads to stacks of cups stuck in the hole as well as trash piled up on the entirety of the lid (Image 12). This means that the receptacles become unusable, often before the bags are even half full. Patrons of the game are generally in a rush to enter the stadium and therefore don't take the time to fix other people's mistakes and therefore either add to the stack of cups and bottles or throw away recyclable materials in the readily available trash receptacles. Another type of recycling receptacle could be employed in this area outside the gates in order to deal with the irregularly sized recycling items which are discarded as people enter the stadium.

The paired trash and recycling receptacles within the stadium are also not ideal for recycling in that it is often difficult to tell from a distance that the receptacle has both a trash and recycling component. The signage is placed on a post above the receptacle which juts out with the proper label above each can. The label for the other bin is often hidden from certain angles, making it harder for patrons to choose the correct receptacle in the few seconds that they take to decide where to discard their waste (Image 7). This problem could be remedied by signage, with pictures of waste for visual clues, which is noticeable from a greater distance so that less contamination occurs between trash and recycling receptacles.

As we read about precedents at other schools, we found that Ohio State University color-codes the entire receptacle to match school colors so that scarlet receptacles are for recycling and gray receptacles are for composting. Along with clear and proper signage this seems like a solution for keeping students and fans interested by tying school pride into the process of disposing of waste properly. Information from other schools has been very helpful as we've begun the work on this project and we feel that it will be extremely beneficial for the project to continue to keep in contact with other schools who are further along in the process of implementing Zero Waste programs.

## Limitations

Through our research, we have been able to create suggestions for the layout of the receptacles on game day and this has continued to move the Zero-Waste Football Initiative forward. After all the interviews, stadium tours, and observations, we have been able to compile a collection of results which can be used for the future use of the program, but we are still limited in a few ways. For our portion of the Zero-Waste Initiative, our limitations included the number of home games and time, lack of information from facilities



about the layout of the receptacles, and budgetary issues. These limitations were not crippling but they have made it difficult on our end to promote change in a more effective manner. Also, it must be understood that some of these limitations are inherent to the project within the scope of the class and cannot be changed. However, future groups and facilities must be able to work within these constraints in order to accomplish as much as possible in their time on the project.

The main limitation that we found to our project, and probably to the Zero-Waste Initiative in general, was timing. Within the limitation of time, there are a few sub categories, which make it hard to continue the progression of our project and the initiative in general. First, the window of opportunity to observe the behavior of people and the trash receptacles is limited because of the number of home games. This past season, Virginia Football played seven home games. We were assigned this project with six games remaining in the year and we really only had four opportunities where the team could observe and collect data on game day. We were able to collect data at these games but unfortunately we feel that we could have collected more reliable data if we had had more opportunities to compare data from game to game. As the season progresses fans patterns may change, from the time they spend in the stadium due to weather and the types of concessions they buy and what that means to what is recyclable or not. For instance there are probably more water bottles purchased at the beginning of the season in late August and September while later games are sure to see an influx of hot beverage containers which may or may not be recyclable.

The creation of the football schedule is obviously out of our hands, having been made by the NCAA, but no matter what the schedule is, it will be difficult to see any changes implemented in the season because changing stadium operations mid-way through the season would be inefficient and could cause more errors without the proper training. This time limitation makes the implementation of new strategies seem especially difficult; there was no way that we could compile data quickly enough to attempt any real changes this year. To see any changes actually happen within the stadium we feel that planning would have to start now in order to be implemented the following season. That is why we think that the Zero Waste should become a yearlong initiative. Currently, it appears that progress is being made in the fall because of the Global Sustainability course, but all progress comes to a halt in the spring because the class is not offered and other student groups are not involved with the initiative. For progress to be made and proper changes implemented, a yearlong effort should be incorporated potentially through a student organization or sustainability group that would be willing to take it on.

Time is a major limitation, but budgetary and operation concerns will also need to be looked at in this initiative. As said earlier, operations cannot be changed in the middle of the season; they must be changed in the offseason. Depending on the progress of the initiative, this could potentially include having to hire/fire and retrain staff members. This would take time away from other operations with UVa facilities, and money also becomes an issue. Implementing these changes would require that facilities buy new receptacles, additional recyclable pop-up units, and other items needed in order to follow our proposals. The cost requirement could kill this project. We did not obtain any financial information on trash receptacles or the budget of facilities, but purchasing power may be low which would lead to hesitation or rejection of the plan.

A final major limitation was the lack of information about the receptacle layout that we received from facilities. We did not receive any documents about the current practices of the receptacle layout or reasoning behind it. All of the information we received was through interviews with different community partners and collaborators. In fact, it was said on one of the tours was that facilities does not have a clear plan with the receptacle distribution, but rather they just left them in the same place every game-no questions asked. The lack of a plan and any other pertinent information forced us to create a current receptacle map and we had to make our best estimate from our observations in regard to waste and contamination figures. Our map and data are a fairly accurate measurement, but in order to obtain better

results, facilities management may need to make a map themselves and do an audit of the receptacles in the stadium.

The Zero-Waste Initiative is progressing at UVa, but it must move forward year round. Other organizations that apply to sustainability must become aware of the initiative and what the Global Sustainability course has done so far. These groups can work with facilities at all times of the year to see that progress is being made. In the fall, the Global Sustainability students can help with the initiative still, and continue to act in the way that they do, currently. Overcoming budgetary issues and better organization in regards to receptacle maps at facilities will come in time, but the limitation of time must be handled first.

## STRATEGIES FOR SUSTAINABILITY

The University already does a lot in order to facilitate recycling within Scott Stadium but in order to achieve a truly Zero Waste solution there is a lot that remains to be done. Our project is a continuation of the work that Matt Boegner and Ashley Badesch have done previously in the Global Sustainability course and we hope that the information that we've gathered will help them and future classes to work more efficiently with Facilities Management in the future. Our work with receptacle distribution is a small part of the project but the information that we've gathered on existing conditions will potentially lead to conditions which are more conducive to recycling in the future.

We believe that composting would be extremely beneficial to the Zero-Waste effort and is something that should be pursued in future work on the project. Future groups will be at an advantage because the Black Bear Composting will hopefully be open and completely functional by the time the project starts next year. While there are many limitations to composting, which we learned from Craig Coker (Appendix 3) via a phone interview, as well as the information we have gathered from other schools, there also seems to be a lot of opportunity. Mr. Coker was helpful in explaining the process of composting, specifically the difficulty with contamination of compost, which is much harder to fix than recycling. In order to avoid contamination we hope to see an expansion of the recycling program that Facilities Management has in place that allows student organizations to pick up recycling after the game to raise money. If groups were also able to sign up for shifts to oversee the recycling receptacles during the games contamination could be avoided.

Our suggestions this semester require only minor funding in terms of providing additional recycling receptacles adding composting would require a significant cost analysis and could potentially be more of an economic burden to the school. Future groups working on this project should work to see if the price of waste diverted from the trash stream would offset the cost of working with a composting facility, which is possible and would help future negotiations with Black Bear Composting to make this a reality. Again, this will be more feasible in the future because Black Bear Composting should be fully operational by then.

While there is a lot to be done in terms of making Zero-Waste Football a reality at UVa we see this as an opportunity rather than a problem. Because groups will continue to work on this project in future classes there will be a surplus of great ideas about how to make the project better as a whole. It seems that future groups will be able to take the suggestions made by classes that have come before them on all aspects of the project, including not only receptacle distribution but also signage, behavior, precedents and outreach in order to find new ways to work with Facilities Management to better facilitate recycling within the stadium. By disseminating our reports to future students as well as Facilities Management and working as a whole to combine our work we hope to help to make Zero-Waste Football a reality at the University of Virginia.

APPENDIX

Image 1: Receptacle Distrubution Map

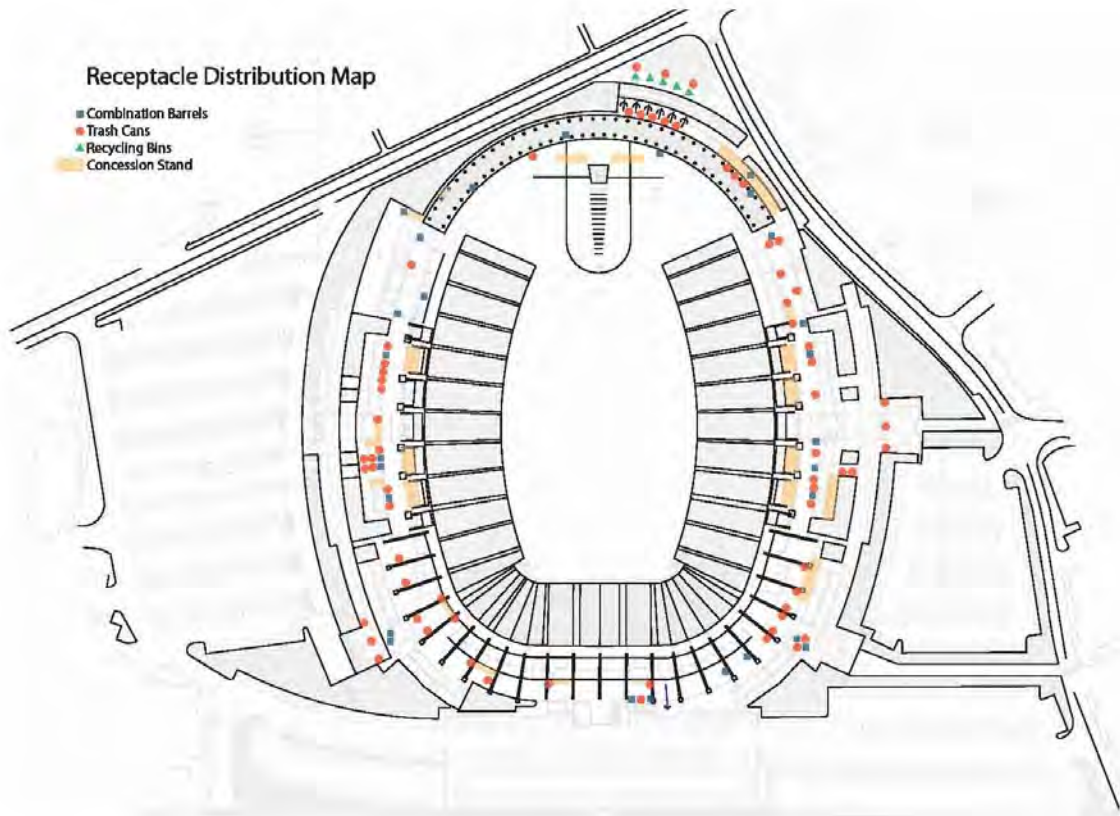


Image 2: Map of Relative Amount of Trash in Each Receptacle Before Kickoff

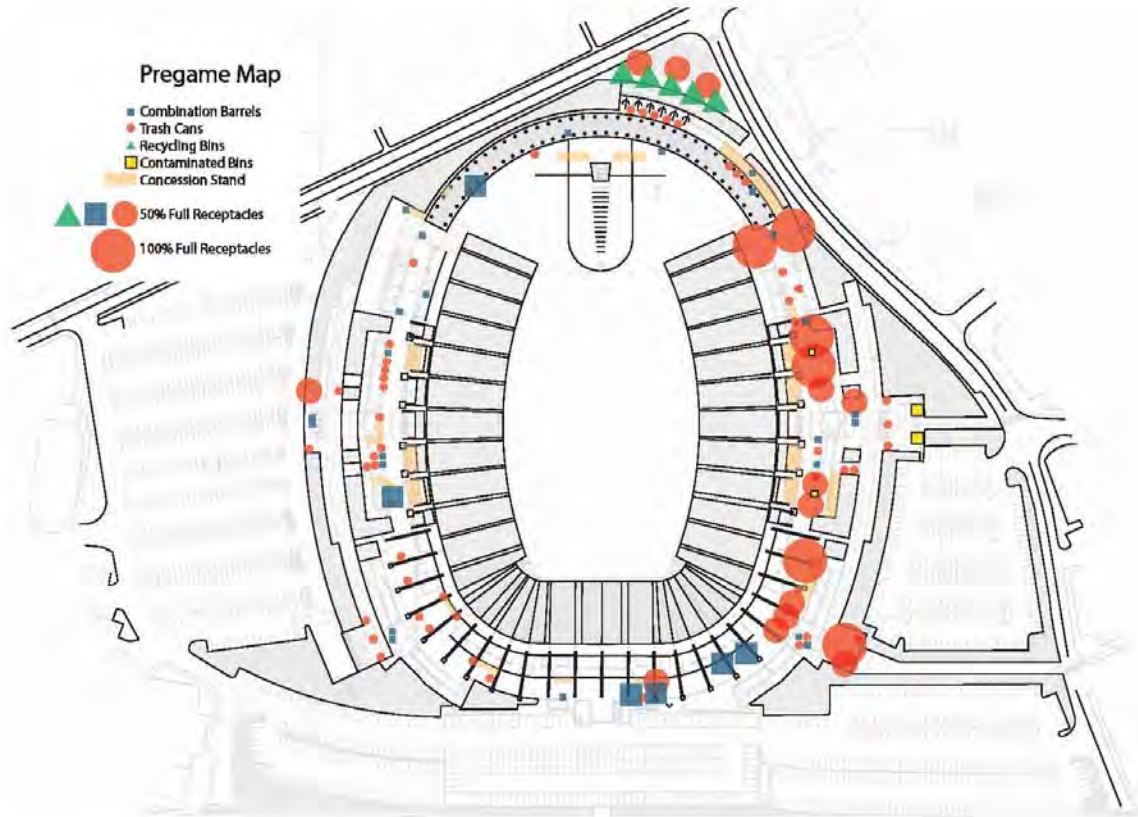


Image 3: Proposed Receptacle Distribution Map

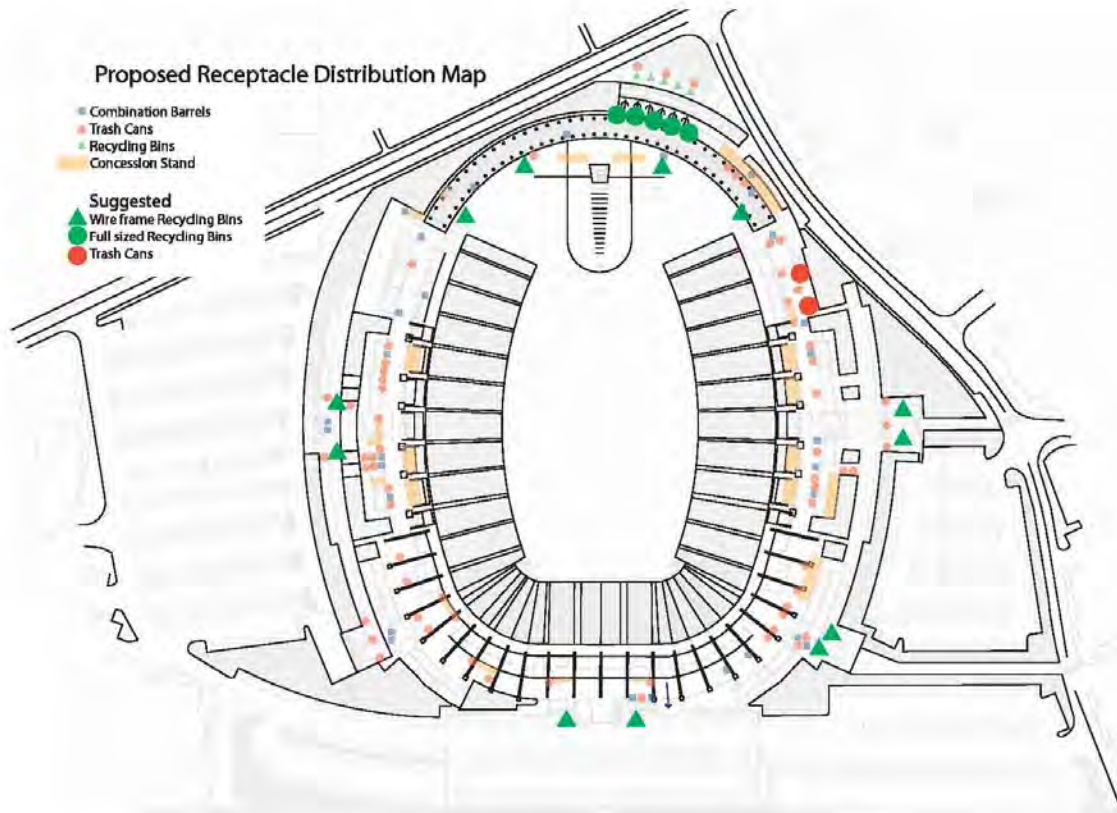




Image 4



Image 5



Image 6



Image 7



Image 8



Image 9





Image 10



Image 11



Image 12



Image 13



## Appendix 1: Mike Stroud Email Interview: 10/3/11,

1. About how much waste does the stadium produce per home football game?

- This question would be better answered by Sonny Beale in Facilities Management. His email is bcb8s@virginia.edu

2. What do fans seem to consume most when they enter into the football game?

- There is a very broad range of products that we offer. Without having specific numbers I would say that bottle drinks, fountain drinks, and hot dogs are the most popular because we offer these products in every location throughout the stadium.

3. Is there any strategy to where you put the trash bins? Why do you put them where you put them?

- Not a significant amount of strategy for locating recycling & trash containers. More common sense in the fact that we don't put them directly beside a food/drink location or in the path of ingress/egress. We keep them on column lines but as visible to the fan base as possible. Locate them at the condiment stations in the facility and at the gates for ingress.

4. Do you have an online layout of Scott stadium so that we might be able to lay points down to map out receptacle distribution?

- Attached a pdf to this message that may help.

5. What do you foresee the biggest challenge being with the Zero-Waste Project?

- There seems to be some financial implications that present challenges for zero-waste. Some of the implications appear to be a onetime investment such as additional containers. Some seem to have recurring implications in the sense of materials we present our concession products in. Some implications appear to be quality in general. This area of the project requires some significant research before anyone is prepared to move forward with action.

6. Is there anything that we could do to better communicate what our goals and progress is to your team?

- The goals are clear and the concept is clear. I think this project is at a point where effective research and an action plan with options are necessary. It would be important for the project to identify the options of change and how they affect the system as a whole. Financially, operationally, etc. From there we could begin to identify what is realistic or the most reasonable to begin changing. We could also identify what items require funding and how that could occur.

7. Do you think that this project might be worth the extra work on the end of your team?

- An opportunity to get better and more efficient is always worth it's time but the timing of the year is most important. We should begin working toward options for the 2012 season. This would require some significant levels of research and study during this season. I would recommend beginning to study some of the items that you have questions about. The spring of 2012 becomes the right time to dive into this project on topics of discussion and change for fall of 2012.

8. Why is it that you like/dislike this project? And what goals would you like to see that we are missing?

- Good project with a lot of value. The overarching goal of zero waste is great but now the group leading this project needs to identify how this big goal can be reached by accomplishing all the smaller goals. What

items get you there and which of those goals are we already completing and which of those items can we accomplish and how? What is the operational and fiscal impact of these goals?

## Appendix 2: Interview with Sonny Beale: 10/4/11

1.) What is your job at UVa and what are some of the things that you manage? How can what you do be instilled into the Zero-Waste Project?

Sonny got involved with all of this starting with the green challenge at the University. It started with the dining halls competing against each other for making their practices greener and goes for more composting. This challenge was started by a student at the University, funded by the University, with the compostable waste taken to Panorama Pay Dirt Farm in Earlysville, VA, near Charlottesville. This sounds great but the problem begins when you talk commercial waste. This includes waste from a football game. Panorama doesn't accept the waste from UVa football games. Thus they have to try and compost on grounds. You can imagine that there is not enough space and the university doesn't have all the proper resources to carry on with this. The next closest place that will accept the UVa compost is Royal Oaks in Lynchburg. The biggest problem with this place is the distance. It isn't feasible to take the compost from a game 60 miles away to Lynchburg.

2.) What is holding the Zero-Waste Project back from succeeding?

He said that really it is the cost of transportation. There is no function facility right now nearby that the University can export waste to in a cost efficient way. Some other smaller things that are holding the project back are the times of cans that are holding the trash and the expense of storage from the stadium in a central area.

3.) What is the best composting option?

He said Black Bear Composting would be a great choice but they just started building the complex in August. They were supposed to be done in October but he has heard nothing back from them yet. He said they would be located only 15 minutes away and they would take the compost from the game. He says they will work because it would be cost effective to take waste from point A to point B.

4.) See if he knows the numbers of recycling at Scott Stadium, such as how many pounds of recyclable material is recovered after a football game?

He doesn't know this number but says that Michael Stroud would have a better understanding of this and that what he does know is that the contractor does take a lot of it..

5.) What are the most recycled items at Scott Stadium?

Here he talked a lot about Aramark's efforts. Basically he has been very impressed with them. He says that they have embraced composting, researched composting vs. recycling, and have even helped the dining halls go tray-less. This has lead to a decrease in food wasted in the dining halls because people take less on a small plate. They have also tried to become UVa's most sustainable partner in the most affordable way to them. One thing that they have done is invented a popcorn container in JPJ with no plastics in it so that it can be recycled directly. They have pushed for many of their products to be recyclable or

compostable including cardboard, cups, etc. (things that are not are hot dog foil and waz paper cups used sometimes used etc.)

6.) See if he knows if the fold-up recycling bins collect a negligible amount. What is the type of recycling bin that you think that could be used in the stadium (Windsor barrels) Very particular but just interested.

So the Windsor barrels are the barrels that have been used by the university ever since the addition of the south side of the stadium. The new ones cost from 800-1,000 dollars and they have purchased 100 of them. These new ones would have a center post in it with an option for another bin. This third bin would be used for composting. But there would need to be some type of lid to keep the insects out of it, especially around the time of early fall. However he did say that compost does and can get heavy so the best option for compost would be rolling bins. Via suggestion form Royal Oaks there are 64 gallon 2 wheeled bins called mobile totters (I think that is how you spell them but he said Boushe products and Schafer containers, American containers make these). Basically the recycling efforts extend outside of the stadium and they try to place them where they think there is a high demand (along the road, at tailgate spots, just outside the stadium). They also get calls for them at specific tailgating spots and they bring them there. They have not done any research on where or why they place the bins where they do but they have watched the traffic flow of games and have put the bins in and out of the stadium where they saw the most traffic.

7.) How long does the waste sit in the stadium before being transferred to the next stage in the process?

For this one he said that trash is taken to multiple places. One is in the basement of the stadium to the big trash bin or to be compacted there. But the most common place is outside the stadium at big trash bins or other receptacles because this is the fastest and easiest way to take it away. Student groups come volunteer and clean up after the games and also they have a contracted cleaning vendor that comes in either right after or the next morning to pick up.

8.) What are any trends that he has noticed in recycling behavior throughout the year?

He said they have not run any numbers but he has watched trends over time. He talked about an e-waste initiative that the university teamed up with Crutchfield etc. The first year (I think around 03 but don't really remember) they collected 17,000 pounds of e-waste. In 06 they doubled that. And in 09 they collected 125,000 and had to turn people away. He said that this is a great example of how recycling is becoming "the cool thing to do". At the stadium he has watched people and he says that over the years people have become more aware. Visual estimates were 98% of what he saw in the recycling bins were supposed to be recycled. He said about 35% of what he found in trash cans could have been recycled.

9.) The Green Football game thing is coming up, maybe asking him what are some special things that UVa recycling is doing at the game in terms of receptacles and recycling/compost bins.

Basically he said that this is a competition between two schools. So this year since it is at our game it must be between UVa and Georgia Tech. The EPA has embraced and has sponsored this event in which the goal is waste reduction, composting and recycling. The schools push for a 0 waste event (the football game in this case). Volunteers hand out blue bags to tailgates and encourage fans and students to please put

recyclable items into the blue bags and set them by the nearest recycling area. Biggest problem here is that his team only has 20 people. He needs volunteers to handle big events like this because of his limited resources.

10.) Final Words?

We need to ID the responsible parties for recycling and reducing. Don't stop at Scott Stadium. Expand beyond.

### Appendix 3: Interview with Craig Coker 10/5/11

1) How would UVa go about setting up a third waste stream in the form of compost?

First you would need to find a composting company, Black Bear Composting in Crimora, VA in Augusta County, north of Waynesboro will be open by the end of October. The way he will do composting at the stadium would be to set up staffed diversion stations. Ideally these would be staffed by students. Students would be trained for this task, could potentially become a part of the stadium's current program which consists of student organizations picking up recycling after games. Composting is the opposite of recycling; companies need to charge a processing fee for the material, whereas recycling companies pay the recycler for their material. One of the key questions that needs to be asked is what does it cost the University (per ton) to throw away trash. If the composting facility charges less than that price then there are savings to be had and the project becomes feasible.

2) What would the students staffing the receptacles need to do? Would the bins need to be staffed for the entire game?

The bins need to be manned the entire time because contamination is much harder to deal with in composting than it is with recycling. Student groups could set up shifts so that they work for one to two hours with two to three volunteers at each station.

3) What exactly is compostable currently at the football games? Is it mostly food items?

For the most part food is the main compostable material, as well as compostable serving plates and dishes that the vendors are using or could switch to.

4) What types of receptacles are used for composting?

65 gallon roll carts are used. They're generally lined with compostable liners. Full carts would be wheeled to an out of the way area in the stadium and then picked up by Eric Walter on Monday morning. The receptacles would be owned by Black Bear and lent to the stadium for games, meaning that there would be no need for long term storage.

The roll carts would probably cost approximately \$8 to \$10 each and the cost of the liners would be negotiated as a part of the agreement, they would also probably be provided by Black Bear.

5) Is there any problem with sanitation or smell that arises from leaving the compost until Monday morning?

The roll carts are equipped with lids and as long as those are closed the bins can sit for about 36 to 40 hours before being picked up, even in the heat there would be some overheating of the compost but not much. There's very little concern about vectors-flies, rodents and rats.

6) Is it possible to collect composting more than once? Currently Facilities Management requires the trash emptied



The major problem is that nobody has a good handle on how much waste is produced and where it's produced, once that's understood we can decide on the number of carts which would probably not be emptied, due to the fact that they'll be left there for approximately 36 to 40 hours. The trash generated by patrons and vendors needs to be understood, the stations for composting would probably be stationed near the men's and ladies rooms and near food service establishments. There would be no use placing them in parking lots because the tailgating crowd is much more complicated and there's a higher risk of contamination.

Our current guess is that there would be a need for 20 to 25 carts. I met with Sonny Beale, Jess Wenger and other from Athletics and Dining Services in August to discuss this idea. We think this might also work for Davenport Field and John Paul Jones Arena, and might be an easier way to get started than at Scott Stadium. We're thinking about attempting a test pilot at Davenport during a home baseball game this spring.

## Appendix 4: Tour of the Stadium Information.

Eric Dadmun, October 14th and 15th

### Products:

Recyclable- plastic/hologram cups

Non-Recyclable- hotdog trays, popcorn bucket, fry cup, foil wrappers, plastic nacho trays, candy wrappers (non-convertible)

Unknown- plastic wrapping of kettle corn, bags of buns, cardboard of concessions, small vendor materials

### Trash Take Out:

Dumpster under Bryant Hall on first floor, along East Yard Line

Trash in black bins with lids

6 UVA housekeepers

20 outside-contracted housekeepers

### Suites:

2 small rectangular trash cans

1 recycling for bottles and cans (UVA recycling bin)

### Catering on 3rd level:

Across from suites and press boxes

Steel trashcans by door to outside boxes

Recycling at point of purchase not point of consumption

### Questions (for us to figure out):

How often is each can used?

How much is diverted from trash by recycling?

How feasible is a composting plan?

How are receptacle locations chosen?

How often are they collected during game?

### Game Day:

Temporary wire bottle recycling outside the North Gate

At section 114 concessions/exit no recycling opportunities

### Clean Up:

Trash bag liners removed from bins and placed beside

Trash from bathrooms placed by exterior door along wall

Rented chairs stored along wall by exits to stands

Concessions trash outside of side door to concessions

Wheel barrows at South End Zone with trash bags after game

All concessions, stadium, bathroom, suite, press trash taken by housekeeping

### Facilities:

Parking lot contractor cleans trash starting at 5am on Sunday, done by Monday

### Recycling:

Taken by UVA recycling contractor

Collected by student groups after game from Hill and stands

Sorted at off-grounds facilities

### North Gate Entrance:

Black Trash cans at every entrance gate, filled with recyclable bottles  
Poorly-labeled Recycling Barrels, filled with bottles and private plastic cups  
Temporary Wire Recycling, only 1/4th way filled with bottles  
Black Lid Trashcans, filled with trash and napkins

When does recycling get sorted?

- Recycling is taken off site before it gets sorted. UVA recycling takes care of this much in the same way it takes care of the recyclable containers around campus.

Do we sell paper cups that aren't reusable?

- We don't sell any paper drink cups. The two sizes of plastic cups are basically the two choices. I know the hot chocolate cups and lemonade cups are different, but I don't think they're recyclable.

Are the smaller vendors on the outside of the concourse Aramark as well?

- No. Most of their supplies and products are made independent of Aramark. They are, however, under the supervision of Aramark and some vendors get some supplies from them.

Who manages housekeeping and how is their work distributed?

- I'm trying to find a document that describes how this works. I'll pass it along to you if I find it, but it may be a few days.