

# **SUSTAINABILITY OF UBC'S ON-SITE RECORDS STORAGE FACILITY**

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Report prepared at the request of the University of British Columbia Records Management in partial fulfillment of UBC GEOG 419: Research in Environmental Geography, for Dr. David Brownstein.

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## **1. EXECUTIVE SUMMARY:**

The University of British Columbia currently uses a number of commercial providers for off campus paper records storage. However due to time, financial and environmental inefficiencies the University Archives has commenced in incorporating an on-site repository, in hopes of fostering better records management. The on-site facility located at the Preservation and Archives Library (PARC) on the south side of the UBC campus is sought to also have the advantage of being environmentally and economically more sustainable. In this report, a detailed investigation and comparison is conducted with the interest of justifying how the shift to an on-site facility is advantageous compared to current services. A special focus is placed on three core elements: transportation, centralized shredding and recycling and storage space effectiveness, as well as on components that can further the sustainability of the anticipated facility.

Based on the literature I have encountered, interviews conducted and recommendations presented, I am now able to validate that an on-site facility can indeed be environmentally and subsequently economically advantageous. A 70.7 per cent annual decrease in carbon dioxide equivalent emissions can be obtained by switching to an on-site facility, using medium-sized vans and installing centralized shredding. Placing retentions periods, removing fees related to disposition, understanding and incorporating better management of paper and electronic records, enables PARC Library to optimize storage space and decrease costs and emissions. An additional 59 per cent decrease can potentially be attained by integrating hybrid-electric vehicles instead of petro-engine vehicles and using the on campus Material Recycling Facility depot as opposed to relying on off site services.

## 2. INTRODUCTION:

Through working with UBC's Records Manager, Mr. Alan Doyle, I learned that the off-site storage services provided by a number of commercial providers are no longer environmentally or financially sustainable to UBC. They are time inefficient, distances are very long and costly, and the storage and shredding of confidential documents has shown to be uneconomical. As a result, the University's Record Manager had begun researching the efficiencies associated with an on-site repository. The university's library website mentions that the PARC Library is accessible, sustainable and collaborative. Stating "this on-campus facility supports *sustainability* by using local delivery systems to reduce carbon emissions. Being on campus creates less travel distance for deliveries of materials and eliminates warehouse rental costs for current storage needs".<sup>1</sup> However no justifiable evidence has been produced to prove the potential environmental benefits. On the other hand, it is mentioned on the University's Library webpage that a high-density storage facility of this kind is a proven, economical means of housing research collections for the long term. Around forty such facilities currently exist at universities across North America due to the financial cutbacks. Accordingly, this report intends to focus on the environmental-sustainability aspect of the new location, through incorporating green transformations.

## 3. METHODS:

A literature review was conducted; mainly of academic literature including multiple books, peer-reviewed material and former student reports written in association with University of British Columbia's Social Ecological Economic Development Studies (SEEDS). As well as non-academic sources such as company websites, interviews, online maps and my meeting with the Records Manager. In reviewing literature, much focus was placed on information emphasizing the drawbacks and benefits of different storage locations in relation to three core elements. Besides simply gaining insight on what is

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<sup>1</sup> "Library changes: Integrated Research Library/ Library PARC".

currently offered and established, academic literature facilitated my understanding and knowledge of new and innovative practices in hopes of achieving optimal storage service sustainability. Online websites helped me to acquire an overview of current practices and locations, consequently allowing me to generate reliable quantitative statistics to justify my argument. Furthermore, the interview conducted with the Inventory and Fleet Manager at UBC Building Operations is of extreme benefit as I became familiar with the possible sustainable transportation options.

#### **4. BRIEF OVERVIEW OF RESULTS:**

Records management is the systematic control of records throughout their life cycle.<sup>2</sup> Records Storage is a space in a facility devoted to the storage of documents, files and boxes. The numerous off campus commercial providers have made it difficult to manage and store records in an efficient manner due to constraints such as distance, time and money. For that reason the Records Manager suggests incorporating an on-site facility. Besides economic cutbacks the new facility is able to drastically decrease carbon dioxide equivalent emissions by considering three main improvements. Firstly, *transportation*, a 91 per cent decrease in carbon dioxide emission will be made possible and potentially 100 per cent decrease can be incorporated. As for *centralized shredding and recycling*, with proper facilitation and management of the shredding and more importantly the recycling process emissions can decrease by 91 per cent. Thirdly, by discarding current unsustainable habits the facility can optimize *storage space effectiveness*.

It is also important to mention that the storage services component will be part of the main PARC Library and so my report does not incorporate research regarding the physical structures of the storage facilities. Moreover, since the library is being built on university property there is no cost of real estate, making its construction extremely feasible.<sup>3</sup>

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<sup>2</sup> Ashley, Lori J., Robert F. Williams, and ARMA International (2009)

<sup>3</sup> As mentioned by Alan Doyle- UBC's Records Manager

## 5. RESULTS AND RECOMMENDATIONS:

### 5.1. TRANSPORTATION:

The major commercial provider used at the moment by UBC is located in Port Coquitlam<sup>4</sup>. These commercial records storages provide an information management service that helps UBC store and transport its confidential documents. Based on an earlier SEEDS research paper, the average distance obtained by mapping the driving route on both Google Maps and MapQuest from one of the records storage to UBC is estimated to be 35.31km or 70.2km roundtrip.<sup>5</sup> By using similar calculation methods, PARC Library has an approximate maximum distance from anywhere around campus of 5.1km or 10.2km roundtrip. The following couple of pages will guide you through the figures of the table below.

<b>Table 1:</b> Transportation Statistics:				
Location	Commercial records storage	Library PARC	Library PARC (Hybrid-Electric Vehicles- HEV)	Library PARC (Electric Vehicles- EV)
Distance round trip (km)	70.2	10.2	10.2	10.2
Vehicle type	<b>Cargo-Van</b>	<b>Medium-sized van</b>	<b>Diesel-electric hybrid HEV (medium-sized)</b>	<b>Nissan's e-nv200-100% EV</b>
Vehicle fuel efficiency <sup>6</sup> (km/L)	6.59	8.2	9.4	
Number of trips per year <sup>7</sup>	65	65	65	65
Emission factor (kg CO2 eq./L) <sup>8</sup>	2.443	2.443	2.03	
Emission (kg CO2 eq./trip)	26.02	3.04	2.02	
Emission per year	<b>1691.3</b>	<b>197.52</b>	<b>143.2</b>	<b>0</b>
		<i>8.5 times less emissions</i>	<i>1.3 times less emissions</i>	<i>Emission-free</i>

<sup>4</sup> The names of the commercial records storages will be kept anonymized.

<sup>5</sup> Jackson, Claire, Niloufar Shirazi, and Sana Raad. (2009)

<sup>6</sup> CSA Standards (2009)

<sup>7</sup> As mentioned by Alan Doyle

<sup>8</sup> Chefurka, P (2014)

*Appendix 1* helps in visualizing the reduction in distances travelled. Where as, table 1 depicts the predicted decreases of the annual kilograms of carbon dioxide equivalent emissions accompanying the shift to PARC Library and opting for smaller and more fuel-efficient vehicles. The term ‘equivalent (eq.)’ is used to express greenhouse gas emissions that also include methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and other gases but to a much lesser extent. The emissions per year is calculated by dividing an emission factor by vehicle fuel efficiency and then multiplying it by distance per trip and finally by the number of trips per year, as shown below.<sup>9</sup>

$$\text{CO2 eq. emissions (kg CO2 eq.)} = \left[ \frac{\text{Emission factor (kg CO2 eq./L)}}{\text{vehicle fuel efficiency (km/L)}} \right] \times \text{distance (km)} \times \text{number of trips per year}$$

With the relocation to the Nurseries Rd. location and by opting for a more fuel-efficient medium-sized van, an 8.5 fold decrease in emissions can be acquired. Based on information gathered during an interview with Adam McCluskey,<sup>10</sup> the Inventory and Fleet Manager at UBC Building Operations, PARC Library Management can potentially incorporate medium-sized diesel-electric hybrid vans (HEV) that are evaluated to release 25 per cent less greenhouse gas emissions than the same size petro-engine vehicles, as observed in *appendix 2*. Going beyond HEV technology, “Nissan’s second mass-produced all electric vehicle is scheduled to launch in fiscal 2014”.<sup>11</sup> As indicated in the table the e-nv200 model is a 100 per cent electric commercial medium-sized van and produces zero percent emissions. “The e-NV will potentially change the make up of my fleet, as its efficiency is difficult to ignore”, stated Mr. McCluskey. He is hoping to introduce this vehicle to the UBC Building Operations by 2015 and he highly recommends that PARC Library becomes associated with its use, as he is keen on decreasing CO<sub>2</sub> eq. emission across campus.

<sup>9</sup> McKinnon, Alan and Piecyk, Maja (2011)

<sup>10</sup> McCluskey, Adam (2014)

<sup>11</sup> Nissan Motor Cooperation (2014)

Fleet rightsizing is a management practice used by fleet managers to maintain and build sustainable, fuel-efficient fleets. Due to the fact that 90 per cent of the fleet is available between 3:30pm and 9:30 pm daily,<sup>12</sup> PARC library can choose to rent out the vehicles. The rental cost will be a small percentage of the Building Operation's maintenance and vehicle insurance costs. But the percentage differs depending on vehicle utilization and drivers' behavior, which will be tracked using the GPS systems installed in vehicles.

## **5.2. CENTRALIZED SHREDDING AND RECYLING:**

Centralized shredding is the process of incorporating the practice of shredding confidential material on an on-site facility, as opposed to relying on an off-site information destruction service. At present, certain commercial shredding companies<sup>13</sup>, offer secure information destruction services, collect documents from the off-site records storage facilities, then drive to UBC to pick up additional confidential material and finally makes the trip back to the depot, located in Coquitlam, for shredding and recycling.<sup>14</sup> This journey is repeated once a week, making the process highly unsustainable. Centralizing shredding in the PARC Library enables the records management to eliminate half of the trips. Yet, the anticipated venture still requires a trip to a commercial shredding company's recycling depot once every 2 weeks, as shown in *Appendix 3*. Table 2 below illustrates the foreseen two-fold decrease in CO2 eq. emission mainly due to a decrease in the number of trips rather than reduced distances. It is important to note that some commercial shredding companies have already started piloting smaller, more fuel-efficient trucks. As stated on one of the affiliated shredding companies' webpage, "A new, fuel-efficient mid-size truck, fitted with auto-down technology will emit 55 per cent fewer metric tons of CO2".\*<sup>15</sup>

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<sup>12</sup> McCluskey, Adam

<sup>13</sup> The names of the commercial records storages will be kept anonymized.

<sup>14</sup> As mentioned by Alan Doyle

<sup>15</sup> \*A commercial shredding company, that will remain unnamed (2014)



However as illustrated in *Appendix 4*, emissions can be further minimized to reach approximately 55 kg CO<sub>2</sub> eq. per year by eliminating the all off-site commercial shredding services. The Material Recycling Facility at UBC is located in very close proximity to the PARC Library, as separated by the red line in *Appendix 5*. Since the library intends on integrating centralized shredding, it would be extremely advantageous to transport shredded documents to the MRF depot for recycling. Also due to the fact that the paper is shredded, it is no longer considered confidential material and thus safety concerns can be dismissed and documents can be sent to MRF. Accordingly a 91 percent decrease in emissions can be attained while also making the processes of recycling more practical, time efficient and less costly.

<b>Table 2: Total distance travelled (pick-ups, shredding and recycling)</b>					
	From	To	Distance travelled (km/trip) <sup>16</sup>	km/yr	Annual emissions kg CO <sub>2</sub> eq. / yr.
<b>Off-site shredding (1 trip/ week)</b>					
	Shredding company	Records storage	11.2		
	Records storage	UBC pick-up	35.1		
	UBC	Shredding company	34.5		
			<b>80.8</b>	4201.6	1251.7
<b>On-site shredding (1 trip/ 2 weeks)</b>					
	Around campus pick-ups (HEV)	PARC library for shredding	8.5		
	Shredding company	UBC pick-up	34.5		
	UBC	Shredding company	34.5		
			<b>77.5</b>	2015	600
<b>On-site shredding and recycling (1trip/ 2 weeks)</b>					
	Around campus	PARC library for shredding	8.5		
	PARC Library	MRF depot	1		
			<b>9.5</b>	251.75	54.4

### **5.3. STORAGE SPACE EFFECTIVENESS:**

A crucial mistake would be to implement the current environmentally and economically unsustainable storage habits. Commercial record storage centers do not have set retention periods and often store boxes and documents much longer than necessary due to lack of involvement with UBC's Records Management. This has resulted in more than 2,500 boxes that should have been destroyed to still sit off-site, taking up money, energy and space.<sup>17</sup>

Secondly, the off-site storage services charge very high fees related to disposition of documents and boxes. For example, the commercial records storages either charge the Records Managers seven dollars per box to be destroyed on their site or the companies send it back to UBC records management at a rate of nine dollars per box, requiring an additional 70 km of travel distance. Needless to say, this procedure is extremely unsustainable, in both the economical and environmental sense. Thirdly, again due to lack of proper communication with UBC, many files and documents are stored in both electronic and paper form, generating unnecessary redundancy. This has lead to storage space inefficiencies, as many E-records are also stored as paper documents and vice versa. Again this is due to the lack of sufficient research with regards to optimizing storage space and the lack of involvement with UBC, mainly because of distance and time constraints.

Accordingly, PARC Library in collaboration with the Records Manager will better facilitate and plan the new storage space located on campus. The main advantage of the new service is its location, making it extremely accessible and thus much easier to manage. Based on the drawbacks above, the UBC facility should require retention periods, by assigning a precise period of time a document should be kept or retained both electronically and in paper format and include a termination period of when the documents must be disposed of. By incorporating retention periods the site will be able to ensure the destruction of unnecessary documents. The second improvement requires

UBC to eliminate any fees related to the disposition of documents, making it feasible and thus encouraging a quick disposal of expired documents.

Furthermore, it is imperative to recognize the impact of choosing to either store documents in electronic or paper form. During our meeting, Mr. Alan Doyle mentioned that records can often be stored electronically, particularly if they have a retention period of less than three years. He deduced this information from a recent report conducted on “The Long Term Sustainability of Paper and Electronic Records”.<sup>18</sup> The paper argues that records that need to be stored for less than three years or those that need to be accessed frequently should be stored in electronic form, while the rest should be sorted as paper. By incorporating proper management of E-records the on-site facility is able to optimize storage space and decrease carbon emissions. However, it was proven that E-records are not a sustainable option for long-term records or ones that are accessed infrequently, thus a complete electronic shift would not be a beneficial approach.

## **6. CONCLUSION AND FURTHER RESEARCH:**

With the aid of academic and non-academic literature supported by the qualitative and quantitative analysis I have produced, I am now able to positively justify that the process of opting for an on-site records storage facility on the south-side of campus is a more economically and environmentally sustainable decision. The switch to an on-site facility, using medium-sized vans and installing centralized shredding enables UBC Records Management to decrease carbon dioxide equivalent emissions by 70.7 per cent annually. Placing retention periods, removing fees related to disposition, understanding and incorporating more proper management of paper and electronic records, enables the PARC Library to optimize storage space and decrease costs and emissions. Furthermore, by deciding to integrate HEVs instead of petro-engine vehicles and using the MRF depot as opposed to other commercial shredding companies' services, records management can attain an additional 59.2 per cent decrease in emissions.

Due to time constraints I was not able to create quantitative data for the storage space effectiveness, as it would have taken a great deal of effort to generate statistics regarding all the different aspects that accompany storage spaces. Therefore, if further research were constructed it should encompass numerical data and emission cutbacks of the new storage space. In addition, further research ought to focus on coordinating a process of integrating the Material Recycling Facility with the Preservation and Archives Library. For the reason that, choosing to adopt on campus recycling will without a doubt drastically decrease economic costs and environmental impacts.

## 7. BIBLIOGRAPHY:

Ashley, Lori J., Robert F. Williams, and ARMA International. "Electronic Records Management Survey". Survey. Chicago: Cohasset Associates. 2009.

Cakal, Sumeyye. "UBC Social Ecological Development Studies Student Report: The Long-Term Sustainability of Paper and Electronic Records." April 2013. Print

Chau, Randy. "Determining the sustainability of current electronic information storage techniques." UBC Social Ecological Economic Development Studies (SEEDS) Student Report (2012). Print.

Chefurka, P. "How Much CO2 Do Electric Cars Produce?" 2007. Retrieved 2014, from <<http://www.paulchefurka.ca/Electric%20Cars%20and%20CO2.html>>

CSA Standards. "Climate Change & GHG Registries". Version 6.0. 155 Queen St., Ottawa, Ontario. October 2009. Retrieved from <[http://www.csaregistries.ca/assets/pdf/Challenge\\_Guide\\_E.pdf](http://www.csaregistries.ca/assets/pdf/Challenge_Guide_E.pdf)>

Elvis, Daniel. "Advocating electronic records: archival and records management promotion of new approached to long-term digital preservation". University of Manitoba, Mnitoba, Canada, ProQuest, UMI Dissertations Publishing, 2012.

European Commission: Research Area: Transport. "European Green Cars Initiatives: towards an electric future?" Luxembourg: Publications Office of the European Union. 2010. Print

Jackson, Claire, Niloufar Shirazi, and Sana Raad. "Green House Gas Emissions Associated with UBC Supply Management's Use of the Iron Mountain Storage Facility". UBC Social Ecological Economic Development Studies (SEEDS) Student Report. April 15, 2009. Print

“Library changes: Integrated Research Library/ Library PARC”. The University of British Columbia. 2014. <<http://about.library.ubc.ca/changes/bc-integrated-research-library-bc-irl/>>

McCluskey, Adam. "Inventory and Fleet Manager at UBC Building Operations." Personal interview. 17 Mar. 2014.

McKinnon, Alan and Piecyk, Maja. “Measuring and Managing CO2 Emissions: of European Chemical Transport.” Logistics Research Center, Herriot-Watt University, Edinburgh, U.K. Prepared for cefic. 2012. Web.  
<<http://www.cefic.org/Documents/IndustrySupport/Transport-and-Logistics/Sustainable%20Logistics/McKinnon%20Report%20Transport%20GHG%20emissions%2024.01.11.pdf>>

Nissan Motor Cooperation. “Environmental Activities: EVs: e-NV200, the 100% electronic commercial vehicle”. 2014. <[http://www.nissan-global.com/EN/ENVIRONMENT/CAR/FUEL\\_BATTERY/DEVELOPMENT/EV/](http://www.nissan-global.com/EN/ENVIRONMENT/CAR/FUEL_BATTERY/DEVELOPMENT/EV/)>

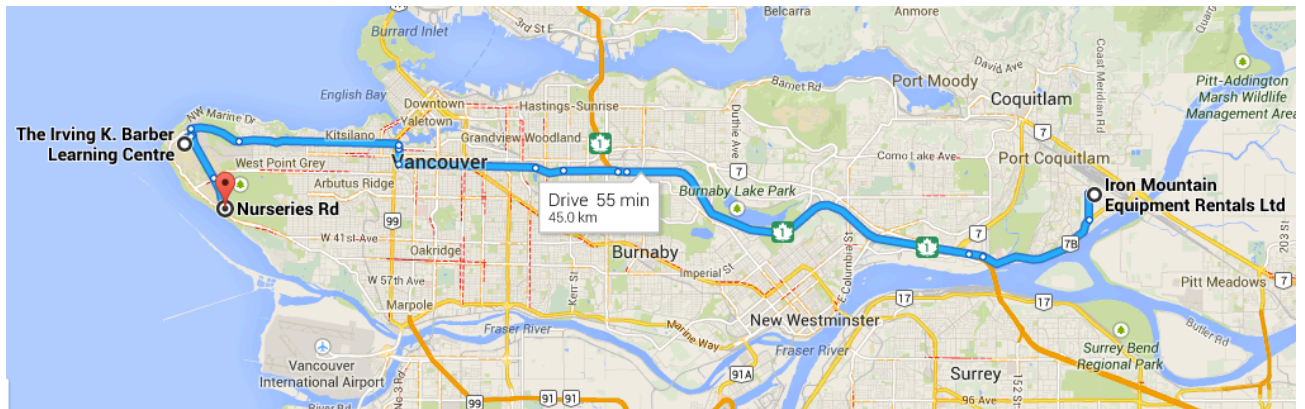
“Tetra Pak maximizes recycling of UBC to reduce greenhouse gases”. Business Recorder. November 2011. Print

Welch, Kristina. “Assessing the Business Case for Data Center Relocations”. ISIS Sauder School of Business, University of British Columbia. Spring 2011. Web.  
<[http://www.sauder.ubc.ca/Faculty/Research\\_Centres/ISIS/Resources/~/\\_media/459465DFAB1241EE8062560F159C5D93.ashx](http://www.sauder.ubc.ca/Faculty/Research_Centres/ISIS/Resources/~/_media/459465DFAB1241EE8062560F159C5D93.ashx)>

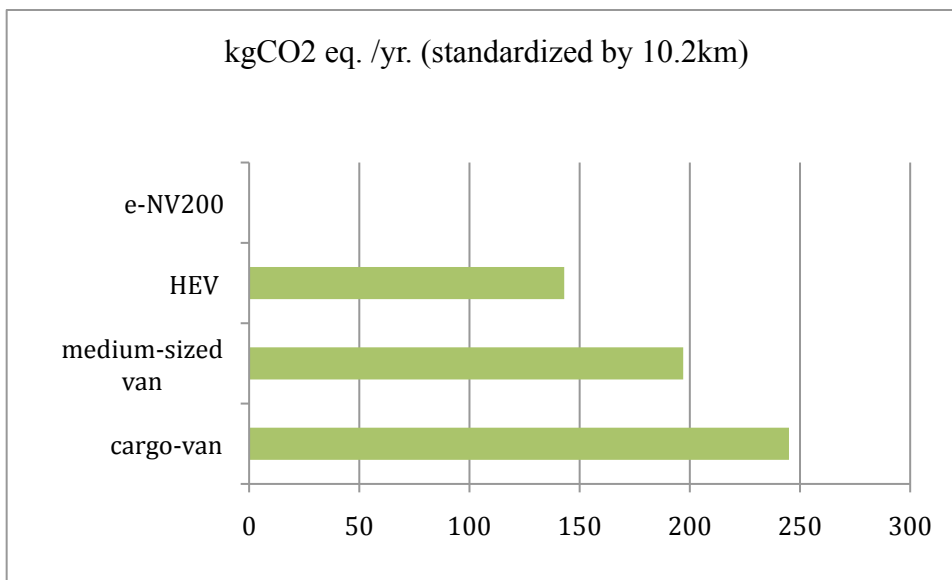
University Archives. Records Management Manual. Sept. 2007. Manual. Web.  
<[http://www.library.ubc.ca/archives/manuals/rm\\_manual.pdf](http://www.library.ubc.ca/archives/manuals/rm_manual.pdf)>.

## 8. APPENDIX:

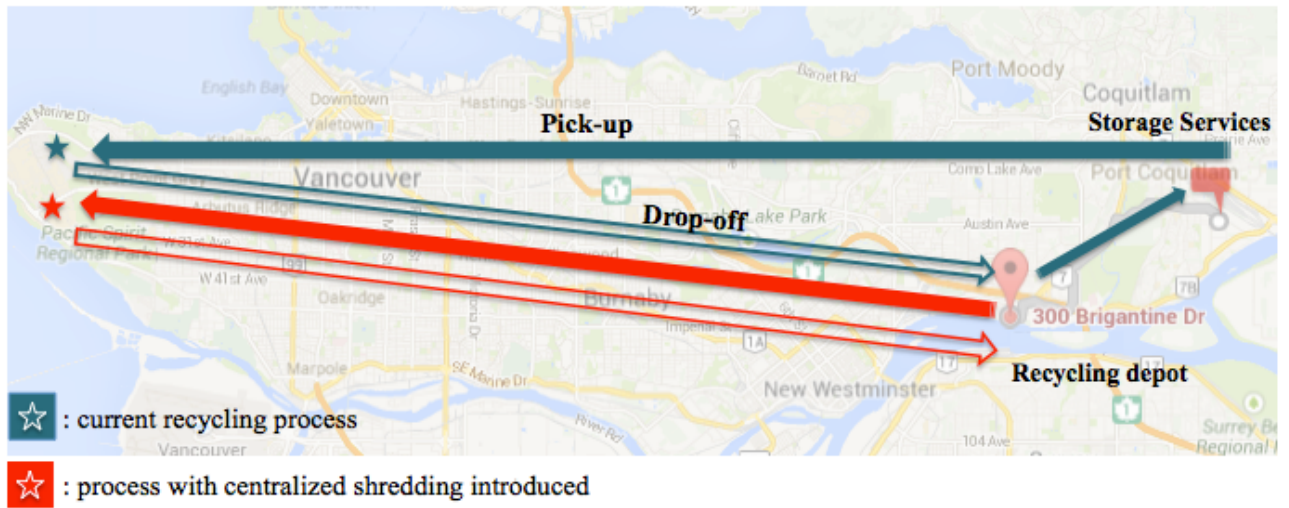
Appendix 1: *Distance Cutbacks, obtained from Google Maps*



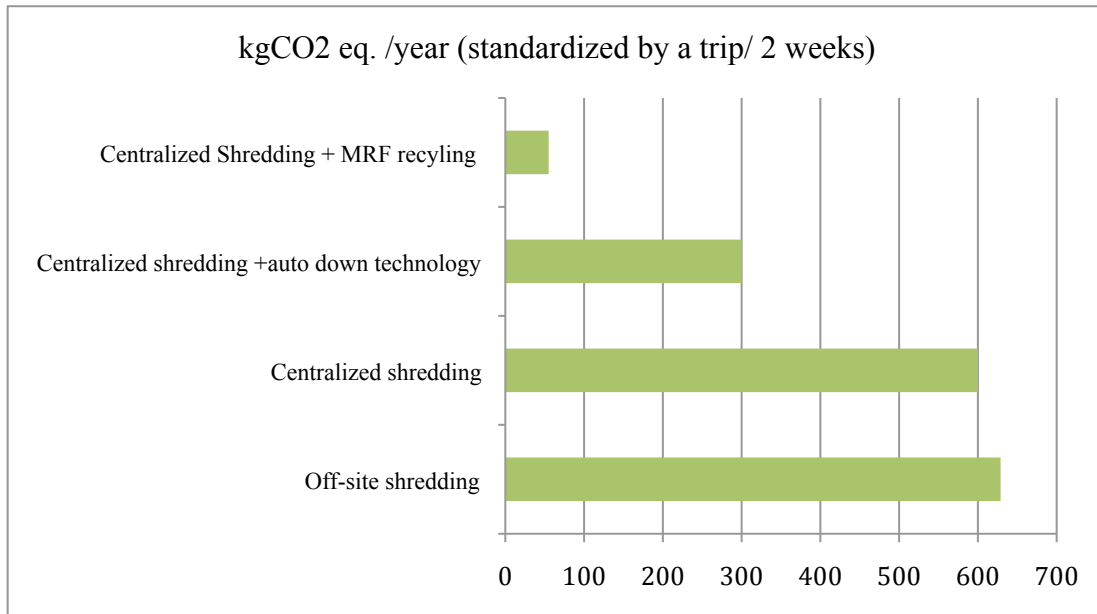
Appendix 2: *Decrease in Carbon Dioxide Emissions per year*



Appendix 3: *The Anticipated shredding and recycling process, obtained from Google Maps*



Appendix 4: *Decrease in Carbon Dioxide Emissions per year*





Appendix 5: *Depicts the extreme proximity of PARC to MRF*; the area beyond the red line to the left is the recycling dept and to the right of the red line is the Library construction site.

