

**Methods of Paper Waste Reduction in the Environmental Sector**

**By**

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## Abstract

TRC Environmental Corporation is an environmental consulting firm located in northern New Jersey. While TRC offers services in many different disciplines within the environmental sector, sustainable business practices are not employed. TRC's solid waste streams exit the office unaccounted for: few are aware of how much paper we consume, how much garbage we create, how much water we use, and how much energy is spent all in the name of doing business. Many employees, however, are resistant to change the way they use paper as they are concerned it may affect the way we as a company are able to conduct business.

This master's project is broken into three areas: causes of paper waste, individual behavior contributing to paper waste and willingness to participate in a paper reduction program and finally administrative and technology solutions that can help reduce Millburn's paper waste. A 2-week study was conducted in which the paper that was left behind at each printer was weighed at the conclusion of each work day. The results of this study helped determine how much paper is truly wasted and not put into reports, reused as scrap or recycled. After it was determined how much paper was being wasted throughout the office, an electronic survey was distributed throughout the Millburn office with questions that were aimed at determining how "green" Millburn employees are and their willingness to participate in a paper waste reduction program. A 61% participation rate was achieved. Finally, a literature review was conducted to gather possible administrative and technology solutions to aid the office in reducing the paper waste streams identified.

Results of the study indicate that if TRC Millburn reduced the amount of paper we used, clients would still receive the same caliber of excellence to which they have become accustomed. There are many paper waste reduction solutions available that can be employed in the office with little to no disruption of the employees' routine. As TRC moves office spaces, many of the strategies suggested in this project will be employed in the new office.

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## **Executive Summary**

*Companies in many industries rely on paper correspondence as part of their daily operations. TRC Environmental Corporation in Millburn New Jersey is no exception - Millburn spends just under \$10,000 each year on paper and about the same in maintenance of printers, copiers and plotters. Thousands of dollars could be saved every year if the office were able to operate with less paper. This study identifies the areas in which TRC could focus to reduce paper most effectively and also presents technological and administrative solutions that can help reduce paper usage and paper waste.*

### **1.0 Identification of the problem**

According to the Natural Resources Defense Council (NRDC), the average office disposes of approximately 350 pounds of wastepaper per employee per year (NRDC). TRC Environmental Corporation's Millburn office is not an exception. While reducing our paper waste is not imperative to the function of our office, as a publically traded company, we have an obligation to our shareholders to conduct business in the most economically and environmentally sustainable manner possible.

The rate at which we use paper reflects that few people are aware of how much paper we use weekly, monthly or annually, and few are aware of how much paper is recycled. Reams of paper are wasted unnecessarily and the aim of this paper is to explore various options of both reducing the amount of paper used and put into recycling. If a concerted effort were made to simply reduce the amount of paper Millburn consumes, the company could cut costs on paper purchasing, which would in turn reduce the amount of paper we recycle.

In the Millburn office, approximately \$1500 is spent on paper each quarter. There are limited records regarding how much paper is ordered, as it is ordered on an as-needed basis. There are no records of the amount of paper that is recycled either. Millburn pays a flat rate of \$200 each month for recycling services and pickups occur on an as-needed basis.

The cost of this seemingly endless supply of paper is primarily carried by the company. When cost estimates are

prepared for clients, 10% of the total labor and subcontractor costs are added to cover administrative costs, including office supplies. The 10% contingency fee applies whether 2 reports are being produced or 16 reports are being produced: this fee does not account for the volumes of paper that will be consumed during the writing process, editing process and report reproduction process.

If project managers and scientists at TRC Millburn could modify certain behaviors with regard to their paper usage, waste paper and recycling volume could be greatly reduced resulting in a company with a much smaller environmental impact and a significant surplus budget for supplies.

## **2.0 Background Information – TRC Environmental Corporation**

TRC Environmental Corporation purchased Dan Raviv Associates in 2006, which was renamed as TRC's Millburn office at the time of purchase. The Millburn office specializes in projects related to soil and ground water remediation. Client services typically consist of data collection (field sampling) report generation and correspondence with the overseeing agency (New Jersey Department of Environmental Protection or New York Department of Environmental Conservation). The report generation process is consuming of time and materials and considering the size of TRC in Millburn, there is a faster and more efficient way of doing business.

## **3.0 Identification of Paper Waste Problems at TRC**

During January 2014 an analysis of paper waste was conducted in TRC's Millburn office. The time period was chosen specifically because it was representative of an average workload throughout the year. There were no large reports being produced that would artificially inflate the study. Several angles were examined and data was extrapolated to project TRC Millburn's paper usage over the course of a year.

### **3.1 Printers**

TRC Millburn currently uses four printers throughout the office: the HP 4300 is a black and white laser printer used

by approximately 33% of Building 57 employees. This printer appears to be most heavily used by individuals within the office as it is in a central location.

The HP 4250 printer is black and white laser printer similar to the 4300, and it is stationed next to the 5550, a large black and white and color laser printer that prints 8.5x11" sheets as well as 11x17" sheets. Together these printers service approximately 43% of Building 57 employees.

The CP5520 printer is Millburn's newest printer, purchased at the end of 2013. This machine prints pages 8.5x11" and 11x17" pages in color and black and white. This printer services the entire office and is used by approximately 24% of Building 57 employees.

During two weeks of January 2014, TRC's paper waste was examined by evaluating how many "orphaned" print jobs occurred during those two weeks. The paper that was in the recycling bins next to the printer was not included in this data; only paper forgotten in and around the printer was counted.

### 3.2 Paper Recycling

TRC has a paper recycling program in place that is adhered to by the majority of employees. Paper recycling bins are placed in each cubicle, in the kitchen and next to each printer. Two large (aprox. 2 cubic yards) bins are also available for cardboard recycling products. Each night the cleaning staff empties the bins in each office into a larger recycling cart. This cart is emptied by P. Ragonese and Sons recycling company of Newark, New Jersey on an as-needed basis. TRC is charged \$200/month for this service, rather than by the pound or by frequency of pickup.

## 4.0 Results of Data Collected at TRC

Due to the fact that the research conducted is aiming to reduce paper waste specifically at TRC's Millburn office, it was important to specifically examine TRC Millburn's paper usage habits and elicit opinions from Millburn's staff

on how to conduct business and use less paper.

#### 4.1 Results of Orphaned Print Jobs Study

On January 6<sup>th</sup>, 2014 all TRC Millburn staff members working in the remediation building (referred to as Building 57) were notified via email that any jobs sent to the printer and not claimed by 4pm at the conclusion of each day would be collected for research purposes. While staff members had to be warned that their print jobs would be collected, this could have artificially lowered the number of orphaned print jobs due to heightened awareness.

From January 6<sup>th</sup> through January 17<sup>th</sup>, 2014, orphaned print jobs were collected from the most frequently used printers in Building 57. Each day at 4pm, papers were collected from each printer and sorted according to the printer from which they were retrieved. The results of the paper collected are presented below:

*Table 1: Orphaned print jobs*

| <b>Printer</b> | <b>People Serviced</b> | <b>Pounds of Paper</b> | <b>Percentage of a Ream</b> |
|----------------|------------------------|------------------------|-----------------------------|
| 4300           | 33%                    | 8                      | 114%                        |
| 4250/5550      | 43%                    | 4                      | 57%                         |
| CP5520         | 24%                    | 4                      | 57%                         |

The results of this study were surprising: the 4250 and 5550 are used by many more people than most employees realized. The initial hypothesis was that considering how much paper waste was observed at the 4300, this would be the most heavily used printer. However, the amount of paper waste at the 4250 and 5550 printers is significantly less – nearly half – of what was abandoned at the 4300 printer.

These numbers are also likely to be lower than any other two-week period of time due to the ‘warning’ that employees



received prior to the start of the study.

#### 4.1.1 Recommendations to Reduce Orphaned Print Jobs

Several employees recommended continuing the daily roundup of orphaned paper to remind employees that their jobs will be collected if they are not claimed. Additionally, the introduction of newly networked printers, addressed in section 8.3.3, will help alleviate this problem.

Until an engineering control can be introduced, a weekly roundup of orphaned paper and an email tabulating the results of the statistics of orphaned paper should be distributed. Additionally, a dry-erase board could be posted near each printer with this same information so that employees can review the statistics as they are retrieving their print jobs. This will inform people of the amount of paper being wasted at the printers and hopefully encourage people to remember to pick up their print jobs.

#### 4.2 Online Survey

Initially a company-wide survey of paper usage habits was considered, however it was later decided that since the results of the survey were going to shape paper usage within the Millburn office, it was more appropriate to poll Millburn employees only. A 10-question survey was drafted using the online tool Survey Monkey. Several other survey tools were considered, however it was very important that survey participants felt comfortable with the survey program and were confident that the survey was anonymous. Survey Monkey is a widely used tool of which many participants are already familiar and they can be certain their responses are anonymous. Anonymity was a very important part of this survey because employees were asked to critique the effectiveness of our current recycling program and also share whether or not they adhere to our current recycling standards.

The survey consisted of eight multiple choice questions and two open-ended questions. It was important to limit the number of questions so that participants would finish the entire survey and the open-ended questions did not require

a response so that if respondents did not have a strong opinion to share, they were not required to do so in order to complete the survey.

Survey Monkey automatically tabulated the survey results into bar graphs for data interpretation. Data could be viewed by question or by responses of each individual (individuals were represented by number and not by any identifying information).

#### 4.2.1 Online Survey Results

Out of 120 people available for polling in the Millburn office 61 participated in the survey yielding a 51.2% participation rate. While a greater number of respondents would have yielded a greater data set, a 51% participation rate was enough data to determine trends in the data. The original survey questions are included in Attachment 1 and the data were manipulated into a graphical format for easier interpretation. Graphs are included with the survey questions in Appendix A.

#### *Paper recycling habits*

One of the first questions of the survey was to elicit information about the recycling habits of Millburn employees. This question was important because it helped determine how conscious people are about the paper they are using and what happens to it after it is used. While this study was not about recycling paper, and rather reducing the paper usage (before it would have to be recycled), this question served as a good way to gauge how “green” people working in Millburn are and how conscious they are of what becomes of their waste.

When asked if they recycle at work, 82% of employees said that they always recycle, 16% said that they recycle most of the time and 2% said they recycle sometimes. Interestingly, those habits are not always carried home: only 43% of employees recycle always, 29% said most of the time, 15% said half the time, 10% said once in a while and 3% said never. Employee recycling habits are very different between home and work and there are several factors

which could attribute to that.

Within an environmental consulting firm, the assumption is that if people are advocating for the environment as their chosen profession, they must be eco-conscious on all levels. This is obviously not the case, as shown by the data, however due to discrepancy between people who always recycle at work and people who always recycle at home, there is evidence that something about the work environment promotes more recycling, and likely more consciousness. The ease of recycling in the Millburn office also likely contributes to the greater recycling rate at work. Recycling bins are placed at each printer station and in each office cube; there is little to no effort required to recycle paper within the office.

### *Report Editing Habits*

TRC turns out hundreds of reports each year, most of them over 100 pages in length. Each report generated goes through numerous revisions prior to submission and each manager has his or her own way of reviewing reports, including text, tables and figure, before they go to reproduction. Many managers ask their team to print a 'draft' copy, which is often on new paper, for review by writing directly onto the report. More managers have begun to review reports in PDF format or using track changes in Microsoft word.

When asked the preferred method of report review, 44% of respondents review reports, tables, figures etc. on a paper copy; 10% use PDFs, 43% use track changes and this question did not apply to 3% of respondents who were likely support staff not involved with report review.

While it was discouraging to see that 44% of respondents are still asking to receive paper copies, it was very encouraging to see that more managers are reviewing reports electronically, whether it be a PDF or in track changes. These tools, explained in detail in section 8.3, will prove very useful as Millburn makes an effort to reduce paper waste.

### *Double Sided Printing*

The Millburn office does not currently encourage printing on ‘scrap’ paper, nor is it common to print documents double sided. Individuals have their own habits when it comes to printing documents, however individuals have suggested we begin double sided printing for draft copies of reports. When asked to share their written opinions on double sided printing, there were mixed responses. Once the responses were combed through, they were categorized into three areas: in favor of double sided printing, mixed feelings or only certain applications for double sided printing, and completely against double sided printing. An overwhelming 68% of respondents were in favor, 30% believed it should be used during certain times, and 2% believe that Millburn should not use double-sided printing at all.

Employing double-sided printing throughout the office has the potential to cut average paper usage in half by using the back side of a page. Even if managers continued asking for draft reports to be printed, the draft report could half the number of pages and still serve the same function. If more printers in the office were available for double sided printing (currently there is only 1 that does it with minimal user effort), text, tables, small figures, memos, manuals and many other documents could be printed on half the amount of paper.

### 4.3 Conclusions and Recommendations

While the idea of recycling and ‘being green’ has been around for a number of years, the data reflects that there are still individuals, within an environmental company no less, that are resistant to recycling and waste reduction. Recycling habits at home are clearly not as strong those at work, therefore something is happening in the workplace that moves people to recycle their paper waste. There may be a ‘green culture’ at work that is pressuring people to be more careful about their paper waste. That pressure combined with enthusiasm from individuals already interested in reducing paper waste may be the key to moving Millburn towards a less wasteful office culture.

## 5.0 Emails and Comments from TRC Employees

Upon learning that there was an evaluation of TRC paper usage underway, several employees approached me verbally and via email to share their thoughts on paper usage within the office. I was very surprised to learn that numerous employees are equally concerned with the amount of paper our office uses and have given serious thought to methods of reducing our paper waste.

### *Heath Potter, Senior Project Manager*

Potter, a Senior Project Manager in TRC Millburn's engineering group, asked to have a personal meeting to discuss his thoughts on paper usage within the office. The meeting yielded some very interesting assessments of the report writing process in our office and a lack of discipline among the junior staff. Potter believes that instilling a stronger need for "getting it right the first time" among the junior staff will result in fewer printed and edited drafts of documents such as tables, figures and report text.

Potter also suggested creating a Standard Operating Procedures Manual (SOP) for printing practices throughout the office. He has envisioned a document that is meant to be reviewed by incoming staff and outlines several points:

- the particulars of each printing station
  - what size paper each printer uses
  - whether a printer is designated for color print jobs only or black and white only
- Which employees (or sections) are assigned to which printers
- Courtesy points about printing
  - Printing large jobs at off hours
  - Checking to make sure that you don't collect someone else's print job

In Potter's view, this document will help alleviate some of the confusion, backlog and waste often seen at printers and will help streamline the printing and retrieving process.

*Joshua Morris, Environmental Scientist III*

Morris was very excited by the orphaned print jobs study. He stated, “I think you should keep collecting paper and at the end of the week, tell everyone how much paper they left behind and how much paper we wasted. People would be very surprised if they knew how much paper was just left behind.” His enthusiasm for this small piece of this research project has made other individuals more aware.

Morris has started delivering print jobs associated with certain projects to the appropriate project manager. He kindly reminds the project manager that someone on their team printed tables that were left behind at the printer. This simple act has encouraged people to be more conscious of retrieving what they print.

Combining his ‘print jobs delivery service’ with posting the amount of paper left at each printer will hopefully change the culture within the office and encourage people to be overall more careful about what they print, where it ultimately gets printed and the speed at which they choose to retrieve their print jobs.

*William Cordasco, Senior Project Manager*

Cordasco, independently made several of the same suggestions Potter and Morris made in their statements. He drafted a kindly-worded email sharing his thoughts on paper usage and printing habits:

*Gauging by what I often see, there is a quick urge to print everything before checking printer settings – so there are printed chimeras lying around, such as illegible graphics (either too small or too large), things sent to the plotter meant for printers, and the like.*

Cordasco touched on an interesting fact: people do not think before they print. One of the greatest challenges facing the roll-out of a paper waste reduction program is to get people to be more conscious of their actions. Cordasco continued:

*On a courtesy note, few of us seem to take the time to check on paper supply for the printers, or to alert the office when large volume jobs are in progress. I saw an example of this a couple of weeks back where someone was trying to print many copies of a large, color-graphic proposal to the 5550 without alerting the office that it would take all day, then leaving a few of the printed copies for the*

*recycling bin.*

Cordasco's second point is still related to office culture, but also interwoven with Potter's request for a printing SOP above. General courtesy points, such as printing large jobs early or late in the day, would be excellent points to include in a printing SOP. Two employees independent of one another commenting on the general courtesy associated with printing documents strengthens the case for creating a guidance document for all employees to follow.

## **6.0 A Case For Economics**

According to stopwaste.org, when purchasing, handling, and disposal costs are included, businesses spend an estimated \$0.05 for each sheet of paper. A study conducted for StopWaste.org in Alameda County, California showed that cost savings in paper purchase and disposal are just a small percentage of what could potentially be saved:

| <b>Savings</b>                             | <b>Per Ream of Paper</b> |
|--|--------------------------|
| Paper purchase savings                     | \$ 2.50                  |
| Paper disposal savings                     | \$ 0.13                  |
| Labor savings (in processing and handling) | \$25                     |

That is a savings of \$27.63 for each ream of paper that is not used, or 5.5 cents per sheet of paper: those figures do not include storage and mailing costs. (*StopWaste.Org*)

A study was conducted in Minnesota that estimated the costs of using paper in the office can be between 13 to 31 times the cost of purchasing the paper in the first place. The costs associated with storage, copying, printing, postage, disposal, and even recycling add up. The ream of paper was purchased for \$5 for could actually cost up to \$155.

| <b>Costs</b>                         | <b>Per Ream of Paper</b> | <b>Per Sheet of Paper</b> |
|--------------------------------------|--------------------------|---------------------------|
| Purchase costs                       | \$5.00                   | \$0.01                    |
| Storage, handling and disposal costs | \$65.00 - \$155.00       | \$0.13 - \$0.31           |

*Source: Minnesota Pollution Control Agency, statewide office paper reduction campaign, www.reduce.org*

Paper is bulky to store, in boxes or in file cabinets and warehouses. By using fewer sheets, storage space be better utilized and can be put to more productive use. Owens Corning made all of its offices worldwide “paperless” and by doing so reduced the amount of paper stored in its 14,000 file cabinets around the world and saved around \$30 million in storage lease costs.

Mailing fewer sheets of paper also means saving on postage. Six sheets of paper weigh approximately 1 ounce; in 2014 the cost to mail a 1oz. letter was \$0.49 using the US Postal Service. A single-sided 60-page report would cost about \$4.90 to send by U.S. first class; that same report, copied onto both sides of the paper, uses only 30 sheets and would require only \$2.45 in postage.

*6.1 Bank of America – Charlotte, North Carolina*

In 1994, Bank of America (then known as BankAmerica) implemented the EPA’s WasteWise program to start practicing measures to reduce their paper use. By simply encouraging employees to print double-sided throughout their offices, centralizing the distribution of company publications and manuals, and switching to double-sided printing on customer banking statements, the bank was able to save more than \$1million annually (EPA, 2012).

*6.2 EPA Region 10 – Northwest United States*

In 2005, the Environmental Protection Agency’s (EPA) Region 10 offices (Northwestern United States) made an effort to reduce paper use within the office. Through a wide variety of strategies including default double-sided printing and collecting of scrap paper for reuse, the offices in Region 10 cut their paper consumption by 30 percent, translating to an annual savings of \$49,000 (EPA, 2012).



### 6.3 *Wilderness Inquiry - Minneapolis, Minnesota*

Wilderness Inquiry is a small, nonprofit organization that provides wilderness trips in the greater Minneapolis area. This organization wanted to make an effort to reduce its paper use, which their customers typically perceive as environmentally unfriendly, but still increase their marketing effectiveness and keep costs down.

A grant from the state enabled the company to upgrade computer software, create a new website, and focus on Internet communication with clients. Wilderness Inquiry was able to complete the following:

- Paper forms were converted to online versions
- Fact sheets with color photos were more easily viewed and downloaded by patrons
- A “mail to a friend” interface made sending the fact sheets to potential trip-mates easier

Wilderness Inquiry saw multiple benefits for their operations and interaction with their customers.

- Customers could get trip information instantly and they perceived operations as environmentally friendly
- The new process is more efficient; there is less time spent copying and mailing out information
- Postage costs decreased significantly due to electronic publications
- Over two years, there has been a 30% reduction in use of black-and-white photocopiers

Based on the early successes of their efforts, WI moved more documents online including job applications, a donor page, trip logs, photos, and other downloadable information for patrons.

## **7.0 Means of Addressing Paper Waste Issues at TRC**

### 7.1 EPA’s Waste Wise Program

Wastewise is a program started by the United States Environmental Protection Agency (EPA). The program helps organizations and businesses apply sustainable materials management practices to help reduce various streams of wastes.

Organizations can join WasteWise in three ways: as a partner, as an endorser, or in both capacities. Wastewise

Partners aim to demonstrate how they reduce waste, how practice environmental stewardship, and incorporate sustainable materials management into their waste-handling processes. Wastewise Endorsers promote enrollment in WasteWise to help their stakeholders realize the economic benefits to reducing waste (EPA).

According to the Wastewise database, 85 companies in New Jersey are already utilizing these tools. The partners range from schools, colleges and universities to hotels and resorts. Wastewise Partner Fox Rothschild LLP is a law firm that works with TRC often and Wastewise Partner Rutgers University is an education partner with TRC. None of TRC's New York Metro area competitors are participating in this program: TRC can capitalize on this fact to enter into the program to actively reduce our paper waste (and other types of waste) and use it for marketing purposes. Ben Franklin once said "A good example is the best sermon." By setting a positive example and actually *doing* what we advise our clients is an excellent way to provide additional credibility and attract more clients.

## 7.2 NRDC's Greening Advisor

NRDC has a long history of working with businesses and other organizations to help reduce the environmental impacts of their operations and events, from major corporations to professional sports teams to the Academy of Motion Picture Arts and Sciences (NRDC).

The NRDC has created the Greening Advisor, a guide that can aid commercial businesses or organizations in reducing environmental impacts. The principles outlined in the Greening Advisor can help commercial businesses become more sustainable and may even cut costs by helping businesses produce less waste, consume less paper, less energy, and use resources more efficiently.

An entire section dedicated to reducing paper use helps companies calculate environmental benefits of paper use reduction and gives many examples of companies that saved significant amounts of money simply by making small adjustments to the way they used paper within the office. Greening Advisor also offers a toolkit to help offices begin

the road to developing a smarter paper plan. A “Paper Reduction Worksheet” is available as an excel document and lists goals that can help an office reduce their paper waste. Columns are situated next to these goals with headings ‘departments necessary to implement’ and ‘steps for putting in place’. This allows the paper reduction team to clearly identify the benchmarks that must be achieved to reduce paper waste and figure out which areas need to change in order to achieve those goals.

This would be a tremendously helpful tool to the Green Team (discussed below) as they begin mapping a plan for Millburn to reduce paper waste. This form can also be easily distributed to other offices to help them achieve similar goals. By employing many of the strategies outlined in the paper reduction of Greening Advisor, TRC can quickly and efficiently get on the road to reducing our waste.

### 7.3 Technology Solutions

At the time this paper is being composed, there are numerous technology solutions available to move a company toward paperless operations. While TRC is not aiming to go completely paperless, there are still many technology solutions that are available to aid in reduced paper usage.

#### 7.3.1 Electronic Reporting

Adobe has revolutionized the document review process with the introduction of Portable Document Format, or PDF, for document review and electronic transmission. This tremendously underutilized tool has become more dynamic and pliable in the last few years and TRC Millburn could certainly use it as a means of transmitting reports instead of using paper copies.

When a report is completed in the Millburn office, a paper copy is typically reproduced for submission to the New Jersey Department of Environmental Protection (NJDEP) and several copies are also reproduced for clients, lawyers, outside consultants and a file copy is also created to keep at TRC. Within the last few years we have moved away

from a hard copy of the file copy and started creating PDFs of the final report for TRC's records. Instead of reserving PDF copies for the field copy, TRC could make better use of this tool and start distributing all 'copies' in PDF format. Some clients may prefer to keep a hard copy, however it could be rationalized that a PDF is a more effective means of distribution.

### 7.3.2 Electronic Report Review

While many managers prefer to review reports on a hard copy, a new group of younger managers have made use of the "Track Changes" function in Microsoft Word. Instead of reviewing a hard copy of a document written by an associate, writing comments and changes on it and handing it back to the associate for editing, the manager can instead make electronic comments. When the associate opens the document, they can easily view tracked changes and comments while they continue editing the document. Balloons appear in the right margin and display deletions, comments, formatting changes, and content that has been moved (Microsoft Corporation). This eliminates the need for printing a full paper copy (often times over 50 pages in length) repeatedly as the report goes through multiple drafts.

Some managers argue that this method is an ineffective teaching tool, as by the associate reading the edits and making them oneself, the appropriate writing style will be learned. If the manager simply enters the document and makes all the changes, the associate will never learn the desired writing style. In addition, many of the older managers prefer to write on reports as they state they are "old school" or "need something to hold".

Whether or not it interferes with the learning process or an editor's ability to effectively critique a document, electronic report review is one of the most effective means of reducing paper waste within the Millburn office. Many junior staff members already employ this technique so that several rounds of editing can occur before the document is ever printed. The hope is that as these junior staff members rise to associate project managers and project managers, they will take this technique of electronic report review with them and teach their junior staffers to work

in this less paper-intensive manner. Additionally, the “old school” managers will rise through the ranks and spend less time reviewing reports and spend more time managing big picture components of their various projects.

### 7.3.3 Paper Waste Reduction from an Information Technology Perspective

In compiling information regarding technology solutions, it was imperative to speak with an individual who was a technology expert and aware of the numerous options available to reduce paper waste. Neil Rillen is currently the Manager of Applications Support at Fidelity Information Services in St. Petersburg, Florida. He has extensive experience in the technology field as the Information Systems Manager for both the St. Petersburg Times (now Tampa Bay Times) and for Dow Jones.

Rillen is a firm believer in the ability of technology to carry us into a paperless world for both business and pleasure. Evidence of this can be seen from large corporations instituting paperless billing to small stores using iPads as the interface for their registers and emailing receipts instead of printing them. When I explained the premise of my research and the heavy use of paper at my office, he had several solutions that he believed would be very successful in my office.

Double sided printing where possible was the first suggestion. If people cannot be broken of the habit of printing documents, double sided printing can at least utilize half the amount of paper to achieve the same result: a tangible document that can be written on and edited. Even if the individual feels the need to have a paper copy of a document, when it comes time to distribute that document, Rillen says that using scanners instead of creating paper copies will cut down tremendously on paper usage. Scanners can often produce images of documents in several usable formats, therefore allowing many different parties to view, manipulate or reproduce the document.

Rillen identified an interesting issue with regard to signature pages of documents. Many people believe that the only binding signature is an original signature signed in blue or black ink. That is, in fact, not the case: an electronic

signature is considered legal and binding, therefore eliminating the need for an original signature. If a consultant had client signatures on file, a simple email asking for permission to use the signature could be sent and upon authorization, pasted into the document. This could eliminate the need for the printing/signing/mailing of original signatures through the mail and would save both time and postage.

Printer networking was heavily addressed, as there are many advantages to this technology solution. Mailbox printing is a very easy means of eliminating excess waste from printers: an employee, already signed onto the network with their unique ID, can print a document, walk to any printer in the office, type in their unique ID number, and their document will print to the printer to which it was called. This eliminates the “which printer did I print to” panic, as well as the excess paper left at printers, as referenced in Section 4.1.

In addition to printer networking, various programs such as *PaperCut* are available to tabulate statistics regarding each printer’s usage. Information such as which employees printed to the printer, the number of documents, length of documents and time of day documents were sent can all be tabulated and viewed graphically. This information can be invaluable to a company trying to reduce paper usage and waste: these statistics could be viewed weekly to analyze trends in printing habits and determine reduction rates in printing.

Rillen concluded our interview with a loose conversation about reporting requirements and the reason for paper submissions. When informed that the NJDEP is now moving toward more electronic submissions, he stated, “it is the job of the private sector to employ more of these technology solutions and move forward; it’s not the job of the government to encourage companies like yours to move toward paperless reporting.”

While TRC is moving in the direction of more electronic reporting by putting large documents on CDs and saving copies of reports as PDFs instead of paper file copies, Rillen is correct in his statement. We have an opportunity to set a new standard within our company and for other large consulting firms by capitalizing on available technology

solutions. Clients like working with innovative companies that will save them time and money: utilizing many of these solutions can do exactly that.

#### 7.4 Gamification

Gamification is a word that is becoming more and more present in the corporate world. Gamification is defined as a business trend — some would say fad — that aims to infuse otherwise mundane activities with the excitement and instant feedback of video games (Wingfield). The idea of gamification is not new – parents reward their children for doing chores with gold star stickers and business travelers are rewarded with airline points for every mile they fly. According to New York Times Technology writer Nick Wingfield, “Now, game concepts like points, badges and leader boards are so mainstream that they have become powerful motivators in many settings, even some incongruous ones. At a time when games are becoming ever more realistic, reality is becoming more gamelike.”

TRC can capitalize on this gamification trend by bringing it into the office and encouraging employees to reduce our paper waste.

##### 7.4.1 Competition Within the Office

The office is currently divided into sections with varying numbers of individuals in each section. If these sections could instead be viewed as teams, several competitive “games” could be created centering around reducing paper waste such as a Weekly leaderboard monitoring reduction of paper waste on each team over the course of a quarter. When individuals have an opportunity to band together to achieve something tangible – a prize, for example – the desired result is typically seen faster than if people are simply asked to do something.

##### 7.4.2 Corporate Financial Assistance

Gamification rewards individuals with leaderboard ‘bragging rights’ but with financial assistance from our corporate office, it is possible to truly give employees something to work toward. Each quarter our healthcare provider, Aetna,

sponsors a fitness challenge. All participants in the challenge are given a \$25 American Express gift card at the conclusion of the challenge and the winners can win prizes such as iPads.

With assistance from Corporate, Millburn could compete for prizes larger than bragging rights or office-wide pride. Employees could be compensated for their efforts with gift cards or electronic prizes. Having a tangible prize as a reward for exercising good behavior is a tremendous motivator for individuals to participate in the waste reduction initiatives proposed.

#### 7.5 TRC Green Team

In trying to determine methods for cultural change within the office, The 2012 Sustainability Report for Burt's Bees in Durham, NC was reviewed as a potential model for cultural change in the workplace.

*“Formerly, we had a group of volunteer environmental champions called the “EcoBees.” Eventually we said everyone has a part to play in reducing our environmental impacts and dissolved the group. Without people championing projects and programs, and monitoring goals, we found that we lost some traction and recognized that every cause needs leadership.” (Burt's Bees, 2012)*

The fact that Burt's Bees wanted to share the responsibility of their sustainability initiative is commendable, however, as they identified, without a central leadership group, the cause lost traction.

TRC would benefit from a centralized group to steer progress and initiative on reducing paper waste. The formation of a “Green Team” within the office has been discussed; however no one has taken on the undertaking of organizing such an organization. Appendix B, *Strategic Plan: Implementation of a Green Team at TRC*, outlines the steps and communication that would occur with the formation of a new organization within TRC's Millburn office.

### 8.0 Application of Solutions at TRC



The solutions proposed above in Section 8.0 are absolutely applicable at the Millburn office. Some will be more difficult to implement than others, therefore the least time consuming and least effort solutions will likely be implemented first.

### 8.1 Electronic Reporting

While at first it was believed that this would take a cultural change within the office, the NJDEP has played a tremendous role in making this one of the easiest ways for Millburn to reduce paper waste: soon electronic report submission will be required. Slowly the NJDEP has been phasing out the requirement of paper copies for many submissions.

In 2011, NJDEP rolled out a series of forms that were required to be submitted with reports. The forms served as a summary and helped streamline the receipt and distribution process once a report arrived at the NJDEP. They have taken the forms a step further with several detailed revisions that now are the only paper submission. Reports, figures, tables are no longer submitted in hard copy; what used to be paper deliverables are now burned to a CD in PDF format. A deliverable that once consisted of a 100-page report in a binder, has now been reduced to a 3-page form and a CD.

This requirement alone will help reduce TRC's need to print multiple copies of reports for NJDEP and clients.

### 8.2 Printer Networking

As mentioned in Section 8.8.3, Neil Rillen stated that printer networking could be a key solution to the waste paper problem that Millburn currently faces. Millburn's current computer network allows employees to choose any printer in the office, press print, and immediately retrieve their print job. As mentioned in Section 4.1, people often print items and forget to retrieve them resulting in numerous pages that go straight from the printer to the recycling bin.

While adjusting the computer network will take some time on the part of the Information Technology Systems department, a direct mailbox system could prevent employees from unnecessarily printing multiple copies of the same document.

Additionally, this system has the potential to keep track of how many pages each employee is printing on a daily basis. While that is not the intent, may use more discretion when printing if they know that IT has the potential to know how much paper they are using.

### 8.3 EPA Waste Wise and NRDC Greening Advisor

While these programs are fantastic resources, it takes time and resources to understand the strategies and carefully rollout the programs proposed. Several of the other proposed strategies – motivating people to do electronic report review and gamifying waste reduction activities – could be implemented in conjunction with many of the Waste Wise program and Greening Advisor suggestions. TRC’s Green Team would be a perfect organization to help in the rollout of all these programs.

## 9.0 Plans for Implementation at TRC Millburn

Much time has been spent conducting research because Millburn will, using some of the strategies above, be moving toward doing business in a less wasteful manner.

In 2013, our office manager retired and a new office manager, June Darvalics, was hired in her place. June brought with her extensive experience managing offices outside the environmental sector and was shocked at the wastefulness in this industry. Her prior experiences have brought a new perspective to our office and she has many new ideas on how this office should operate – from our waste management to organizational structure. June has been a tremendous supporter of this paper waste reduction initiative and will be a large component of the roll-out of the strategies proposed.

Dawn Pompeo, Office Practice leader for the Millburn Office, carries with her extensive experience in the environmental sector, having worked for NJDEP before coming to Millburn. Dawn is a passionate scientist, excellent leader, as well as dedicated to resolving many of the waste issues in the Millburn office. Her support through this research has been paramount, and her position within the corporate structure will ensure that Millburn has good communication with the corporate office through this process.

These individuals, in addition to numerous other dedicated environmentalists in the office, will be important as various strategies are tried. These individuals will provide information on how well a strategy is or is not working, and they can also serve as motivators for individuals in the office that are less enthusiastic about the paper waste reduction measures. Most importantly, individuals of high stature, such as Darvalics and Pompeo, can set a positive example for project managers, engineers and scientists in the Millburn office.

#### 9.1 Ways to Capitalize on New Office Space

During May of 2014, TRC will move its offices from the current space in Millburn to a newer space approximately 10 minutes west of Millburn in New Providence, New Jersey. The move will be a tremendous change, as we have been in the same building for over 20 years. This change in space will serve as an opportunity to implement changes in policies. New policies will have to be put into place to fit our new space and therefore using this as an opportunity to implement some policies regarding paper usage is ideal.

#### 9.2 New Computer and Printer Network

The current office is limited by the existing computer network; it is difficult to implement a new printer network with the existing infrastructure. One of the advantages of moving to a new office space is that we will be getting new printers that have newer technology. The new office will have three new printers that are all capable of printing double sided. Additionally, all employees will be set up with a direct mailbox printing system (as outlined in Section

8.2). These two improvements will help reduce paper waste tremendously. This is an excellent step toward goals of reducing waste.

### **10.0 Plans for Implementation at TRC Nationwide**

While none of these strategies have been implemented in the Millburn office, the hope is that through trial and error a select few strategies will shine as viable options for successful waste paper reduction. If, as 130 employees, Millburn can successfully reduce paper waste, the hope is that these strategies can be implemented at smaller offices in the area. If those offices can successfully implement the proposed strategies, the hope is that offices in other regions can start doing the same.

### **11.0 Conclusions and Recommendations**

This study has yielded several excellent options to get Millburn to reduce paper waste. While there are options having to do with technology, or a variety of government programs, a cultural shift within the office will have to occur before any of these options can be effective. Appendix C is an outline of a communications plan created specifically to aid in the roll-out of this waste reduction campaign. Without a carefully crafted communications plan, people in the office will likely feel forced into participating in an effort that they may already be reluctant to join.

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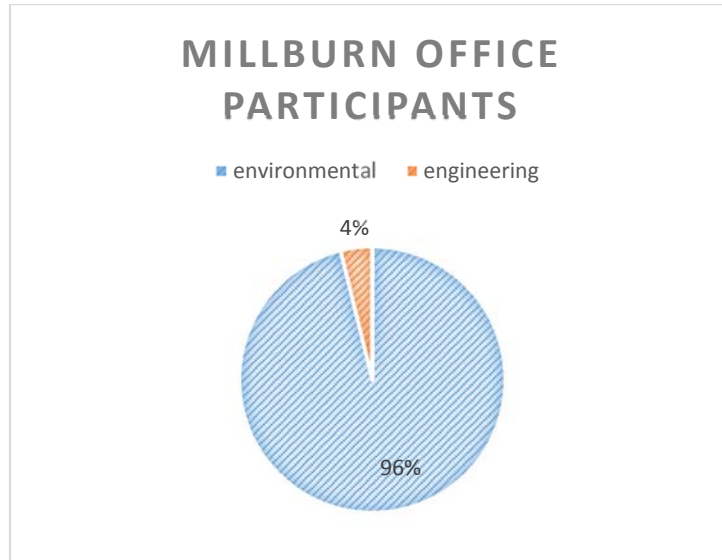
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# Appendix A

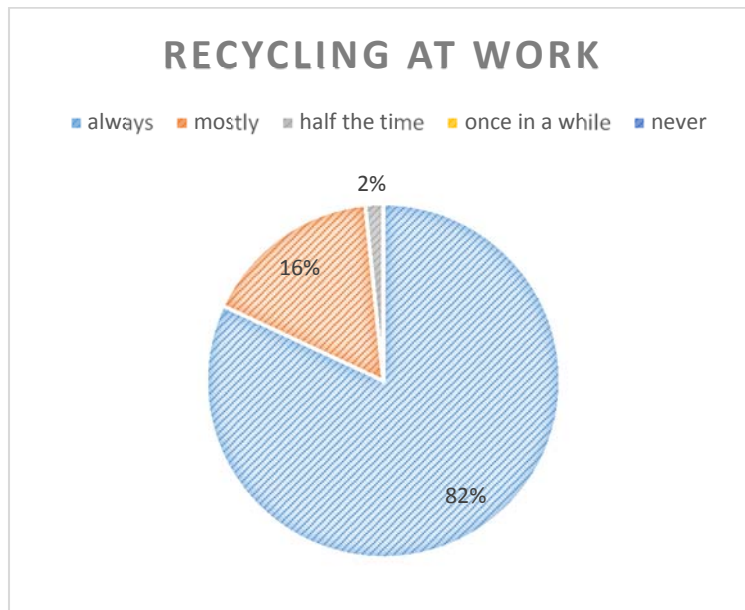
Data represented graphically

## Appendix A Office-Wide Survey Results Presented Graphically

1. In which TRC group do you work?

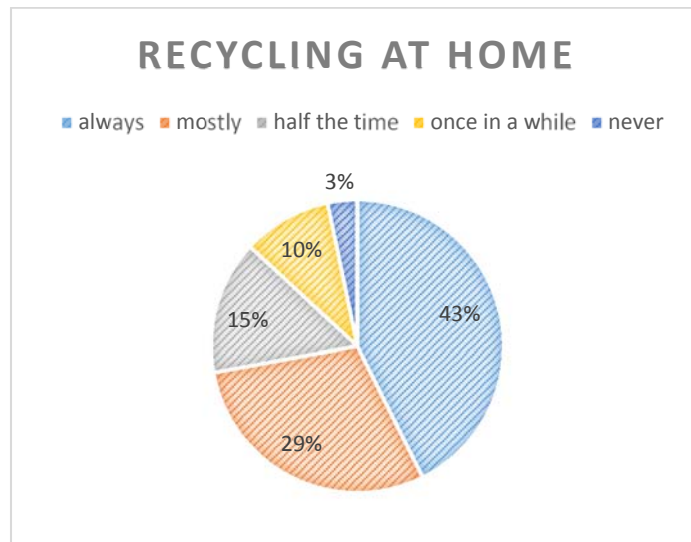


2. Do you recycle paper products at work?

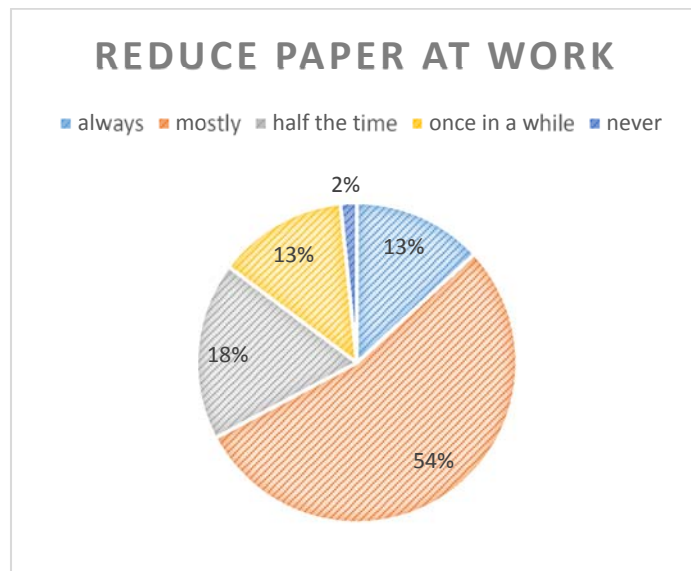


## Appendix A Office-Wide Survey Results Presented Graphically

3. Do you recycle paper products at home?



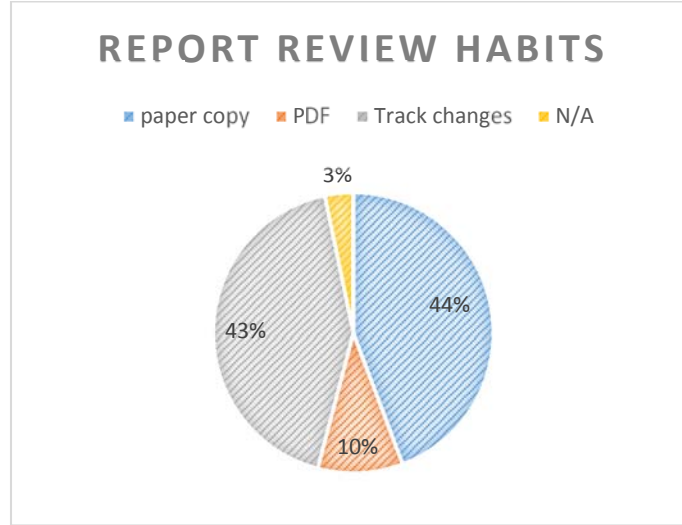
4. Do you make an individual effort to reduce your paper usage at work?



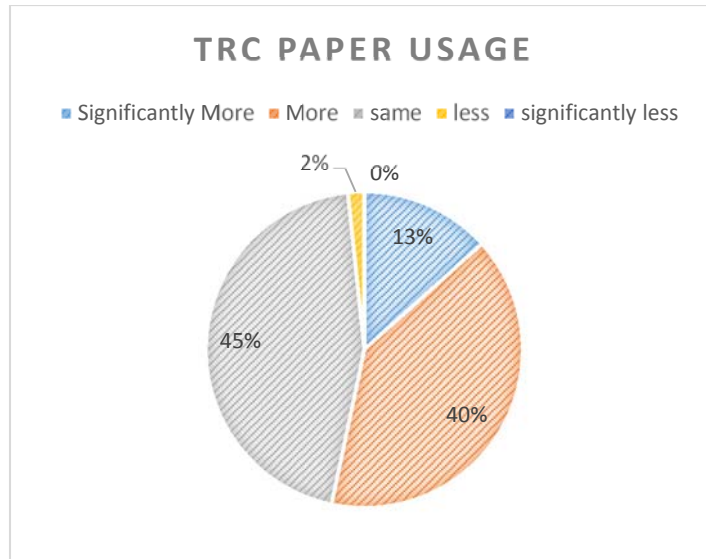


## Appendix A Office-Wide Survey Results Presented Graphically

5. How do you prefer to review/edit reports, tables, and attachments?

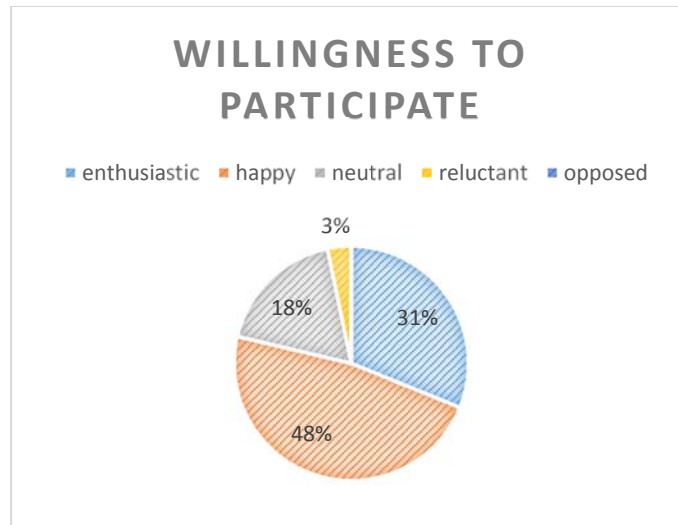


6. In your opinion, TRC uses \_\_\_\_\_ paper than the average office.



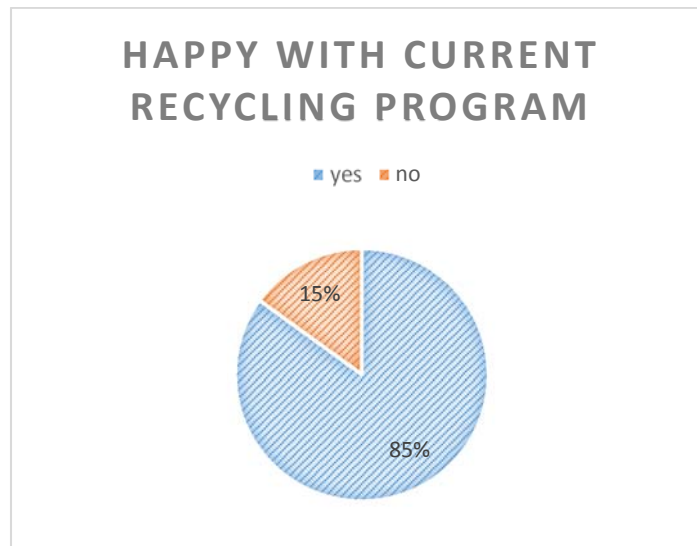
## Appendix A Office-Wide Survey Results Presented Graphically

7. If TRC implemented a paper reduction program I would be \_\_\_\_\_ to participate.



8. What are your thoughts on double sided printing? <open ended>

9. Are you happy with TRC Millburn's current paper recycling program?



10. What are your suggestions to improve TRC's current paper recycling program or reduce our paper usage? <open ended>

# Appendix B

Strategic Plan: Implementation of a  
Green Team at TRC Millburn

## **INTRODUCTION**

TRC Environmental Corporation is a national consulting firm offering our clients guidance in energy, environmental and infrastructure consulting services. Over the last several years, our Millburn, New Jersey office has increased in personnel and workload. Our demand for resources, particularly paper and energy, has grown and few steps have been taken to examine a more sustainable way to do business.

### *Current Situation*

Currently, our office has recycling programs in place for paper, cardboard, bottles and cans; however the sustainability initiative should not end here. Our lighting systems are not energy efficient; we consume a tremendous amount of energy to power all of the computer workstations; the windows in our building are old, poorly insulated and leaky; we have not instituted measures to regulate our water usage; and there is no solid waste reduction plan.

### *Where TRC is Lacking*

Most employees in our office are environmentally minded and comply with the paper recycling program currently in place. There is no means, however, of addressing the issues that go beyond individual behavior, such as the strategy to purchase more sustainable products, or a planning design process for improvements in technology and office infrastructure. While these tasks of purchasing and designing improvements are not imperative to the function of our office, as a publically traded company, we have an obligation to our shareholders to conduct business in the most economically and environmentally sustainable manner possible.

### *How a Strategic Plan Can Help*

I propose to organize a sustainability task force within the Millburn office to examine various methods of reducing our solid waste, paper waste, water usage and energy usage. I am interested in creating this task force because I recognize that there is employee interest in sustainability within the office, however there is no means of organizing these people who share a common interest. The development of a strategic plan is imperative to organize and run this task force. Without a strategic plan, it will be difficult to create structure and organize a sustainability program within the office.

## **VISION, MISSION and VALUES STATEMENT**

**Vision:** The Sustainability Task Force within TRC's Millburn office will serve as a catalyst to help our office conduct business in a sustainable manner. The sustainability Task Force aims to:

- Reduce soil waste
- Reduce energy consumption
- Reduce water usage
- Invest the required time and energy to acquire a list of vendors who can provide our office with sustainably harvested and manufactured products.
- Achieve these goals with the support and involvement of all members of the TRC family.

### **Mission:**

Our mission is to move the employees and administrators at TRC towards conducting business in a sustainable manner while maintaining the excellent caliber of service we provide to our clients.

### **Values:**

Our values define the way our task force will set an example for other employees, and how we will motivate our office to conduct business in a sustainable manner. TRC's sustainability task force expects:

- **Responsibility:** Our members must remember that our primary responsibility is to our fellow employees and our goals cannot be achieved unless we serve them first.
- **Collaboration:** Our members must work together to determine inventive programs and means of organizing our employees to meet our goals.
- **Innovation:** Our members must employ transforming means of motivating employees over time so that the program will continue and flourish.
- **Flexibility:** Our members must be willing to adapt to our ever-changing industry.
- **Sustainability:** Our members must structure the organization in a way that it will continue to flourish and succeed after the founding members have left the organization.

## SWOT ANALYSIS

In order to determine where strengths and weaknesses lie within this campaign, a SWOT analysis was conducted to evaluate strengths, weaknesses, opportunities and threats to rolling out a Green Team at TRC.

### *Strengths*

The advantage of instituting a “green team” and eventually a paperless office at TRC Millburn (TRCM) is that we would be a small pilot program for the rest of the TRC offices. As a pilot program we would have the ability to truly shape the program as we see fit for our office. Due to the small nature of this project, we would also have a small team implementing the plan, therefore the ability to have good communication.

### *Weaknesses*

While our small size can be a communication advantage, it may hinder our ability to delegate tasks and organize. With only a few people working to put the program into place, it will be difficult to organize the tasks required to implement and successful program. We will likely not having adequate staffing and that may prevent us from having clearly defined roles and delegating tasks appropriately.

### *Opportunities*

The “Go Green” movement will certainly be in our favor. Our clients are becoming more environmentally aware and will likely want to do business with a consulting firm that puts into practice what they preach as environmentalists. Additionally, there are many technology options currently available – email, pdfs, document scanners – that will make this push to be greener and go paperless much more feasible than it has been in the past.

### *Threats*

The threat of trying to institute a program like this is that our group runs the risk of alienating some of our coworkers. If people feel like they are being pressured to do something they don’t want to do (review documents electronically, print fewer items), we run the risk of alienating people and losing support for our cause. As stated before, our group of implementers will be small, so we also run the risk of having more work to do than our group can accomplish, especially if we are met with resistance from coworkers.

**Opportunities**  
 1. Go Green Movement  
 2. Technology options

**Threats**  
 1. can alienate ppl in office  
 2. can take more people than we have to organize effort

|   |                                     |  |
|---|-------------------------------------|--|
| <p><b>Strengths</b><br/>         1. Small pilot program<br/>         2. Ability to communicate</p>              | <p><b>Domination Strategies</b></p> | <p><b>Confrontation Strategies</b></p> |
| <p><b>Weaknesses</b><br/>         1. not much organization<br/>         2. don't have clearly defined roles</p> | <p><b>Mitigation Strategies</b></p> | <p><b>Minimization Strategies</b></p>  |

**Description and Analysis of Strategies**

The most promising strategy for each category:

Domination – *Favored Strategy* – the combination of the current technology options plus the fact that we would be a small pilot program set this strategy apart as being the most viable option for use to succeed.

Confrontation – our strengths as a small pilot program with potentially excellent communication ability will be countered by the potential to alienate people in the office and turn them off of the efforts we are making to reduce paper.

Mitigation – Unfortunately the strengths of the go green movement and the available technologies could potentially be countered by the lack of organization and the muddled roles of the small group we have.

Minimization- the aforementioned weaknesses coupled with the threats of alienating people from our movement are the most lethal to the success of our organization.

**Strategy**

I believe the **Domination Strategy** is the most viable option to implement a paper reduction program at TRC Millburn. We have a very good opportunity to ride the coattails of the current “go green” movement that is very prominent in our nation and moving its way through large businesses. Coupled with the tremendous advances in computing abilities, such as electronic document review tools, PDF capabilities, and larger servers to send large documents electronically, our organization stands a good chance of being successful if we capitalize on the positive attributes of the domination strategy.

**Probability**

If we were to employ the domination strategy as a means to launch our paper reduction program, I think the likelihood of our program’s success is very high. With this strategy in place, our opportunities and group strengths meet to intersect at a point where, if our group can appropriately implement this strategy, we will be met with the most success – launching a positive and effective paper reduction campaign.

### **Risk Reduction**

The key to our risk reduction strategy will be ensuring that the program is pitched to coworkers in such a way that people feel they can contribute to something, rather than they are being told to comply with a new policy. If we are able to present our program in such a way, we will have a much greater chance of a successful launch than if we created a new paper reduction policy and told employees to comply. It is difficult to say by how much the probability of rejection could be reduced as we do not yet know the potential or likelihood for rejection.

### **Cost**

The cost will likely not be a monetary cost, rather a time cost. Ensuring that we reduce risk will require additional time, planning and effort on the part of the organizers. We will likely need to employ some strategies from TRC's marketing department as well. The time and effort spent reducing the risk of program rejection by our peers will likely be as significant as the time and effort spent creating the program itself.

### **Implementation**

After exploration of the options, I still believe that the domination strategy is the most appropriate strategy for this program. The weaknesses and threats would be so crippling to the success of this program that it is imperative to focus on strengths and opportunities that are associated with creating a paper-reduction plan for our office.

**COMMUNICATIONS PLAN**

**TRC PAPER WASTE REDUCTION PROGRAM**

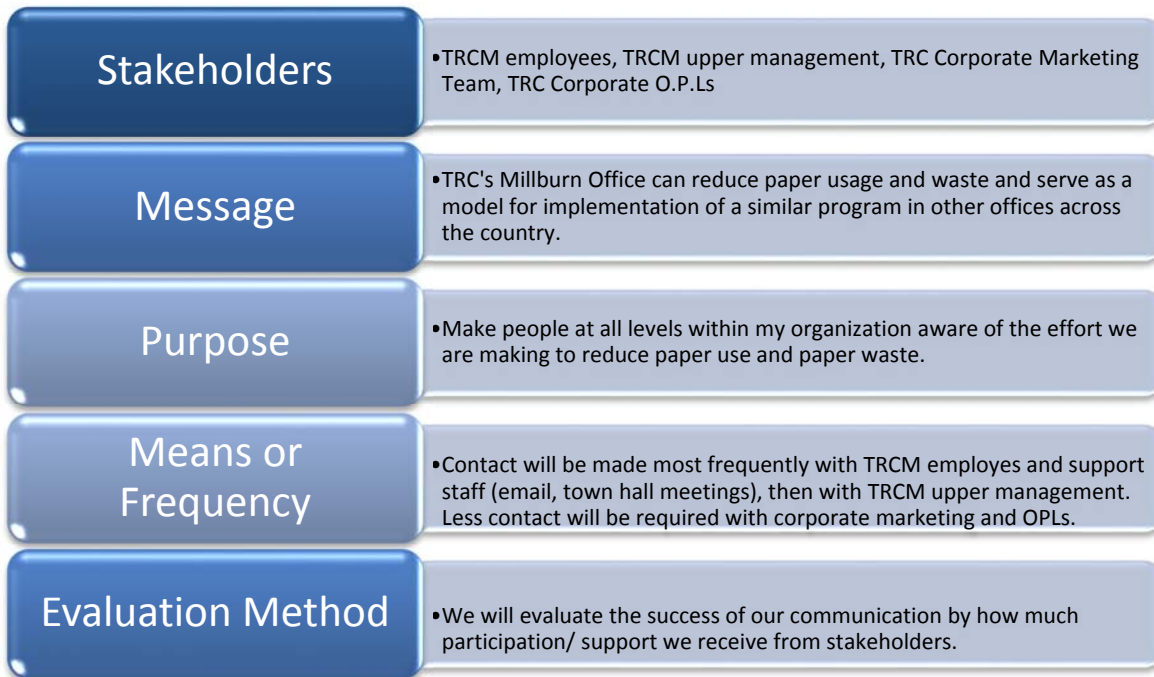
*Stakeholder groups and communication*





## ***TRC MILLBURN PAPER WASTE REDUCTION PROGRAM***

### ***Communications Plan***



**Stakeholders:** TRC Millburn employees (project managers, scientists, administrative staff, cleaning staff); TRC Millburn Upper Office Management (senior managers, project directors) Corporate Marketing Team; TRC Corporate Office Practice Leaders.

**Message:** TRC Millburn can reduce paper waste and serve as a model for similar reductions in other offices. TRC Millburn is currently the largest office not associated with a “headquarters”, ie: Windsor, CT on the east coast and Irvine, CA on the west coast. We are home to over 100 employees housed in two separate buildings. Our office also carries more clients than any other non-headquarters office in the company bringing in over \$7 million dollars in revenue annually. The aim of this program is to show that if our large office can find ways to reduce our paper usage, so can the smaller offices scattered across the US and Europe.

**Purpose:** We would like to make TRC employees at all levels – project directors down to janitorial staff - aware of the office-wide effort to reduce paper usage and waste. If we can start reducing waste in one area – paper usage – hopefully the attitude and feeling of making reductions will spill over into energy usage, and have a greater influence on the products our company purchases from vendors.

**Means/Frequency:** Communication will be made most frequently in the TRC MILLBURN home office with employees and staff. Email is a useful tool, however we would also like to promote the cause during our annual training day to allow employees to see the organizational team’s enthusiasm for the project. Communication will be made with other stakeholders (corporate stakeholders) via email in the form of monthly or quarterly progress reports and occasional conference calls.

**Evaluation Method:** We will evaluate our effectiveness by the number of individuals who offer support or opposition for our cause. Support and opposition will likely be measured by emails or personal conversations.

## **STRUCTURING THE ORGANIZATION**

Key Players:

Steven Taranto- Project Manager. Steven has made efforts to encourage field staff to employ more sustainable working habits such as utilizing iPads to view field forms and figures instead of paper copies.

Rosanne Stolz – Head of the administrative staff. Rosanne places orders for office supplies and works directly with TRC’s vendors.

June Darvalics – Office Manager. June is the channel between our office and other TRC offices as well as our corporate headquarters on the east coast. June has shown passion for waste reduction and an effort to make our office a greener example for all TRC offices.

Kristen Rillen – Associate Project Manager. Kristen oversees soil and ground water cleanups within her team. Her experience with the Duke Environmental Leadership Program has spurred her to find methods of conducting business without using as much paper. Kristen is the driving force behind creating this new organization within TRC.

- How and by whom are decisions made and priorities set?
  - *Steven and Rosanne will bring forth the concerns or statuses of the individuals they represent; Kristen and June will synthesize that information and make decisions on the direction of the program.*
- Who bears the ultimate responsibility for these decisions?
  - *Kristen and June will have the ultimate responsibility regarding the direction and decisions regarding the organization.*
- What are the patterns of communication flow from one on section of the organization to the next?
  - *Communication will take place through emails and phone calls as needed in addition to a monthly status meeting.*
- What role do the organization’s leaders play?
  - *The organization’s leaders are charged with listening to other committee members in addition to fielding requests and suggestions from other staff members.*

### **Appropriate Changes for TRC’s existing organization:**

- *The current organizational structure of TRC is a traditional hierarchy, however there is room for adaptive collaboration. Individuals at the “bottom” of the structure accept instructions from directly above them, however they have open access or access to address issues with colleagues that are higher up the chain.*
- *Because of this flexible hierarchy, I will not have an issue starting my own small organization within TRC Millburn’s*

### **Managing Change:**

The structures and processes needed to put in place to create the change envisioned:

1. *Recruit members for paper reduction committee*
  2. *Have those members start talking about paper reduction methods with staff members to get everyone thinking about ways they can contribute.*
  3. *Present the plan to the entire office*
  4. *Present the plan to Corporate so they know what Millburn is doing to reduce their paper usage. Use this as an opportunity to potentially recruit a “senior sponsor”*
  5. *Meet with stakeholder groups as outlined in the communications plan*
  6. *Continue let stakeholders know there are ways they can be involved to gain support and implement the plan throughout the office*
- Who will you involve in the change planning process and how? These stakeholders can be from within and/or outside of the organization.
    - *Corporate management; senior project managers; junior staff members within the organization.*
  - Which stakeholders do you anticipate being resistant to the changes you have proposed? These may be employees, divisions within the organization, or stakeholders outside of the organization. What actions will you take to decrease their resistance?
    - *Senior project managers will likely be the most difficult to convince. The implementation of this plan hinges on the acceptance of new technology solutions. Some of the senior managers are older and resistant to changes, especially in technology.*
  - What formats will you use to communicate your plans for change and what audiences will each of these target?
    - *Email will be the primary means of communication followed by quarterly status meetings and announcements in a standard open forum format. To target the junior staff, Facebook, Twitter and LinkedIn social media platforms will be used to make announcements and garner support.*
    - *To cater to those who are less technology savvy, a poster will be placed in the kitchen (main gathering space) each month to communicate our progress.*
  - What structures and processes will you put in place to monitor the change process and adapt your plan accordingly?
    - *Social media outlets will be relatively easy to monitor; it will be more difficult to recruit interest in the other forums and maintain interest. The new organization will need to make each change step and then assess how the change was received before moving forward. The implementation of this program is such a drastic change for our office that additional progress cannot happen until we are sure that the majority of the staff are happy with the step that has been implemented.*

### **Evaluating Success or Failure**

In this section you should discuss your plan to manage your new program or organization adaptively – to evaluate performance along the way and adapt according to the results of your evaluation. Start by listing and describing some quantifiable, measurable indicators you will use to evaluate whether various aspects of your plan have been successful, and how, how often and by whom they will be measured. You should also describe the structures and processes you will put in place within the organization to ensure that it will be “adaptive”: able to adjust according to the feedback received in measuring your indicators of success and in monitoring changing risks and opportunities.

| <b><i>Criteria Indicating Success</i></b>   | <b>Method of Quantifying</b>   | <b>Responsible party</b>    |
|---|--|-----------------------------|
| <i>Acceptance by stakeholder group</i>      | Personal interviews  | Shared by committee members |
|   | Constructive Feedback  |                             |
|   | surveys  |                             |
| <i>Participation by stakeholder group</i>   | Monitor recycling bins in each printer area  | Shared by committee members |
| <i>Reductions in paper recycled</i>         | Records from recycling service   | Kristen                     |
| <i>Reductions in paper purchased</i>        | Monthly records from purchasing department   | June                        |
| <i>Adoption by other offices within TRC</i> | Presenting results of our pilot program to Corporate and getting feedback from sustainability division | Kristen and June            |

As the project continues, there will be additional criteria that are realized and will likely be added to this table.

# Appendix C

## Communications Plan

## **Background**

The average American uses more than 748 pounds of paper per year (American Forest and Paper Association). Employees at TRC use more paper than the average American, therefore TRC employees are the source of a tremendous amount of paper usage and waste. While reducing our paper waste is not imperative to the function of our office, as a publically traded company, we have an obligation to our shareholders to conduct business in the most economically and environmentally sustainable manner possible. Through an effective communications plan, I hope to alert people of their paper usage, and encourage them to employ other methods of report review and production in order to reduce the amount of paper they are using to complete daily tasks.

## **Goals**

As an individual or with a small team of dedicated individuals, I would like to implement a plan to help TRC Millburn reduce our paper waste. The hope is that once individuals in the office start changing habits and thinking about the paper they are using, their revised behaviors will spill into other areas such as energy savings, water usage and the purchase of more sustainable products for the office.

## **Key Messages and Themes**

1. Message: Our office wastes a lot of paper
2. Message: Our office can very easily reduce the amount of paper we use
3. Message: We can do this without interrupting the flow of work
4. Theme: Implementing a paper waste reduction program will save the company money and streamline the reporting process.

## **Stakeholder Analysis**

### ***Target Audience: TRC Millburn Office Employees***

- Senior Staff
- Project Managers
- Project Scientists
- Administrative Staff

### ***Opportunities to convey message***

- Email - standard office-wide emails letting people know my cause and how they can be a part of it.
- Presentation at Training Day - 15 minute presentation at annual training day. Seminar is split between project management staff and junior staff, so would require 2 separate presentations.
- Small presentations throughout each quarter - not something usually done in our office, but short 15 - 20 minute status update meetings will let people know how the project is progressing.

### ***Methods of communication with each target audience***

- Senior Staff
  - Senior staff members in the office are most concerned with budgetary issues and efficiency. My message to these individuals will need to be focused on how much money will be saved if our office cuts our paper consumption and how much time will be saved if employees are not making copies and walking all over the office to various printers.
- Project Managers
  - Project managers are most concerned with the ability to manage their projects effectively and maintain their project budgets. My communications plan to this group will be focused on the ability to review reports electronically and make comments using track changes. Additionally, reviewing figures electronically and making comments using PDF drawing tools.
- Project Scientists
  - This group does a lot of report writing, field work and data management. Since our office recently purchased two iPads for pilot use in the field, my communications plan with this group will be to emphasize the ease of using an iPad (or other tablet computer) instead of printing lengthy workplans, oversized figures, and then having to keep track of all those documents in the field.
- Administrative Staff
  - This paper reduction plan really starts with this group of people. The admin staff does all the ordering for the office (including paper!) and communicates with the various vendors that pick up our recycling and garbage. My communications plan for this group will focus on the importance of their support in this venture and making them realize that their function in the office is incredibly influential.

### **5. Communications Strategies**

Social media plays a large part in inter-office communications at TRC. Social media outlets such as Twitter, LinkedIn, Instagram and our own TRCNet provide employees with access to new information that is updated daily.

- *The overall message you hope to communicate.*
  - I hope to communicate the importance of reducing our paper usage and simultaneously communicate the idea that paper slows down the reporting process.
  - I think that people, especially in the environmental consulting field, are becoming more sensitive to many of the environmental issues we face. If i can convey the importance of the large role we have played in contributing the environmental issues, I hope to also convey the large part we can play in remedying those problems.
  - I hope to cloak the scary idea of moving towards paperless processes in the excitement of increased efficiency.
- *An explanation for why social media will be used (what do you hope to gain? Why do you think this is an important part of your overall plan?)*

- I'm not sure how helpful social media will be, as our company is relatively new to the world of social media and we have a lot of "old school" employees that would prefer not to use those outlets. I believe, however, that the younger staff will be very receptive to the initiatives announced via social media: they will presumably be the ones who are also most receptive to the idea of moving away from paper and to ward electronic methods. I believe that by reaching this particular group, they can set an example for the hesitant employees and also help the hesitant employees gain interest in the paper-reduction plan.
- Social media is a perfect means of communicating the messages about paper reduction, because it is a platform for announcements NOT using paper. Many people print flyers and hang them on the refrigerator or on the bulletin board. Posting a message or creating infographics on paper usage to facebook or twitter serves the same purpose, however also sets a great example of communication without the use of paper.
- Social Media Campaign Action Plan
  - Assuming an 8-week social media campaign is conducted, I believe the following schedule will provide adequate information without bombardment.
    - Weeks 1-4: daily updates via Instagram and twitter; weekly updates via email; weekly updates via TRCNet.
    - Weeks 4-6: Instagram and twitter updates every other day; weekly updates via email; weekly updates via TRCNet
    - Weeks 8-6: resume daily updates via Instagram and twitter with special emphasis on how close we are to implementing our plan.
- Office Chatter Action Plan
- Office Workshops Action Plan

## **7. Assessment and Evaluation**

A strategy for assessing the impact of this communication

- This will be the most difficult phase of the communication plan. It is undetermined how well-received the social media aspect of the communication plan will be. The target audience contains a wide variety of individuals of all ages and all technological abilities: it will be difficult to determine who is receiving information via this outlet and who is not.
- By creating a group using some of the social media platforms, it is possible to see how many users have viewed a post: that will likely be the most effective means of evaluating how many users we are reaching.