UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

AMS Sustainable Club Practices

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APSC 461

Themes: Buildings, Energy, Waste

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AMS Sustainable Club Practices

Final Report

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MEMORANDUM

TO: Dr. Paul Winkelman, APSC 461 Instructor

CC: Michael Kingsmill (AMS Architect), Chris Hakim (VP Administration)

FROM: Ali Wagih, Steve Sun, Wemi Ade, Ziad Khalifa, Yanli Wang

DATE: June 25, 2018

SUBJECT: Final Report: AMS Sustainable Club Practices

The AMS Club Sustainable Practices project is aimed at promoting environmental, social, and economic sustainability within the UBC community. This will be done by assessing the baseline operations of select clubs that will be moving into the UBC Life Building and identifying areas of improvement to mitigate and minimize waste, energy and water use, and improve sustainability. The scope of this project also includes identifying best where waste disposal bins could be located in the Life Building to service these clubs and other users.

Data was collected through conducting semi-structured focus group interviews and site visits with the UBC Pottery Club and the UBC Photographic Society (PhotoSoc) and consequently, a list of recommendations was developed.

Enclosure.
Abstract
AMS Sustainable Club Practices Final Report
Appendices

Executive Summary

The purpose of the Alma Matar Society (AMS) Club Operations project, in a general sense, is to reduce the ecological footprint of the campus. This is achieved by assessing the equipment and operations of two AMS clubs that are moving to the University of British Columbia (UBC) Life building/Old Sub, in the context of sustainability and waste disposal. These objectives are aligned with UBC sustainability goals and reference the Student Driven Sustainability Strategy (SDSS). The project seeks to identify the club practices and assess for possible areas of improvement, as well as identifying waste disposal bins' locations. The main data collection methods used are hosting focus group interviews and conducting site visits. Ultimately, a comprehensive list of recommendations is presented at the end of the report based on the results of the investigation. The recommendations presented help indicate to the AMS where it should devote its limited money and time and are considered applicable to the other clubs that will be moving.

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1.0 Introduction

The University of British Columbia is a global center for research and teaching, regularly ranked among the 40 best universities in the world. Founded in 1915, UBC has always encouraged innovation, especially in sustainability. The 20 year old Sustainability Strategy developed by the Vancouver Campus, outlines a collaborative process involving students, staff and faculty, through providing a long-term framework for the integration of sustainability across teaching, learning and research, operations and infrastructure, and community. This strategic plan is developed to put UBC at the global frontier of sustainability and well-being across all campuses and communities. Currently, numerous sustainability plans and sponsored initiatives have been put in place by UBC to facilitate the eventual transition of the UBC campus to a fully green campus or as green as it can possibly be. UBC has committed to brave greenhouse gas emission reduction targets - 33% by 2015, 67% by 2020, and 100% by 2050; of said goal, UBC has achieved a 34 reduction in greenhouse gas emissions from a 2007 starting point (UBC, n.d). Some of the major projects that made this possible are the conversion of the Academic District Energy System from steam to hot water, building the Bioenergy Research and Demonstration Facility to provide renewable heat and power, and optimizing academic building performance and reducing energy consumption through the Building Tune-Up Program.

UBC is currently making significant investments in upgrading buildings and infrastructure to create better spaces for teaching, learning, research and the campus community. As part of this, the new UBC Life Building project is underway to house student services and AMS clubs currently dispersed throughout the campus. The AMS of British Columbia - Vancouver represents the student body constituting of over 54,000 individuals at UBC's Point Grey Campus in Vancouver, including both undergraduate and graduate students. It is a non-profit society with the mission "to improve the quality of the educational, social, and personal lives of the students of UBC"(AMS, 2017). The AMS is moving a number of clubs to the UBC Life Building, making them a significant stakeholder in this process. In order for the AMS to better align with its Student Driven Sustainability Strategy, it is necessary to identify the club's current practices, as well as how they could improve sustainability. Areas of concern include mitigating and handling waste, energy consumption, water use, and overall improving the levels of environmental, social and economic sustainability. An additional concern that relates to the main initiative is identifying where the waste disposal bins could be placed in the Life Building to serve these clubs, as well as other users.

Although UBC has made great progress in promoting and achieving sustainability, a lot more can be done regarding sustainability from the different AMS clubs. This report serves to inform the relevant community partner and stakeholders of the findings and ultimately presents a series of recommendations.

2.0 Purpose of the Project

The main purpose of this project is to perform an environmental scan of specific AMS clubs, their equipment use and operations, and come up with plans and opportunities to aid their improvement. These strategies should help inspire better practices for the AMS clubs and improve overall on-campus sustainability. As for the bin locations, this project aims to identify the biggest waste outputs of each club

and in turn make recommendations for the ideal bin types, waste stream, bin location, and waste examples in 3D boxes.

This is a direct consequence of the overarching goal of the AMS of reducing the university campus' Ecological Footprint (EF) to sustainable levels and to foster environmental justice in AMS operations. Ecological footprint analysis is a "systematic resource accounting tool" (Sun, 2014) that significantly aids in identifying the most important areas for improvement. Based on data from the University of New Castle, building operation is identified as having the largest ecological footprint and therefore, it is the category that this report is mainly concerned with.

3.0 Partner Organization, Participants, and Community

There are numerous direct and indirect stakeholders affiliated with this project. The list below outlines the major stakeholders in this project and their affiliations with the project.

1. UBC AMS - Student society of UBC that is administering the move of the clubs.
2. SEEDS Sustainability Program - Program with the aim of advancing campus sustainability strategies and projects.
3. UBC Pottery Club - One of the clubs being studied as part of the project.
4. UBC Photographic Society (PhotoSoc) - One of the clubs being studied as part of the project.
5. UBC Building Operations - Provides daily support and maintenance of municipal utilities and facilities management, including waste management and janitorial services.
6. UBC Campus + Community Planning - Responsible for long-range planning of campus design, while managing sustainability and community building programs.

The UBC AMS, specifically the Student Administrative Commission (SAC) oversees the clubs within the AMS. "The SAC sets out procedures for constituting clubs and manages the space use within the Student Union Building as well as the general operation of AMS Clubs" (AMS, 2014). The SAC is chaired by the Vice President Administration of the AMS, who attended the meetings and provided a thorough background of the project. A key player in this project is the AMS project manager and designer, who has guided the project team with his expertise and profound technical knowledge.

SEEDS is a sustainability program under the UBC Campus + Community Planning department with the aim of developing strategies for achieving the University's operational environmental and social sustainability goals through applied learning and research. This is achieved by employing a community-based research project to the students coursework and providing oversight for the duration of the project. The SEEDS project managers overlooked many aspects in the project and provided great support to the project team. They attended initial project team meetings, provided mentorship and ensured that the project expectations, resources, and milestones are well defined.

The UBC Pottery Club and the UBC PhotoSoc are the two clubs that are studied in this project. The representatives from the two clubs aided the project team in data collection and in organizing the site

visits. Along with some of the stakeholders already mentioned, they also constituted the focus group that the project team interviewed during the site visits.

4.0 Goals and Objectives of the Project

In keeping with the purpose of the project, specific goals were set forth by the project team to ensure that the project objectives are met. The first goal of this project is to accurately identify the current conditions of the AMS clubs by closely examining their baseline practices. By documenting the current practices, whether they are sustainable or not, there will always be a solid framework for all clubs and an opportunity for further improvement for future projects. Secondly, there is the goal of developing a list of recommendations to the stakeholders, concerning the practices of the two clubs, which outlines the areas of improvement and mitigation strategies. Even though, these recommendations are club specific, they could be used as broad guidelines for any clubs that have similar waste sources. The last goal of this project is to identify the optimal waste bin locations, the ideal bin types, and the most suitable messaging on the bins. Unfortunately, due to the time constraints that the project team faced, this goal was not fully achieved. Originally, an online survey was to be conducted and a list of recommendations was to be developed as part of this report, but the project team decided to prioritize and focus their time and effort on meeting the other project goals.

There are also numerous learning goals that the project team has set for itself from this project. Those include developing professional skills from being a part of a multidisciplinary team, learning from the expertise of the faculty, staff and community partners, and building long term relationships. Acquiring professional mentorship, experience and skills from this collaborative project is the overarching goal for the student team. The team actively worked to achieve this goal by constantly applying their skills to the interactions with the stakeholders and capitalizing on any learning opportunity that they faced.

5.0 Approach and Methods

The approach used for this project is tailored to the project objectives and goals. Since there are two main project objectives, namely assessing club practices and bin analysis for the Life Building, we had initially decided that the optimal approach is to have two different ways of data collection. However, one major risk that that we had previously identified for this project is the risk of not collecting all the data needed. Therefore, in order to mitigate this risk, it was decided to eliminate the bin analysis objective from the scope of the project. As a result, the approach and methods for data collection were altered. For the first project objective, focus group interviews were carried out for qualitative data collection, along with site visits.

5.1 Context Development

To increase the project team's knowledge of the context of the project and to identify literature and reports that would aid in the coursework, each team member conducted a preliminary situational analysis. This allowed the project team to interpret and apply their findings to the regional issues that relate to the host organization, namely the AMS and the other stakeholders. It also developed the team's knowledge of the political, social and cultural factors that affect this project.

5.2 Interviews

Semi-structured focus group interviews with the stakeholders were conducted as the main source of qualitative data collection. The purpose of the interview is to explore the views and experiences of the clubs and their representatives on specific matters pertaining to their goals, equipment, and operations. It allowed the team to assess the social, environmental, and economic dimensions of these operations and any perceived opportunities for improvement. After an initial period of research, the team prepared several key questions to help progress the conversation with the stakeholders and to define the areas for discussion. Then, the team would allow the conversation to progress naturally based on the received responses, or would allow the discussion to diverge from the predetermined questions in order to pursue an idea in more detail. It was decided that this method of data collection is not only more natural, as it resembles, a guided conversation, it is also more informative, as it allows for the discovery of information that is important but may not have previously been thought of as pertinent by the research team.[1] The guiding questions used were designed to yield as much information about the clubs practices as possible, such as outlining the club's waste management system for the chemicals used in glazing or identifying the activities with the highest water consumption rate. The questions were also as open-ended as possible and the use of "leading" questions was minimized, as they may unintentionally influence the response of the stakeholders. All questions were written in line with the project goals of identifying baseline operations, and recognizing areas for growth in terms of sustainability upgrades.

The focus group interviews were held at the site visits, with the first one being held at the pottery studio and the second one at the PhotoSoc dark room. The interviews always included at least one representative from the clubs and from the AMS, as well as the project team. Some interview questions were also discussed at the meetings, which included AMS's VP Admin and a SEEDS project manager.

6.0 Results

During the site visits and interviews, the project team documented the baseline operations of the clubs and identified areas for growth. This section presents an overview of the collected data and observations from the two clubs.

6.1 Pottery Club

The site visit to the pottery club familiarized the team with the activities done in the pottery studio and allowed the team to learn from experts in the field. From interviewing the club and AMS representative, the team developed an idea about the tools, equipment, and supplies used in the studio. A list of all the materials (Appendix A) used in the studio was provided by the club representative, which will be further discussed in the upcoming sections. The results of the interview and site visit are further categorized into these four major categories; water consumption, energy consumption, waste disposal, and safety concerns.

[1] Qualitative Data Collection: Interviews and Focus Groups. (n.d.). Research Methods for Clinical and Health Psychology, 39-55. doi:10.4135/9781849209793.n3

Water Consumption

Water is an essential element in the pottery studio. It is needed during the forming process, as the clay must contain some water for it to be workable on the wheel. It is also extensively used in miscellaneous tasks, such as cleaning tools, washing clothes, rinsing out towels, and general cleanup. Although these processes do not necessarily use a large amount of water, some areas for improvement were identified and will be discussed in more detail. It is worthy to note that various sustainable measures are already implemented in the studio to prevent wasting water. A significant measure undertaken in the studio is that the remaining water in the guards of the wheels are collected in one large bucket and filtered for further clay reclamation. Figure 1 below shows the bucket used to reclaim the clay.

Figure 1: Clay Reclamation Bucket

Energy Consumption

Energy consumption in the pottery studio is relatively high, considering that the kilns require a high amperage of 30A. Not to mention, that the lights are almost always on during the day time since members could walk in and use the studio during operating hours. Figure 2 depicts the two kilns used in the studio.

Figure 2: Kilns in Pottery Studio

Waste Disposal

It is definitely a fact that many pottery products contain hazardous chemicals and materials, as shown in Appendix A. Empty containers containing toxic substances are clearly identified and set aside for pick up by the UBC Waste Management group. The clay itself is non-hazardous and is largely recycled. When sinks are being used, clay residue could build up and that is why solid mass waste interceptors are put into place. According to the AMS representative, chemical extractors are not required under the new environmental regulations. The water used to create the glazings and for mixing the chemicals is treated as contaminated water and is also disposed of by UBC Waste Management. Moreover, the studio has a recycling system in place for paper and generally recyclable products. Areas for improvement with regards to waste are mainly dealing with the scraps and incomplete pieces.

Safety Concerns

When it comes to safety, many areas for improvement were identified within the pottery studio. Pottery artists work with many highly hazardous chemical products that can harm their health, such as; silica dust from the dry clay and glazes, and glazes and clay containing toxic metals such as antimony, barium, cadmium, chromium, cobalt, copper, lead, manganese, selenium and vanadium. Moreover, they perform repetitive movements and are always using specific equipment, which gives rise to some issues related to ergonomics.

6.2 PhotoSoc

Visiting the Photo Society's dark room provided us with insight on the club's current operations and activities. We got the chance to take a look at the equipment being used in the club as well as a walk through the process of film development. There are multiple chemicals that are used to develop film further discussed in Appendix B. Similar to the previous section, the results of the PhotoSoc are divided into water consumption, energy consumption, waste disposal, and safety concerns.

Water Consumption

Water is an essential element in the process of film development for photo society. It is mainly used in washing film from the chemicals used to develop it in the dark room. Although this particular washing activity does take up quite a bit of water as it is constantly running for 15 minutes, there's not much that can be done to cut down on the usage as the film can't be washed in contaminated water; this means that the water has to be fresh every single time. Figure 3 below shows the wash basin that the film is cleaned in.

Figure 3: PhotoSoc Wash Basin

Energy Consumption

Energy consumption in the photo society club room is actually quite low already due to most of the work being done in the dark room (development). There are no other operations that require energy in the photo society. Figure 4 shows the dark room used to develop film.

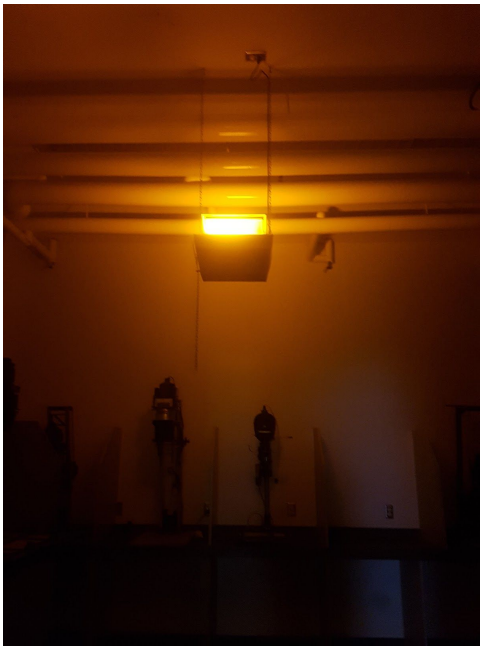

Figure 4: Dark Room for Film Development

Waste Disposal

The only waste generated by the photo society club would be unwanted photographs or scraps of photographs. These are either recycled or donated.

Safety Concerns

Safety has come a long way in the photography club from the previous years, most of the chemicals being used to develop film right now are not toxic. There are only a few toxic ones which are recommended to be handled with care. It is also imperative that the chemicals are not disposed of down the drain because that's against water pipeline regulations as it negatively impacts marine life.

7.0 Discussion

In this section, the significance of the findings from the two clubs will be discussed. It is important to note that this project was conducted during a short and limited period of time. Additionally, when discussing with the club representatives and during project partner meetings, it was evident that many significant sustainability measures were put into place. Nevertheless, we will discuss significance of some of the internal and smaller-scale impacts.

7.1 Pottery Club

Water Consumption

Minimizing water consumption is a significant area for growth as emphasized by the SDSS. In fact, UBC is developing a Water Action Plan to guide the university's water management activities, considering that Vancouver is a drought prone area. In line with the project's goals and objectives, the team highlighted and presented recommendations for minimizing water consumption in the pottery studio. These recommendations are based on a general strategy of reducing, reclaiming, and reusing. The team's observation of the current practices reveal that there are some wasteful practices such as using the sinks for cleaning the tools and such. Therefore, the recommendations presented are concerned with reducing the water used for the miscellaneous tasks. This could be done by filling out smaller buckets from the reclamation bucket to be used for such tasks. This would eliminate the need for sinks for a very large part, since the wasting of water mainly comes from the fact that members are free to use the sink whenever they want and most of the cleaning is not done in batches, considering that members come in at different times. However, sinks could be used occasionally for washing large objects and even then, the water collected could be reused for other purposes, as long as it is not contaminated with toxic materials.

Energy Consumption

Looking at the energy aspects of the club practices, the team identifies some configurations that could be made or future recommendations that could be put in place. Replacing or upgrading the kilns is a farfetched solution, considering their high price. However, the installation of local exhaust ventilation around dust-generating activities, with a hood to capture airborne dust as close as possible to the point of generation, is not. The new pottery studio will include an exhaust duct connected to the kilns to vent out the fumes. Special consideration could be taken in the design of those ducts by minimizing the number of bends to improve efficiency. The observations also showed limited intake of outdoor air and being highly

dependent on the heating system even though the kilns emit a lot of heat which could be potentially recycled. The kilns in the UBC pottery studio are fired up once a week, occasionally twice. It is more economically and environmentally sustainable to not fire up the kilns during peak usage, which is usually from noon to 6 pm on weekdays. This also keeps with the social aspect of sustainability of the community working together to share scarce resources to meet their needs. Furthermore, the interviews revealed that along with the current washing machine, a dryer will also be installed in the new location. Currently, the clothes are being dried up on a rack and there seems to be a system in place for collecting and doing the laundry in batches, without the use of soap.

Waste Disposal

Based on data from the SDSS, a majority of UBC's operational garbage is recyclable. Clay and pottery scraps fall under this category, so any solid waste produced during the pottery making process should be correctly disposed of or recycled. Glazes that contain metals that are considered hazardous are disposed of as hazardous waste. Special consideration could be taken with labelling these glazes and setting them aside, away from the uncontaminated materials. When it comes to the discarded or unfinished pieces, the team outlines a recommendation that shows community involvement, where the scraps are donated to orphanages for decoration, which would also serve to encourage the members to donate more of their work. Other than that, the team believes that the waste outputs for the pottery studio are minimal and profound measures are already implemented to ensure that hazardous waste is correctly disposed of.

Safety Concerns

As previously discussed, there are some dangers inherent with pottery as a practice. Based on the team's findings from the site visit and interviews, the recommendations presented focus on reducing or eliminating health hazards encountered during the process. The team believes that more can be done in improving the air quality within the studio and improving the ergonomics, considering that there are many repetitive movements. The recommendations presented are based on a traditional hierarchy of controls, which will be further explained in the upcoming section.

7.2 PhotoSoc

As a team, we decided that implementing evident poster signs above all sinks warning students and AMS members not to pour toxic chemicals down the drain would promote sustainability at UBC. While discussing with a representative and ex-president of the photography club, an issue that was brought up was that toxic chemicals still get poured down the drains accidentally due to forgetfulness.

Although this may be an honest mistake, it violates water pipeline regulations and has negative impacts on the environment as these toxic chemicals entering the water system are harmful to both marine life and humans. Therefore as a team, we decided that such incidents should be prevented at all costs, and hopefully implementing warning signs will contribute to reducing the occurrence of this mistake. This implementation especially targets students and AMS members who are new to the photography club and who are not accustomed to PhotoSoc safety practices. Implementing such signs may only reduce the occurence of toxic chemicals being poured down the drain by a small amount, but it is important to note that any opportunity to improve sustainability is worth it. UBC's Ecological footprint does indeed

contribute to the environmental well-being of Canada and of the world. The judgment of how broadly or narrowly to define the AMS' sphere of influence is subjective, but we should never hesitate to ask what is the most effective way of reducing AMS's ecological footprint.

Aside from improving safety sustainability, we thought of many ways to reduce water and energy consumption. Being a club that already uses minimal electricity (especially in the dark room), we considered ways to reduce water usage. However, several outdated machines are still being used to develop film and assist with other photography processes - replacing these older machines with newer ones that consume less electricity will also promote sustainability. Although this implementation may only contribute to promoting sustainability on a small scale, it is important to consider internal and external methods we can use to reduce energy consumption.

To reduce water use, the most feasible method was to arrange for a certain period of time where all film are to be rinsed in the basin simultaneously, instead of on separate occasions. Not only this, but running the water for a total of 10 minutes rather than 15 minutes was also something our team proposed. Perhaps running the water for 5 minutes less may only have a minor impact, but since water is the photography club's most used resource, this was the most reasonable suggestions we could make. However, it is important for our team to consider the requirements of the photography club, and we should try our best not to compromise the cleanliness of the films in order to reduce water usage. If this implementation is successful, the impact will only be minor but again, it is not insignificant.

In summary, the significance of all 3 implementations are minor and may only improve sustainability on a small scale. The photography club does contribute to AMS's ecological footprint, which in turn has environmental impacts on both UBC, the Greater Vancouver Area and on a larger scale, Canada. It may be a stretch to conclude that these implementations will significantly make a difference in our communities, however it is the will to improve sustainability that will allow us to make significant impacts in the future. The results of these implementations may not induce significant impacts, but the engagement we had with our stakeholders and communities promoted sustainable thinking.

8.0 Conclusions and Recommendations

In line with the project goals outlined in Section 4.0, this section serves to present the recommendations of the project team to the stakeholders. The implications of the recommendations are also discussed, elucidating the significance of the issues. In summary, the significance of the suggestions below could be considered small and do not extend much to a larger scale, due to the limited amount of time and flexibility we had as a team. However, with these minor implementations, the team believes that it would correlate to improving sustainability within the two clubs and at UBC.

8.1 Pottery Club

To conclude, as part of this study, the team looked at four major areas for improvement after assessing the current practices of the pottery club, and those are water consumption, energy consumption, waste disposal, and safety concerns.

Water Consumption

As previously discussed, the water used for the miscellaneous tasks, such as cleaning tools, washing clothes, rinsing out towels, and general cleanup seems to be the only water that could be regulated. With some planning, water in the studio could almost be used indefinitely. For these tasks, the team recommends that small buckets are filled up from the reclamation bucket. After they're used at the end of the day, the sludgy water could be transferred back to the reclamation bucket to settle overnight. Every morning, clear water could be siphoned out from the top of the bucket to be used for these tasks, or towels and sponges could be dipped in it. As a side benefit of this method, the sinks will not get clogged with any clay residue. The team also recommends that the used tools are set aside and cleaned in batches to minimize the amount of water used. The team also recommends creating a unique ceramic birdbath and a small garden, where the filtered water from the sink could flow to. This aligns with the overarching goal of expanding the green space and increasing biodiversity of campus.

Energy Consumption

In addition to the recommendations outlined in the previous section with regards to venting out the kiln fumes, the team identifies the kiln as having the biggest potential for reducing energy consumption. In order to save energy and yield consistent firings, the team recommends starting the kiln early to avoid energy rush hours and preferably on weekends to avoid the peak consumption. This also serves the dual purpose of potentially reducing the firing time, considering that there are slight voltage drops during those peak hours of consumption. Another measure that could be taken to improve the efficiency of the kiln is to improve its insulation, which could be done by adding a thicker lid and bottom. Lastly, the team recommends not using the dryer for drying clothes. The club has been able to cope with not having a dryer since their move to the UBC Nest and considering that dryers use quite a bit of energy, their use is more of a luxury than a necessity.

Waste Disposal

Regarding waste disposal, the pottery club already imposes numerous measures to ensure that toxic waste is handled carefully. Measures are also taken to ensure that recyclable materials are correctly disposed of. The team's only recommendation in this category is the donation of the scraps to orphanages or holding fundraisers by selling these discarded pieces at low prices and donating the money to a charity of choice.

Safety Concerns

The team's research and findings showed that there are numerous health hazards on pottery artists. To eliminate and minimize the identified hazards in the previous section,the team encourages the use of the following traditional hierarchy of controls:

1. Substitution or elimination of the hazardous agent
2. Administrative controls
3. Ergonomics
4. Personal protective equipment

As part of eliminating the hazardous agent, the team recommends banning food or drinks inside the studio and putting up signage to remind the members of thoroughly washing their hands before eating to prevent ingestion of metals and other contaminants. Not to mention that the team recommends wet wiping surfaces clean, rather than vacuuming or sweeping, which would reduce the dispersion of the silica dust.

For administrative controls, the team recognizes that many things could be enforced by the club executives to ensure that the health hazards of the practice is mitigated. The team recommends holding a safety workshop for all new members and to inform all members of any work practice changes. Strict time of exposure to the hazardous materials could also be enforced by the executives and they could encourage the use of pre-wetted glazes.

Improving the interaction between the members and the physical environment in the studio is also very beneficial, as it reduces the risk of strains and sprains and other related musculoskeletal injuries, while improving overall productivity. Therefore, the team recommends abiding by the following set of guidelines to improve ergonomics within the studio:

- Incorporating an optimal height range of 27.6 inches and a maximum height of 56.2 inches for workstations/worktables, palletized pieces, shelving units, and items on carts to eliminate overhead reaching and bending.
- Storing frequently used materials at waist height rather than at floor level.
- Reducing lifting and carrying items weighing more than 50 pounds, and always using carts to transport heavy materials long distances.
- Purchasing a faucet hose extension to eliminate lifting buckets into and out of the sink.
- Providing a range of heights for pottery wheels and stools, to eliminate back pain and discomfort for the users. As well as using stools with lumbar support and tilt adjustment.
- Putting up signage to discourage members from performing repetitive activities in long sessions.

Finally, the team's last recommendation is to enforce the use of personal protective equipment. The team recommends having a supply of disposable biodegradable nitrile gloves in the studio to protect the members from the hazardous chemicals in the glazes. Additionally, the use of masks and goggles could be encouraged to protect the members from the harmful silica dust.

8.2 PhotoSoc

In summation, PhotoSoc's facilities' biggest waste concern is the water. As mentioned earlier, energy consumption is quite low due to the fact that most of the development work is done in the dark room. As for waste, the only waste generated would be unwanted film/photo scraps and that's either recycled or donated. However, there is chemical waste from the chemicals used to develop the film; for the most part this is taken care of by UBC Waste Management under the Building Operations department that disposes of these chemicals correctly. We do recommend that signs are put up near the wash basins to advise users not to dispose of any polluted water/chemicals down the drain. As for water consumption, our recommendation is to decrease the water consumption per wash from 15 minutes to 10 minutes. Of course, this all depends on the needs of the photography club; if the opportunity presents itself to cut down on water consumption and still reach the same end goals then by all means it is highly recommended to make the necessary cut down.

We believe that if these recommendations are followed, there will be significant cuts in water consumption on the long term. The signs attached to the basins will also ensure that no one spills

contaminated liquids down the drain to avoid the negative impact on marine life. Finally, we believe that we have successfully analyzed the current practices of the photography and pottery clubs to the best of our abilities given the time constraints; by doing that we set out a future framework to be followed by the AMS clubs in order to be in line with the SDSS.

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Appendix A: Pottery Club Materials

Glaze Materials
Alberta Slip
Alumina Calcined
Bentonite
Bone Ash
Chrome Oxide
Cobalt Carbonate
Cobalt Oxide
Copper Carbonate
Custer Feldspar
Dolomite
Frit 3134
Frit 3195
Gerstley Borate Frit
Iron Oxide (Red)
Lithium Carbonate
Manganese Dioxide
Minspar 200
Nepheline Syenite
Ravenscrag Slip
Rutile (granular, milled)

Talc
Tin Oxide
Titanium Dioxide
Whiting
Wollastonite
Yello Ochre
Zinc Oxide
Zircopax

Tech Materials
Alumina Hydrate
Alumina Oxide
Borax
Burnt Umber Oxide
CMC Gum Binder
Copper Oxide
Cornwall Stone
Cryolite
Feldspar G200
Frit 3110
Frit 3124
Frit 3131

Illmenite (granular, milled)
Iron Chromate
Iron Oxide (Black, Yellow)
Kentucky Ball Clay
Magnesium Carbonate
Manganese Carbonate
Nickel Carbonate
Nickel Oxide
Plaster
Petalite
Pumice
Silicon Carbide (60 mesh)
Silver Nitrate Crystals
Soda Ash
Sodium Hydroxide
Sodium Silicate
Spodumene
Strontium Carbonate
Tennesee Ball Clay
Volcanic Ash

Appendix B: PhotoSoc Materials

- FILM CHEMICALS:
  - Developer: Kodak D-76, Ilford Illfosol-3, Adox Rodinal
  - Fixer: Kodak Fixer
  - Stop: Illford illfostop Stop Bath
- PAPER CHEMICALS:
  - Developer: Illford Multigrade Developer, Kodal Dektol Developer
  - Fixer: Kodak Fixer
  - Stop: Illford illfostop Stop Bath
  - Wetting agent: Illford Ilfotol wetting agent

Appendix C: Interview Guide

Do you have an inventory for all the sustainability actions implemented in the club?
Do you have a sustainability strategy and goals?
If yes, how do you ensure that members are aware of it?
Which practices consume water/energy?
What is being done to limit the water/energy wasted?
Which practices pose health hazards?
What hazardous chemicals/materials are used?
How are hazardous chemicals/materials being disposed of?
What kind of waste is produced?
What are the recycling strategies used to take care of waste generated by the club operations?
Does the club invest in recycled material produced by their waste?