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Museum Space Usage Assessment

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For the Fire Services Museum of Victoria

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Abstract

This project improved the utilization of limited exhibit and storage space at the Fire Services Museum of Victoria (Australia), which houses Australia's largest collection of fire fighting memorabilia. The team first produced floor plans covering 5,273 m^2 of floor space at two different sites and careful compilations of visitor and staff preferences. Results include a new visitor guide, recommended enhancements of exhibit space (e.g., a hands-on uniform exhibit), and strategies to safeguard artifacts while using 65% less storage space.

Acknowledgments

Table of Contents

List of Figures

List of Tables

Executive Summary

When limited space becomes a problem for a museum, the staff finds new ways to store and display artefacts so that little space is wasted. When the collection includes more than 80 fire trucks and one of Australia's largest collections of fire services memorabilia, the problem is particularly pronounced. Such is the case for the Fire Services Museum of Victoria (FSMV) in Melbourne, Australia.

The FSMV is a small, volunteer-run museum dedicated to preserving the history of the fire services in Victoria. The Museum relies mostly on donations for income. Limited space is available to store and display the collection, so we provided recommendations to cope with the 5273 m^2 of exhibit and storage area. The staff also wanted a new floor plan and a new exhibit guide to reflect these recommendations. We used staff interviews, visitor surveys, detailed measurements, and the CAD program AutoCAD$^®$ to suggest engaging exhibit layouts that make best use of exhibit space, new visitor guides, a centralized storage layout that will require up to 65% less space than is currently required, and detailed floor plans that document these recommendations for improved use of space. Implementing our recommendations will lead to an improved interactive visitor experience while ensuring efficient storage and preservation of artefacts.

To improve the storage layout, we completed an inventory of vehicles owned by the FSMV. We used our measurements of the total floor space available for storage and our estimates of the volume of various artefacts to determine storage space requirements and make informed storage layout recommendations. We concluded that the Museum staff could easily improve storage and preservation if artefacts were grouped according to type or theme. For example, documents, uniforms, and paintings should all be stored in the same basement room

because they all require similar storage conditions.   Furthermore, more than 200 boxes containing old log books would take up 65% less floor space if stored in the large compactor unit in that room. Storage would be improved further if the location and condition of artefacts were recorded in the inventory. Finally, we created vehicle storage layouts that allowed 54% more of the vehicles to be accessed immediately, without moving others first.

The goal of the exhibit layout was to create an interactive visitor experience that draws visitors into the subject matter, entertains them, and informs them. We surveyed visitors to compare their expectations and experiences. Our surveys and observations of visitor movement patterns revealed that guided tours are critical to the interactive experience and that interactive or well-documented exhibits are the most engaging. Museum staff members were interviewed to identify their views on the current exhibit layout and visitor experience. Comparing the results from the staff interviews and visitor surveys showed that the staff and visitors view the museum quite differently. The final exhibit layout recommendations contained information on the current layout and changes to be made to create an engaging visitor experience. For example, we determined that many exhibits would be more engaging if duplicates were removed and information was displayed on the remaining displays.

The final deliverables consisted of two main components: the floor plan and the exhibit guide. The floor plan incorporates our exhibit and storage layout recommendations. It integrates museum best practices, visitor surveys and observations, and staff interviews. The floor plan also visually displays our recommendations for the Museum staff, for example showing how the majority of the storage in the Museum can be condensed into the Hose Cellar. The exhibit guide conveys information on exhibits and Museum history to visitors in order to create an engaging experience for them.

1. Introduction

The purpose of a museum is to preserve artifacts and to exhibit them in ways that are both educational and enjoyable: "the goal of a museum is to create an interactive experience for the guest as well as preserve the condition of artifacts" (Hunt, 2009).

To achieve these goals, museums try to utilize the available space effectively to engage the visitor while ensuring the preservation of their artifacts. Using space effectively in the context of a museum includes designing exhibit layouts that maximize the likelihood of displays being viewed (Bitgood, 2006). Since the visitors prefer to use the least amount of energy to explore the museum, exhibit layouts must be designed to attract the visitor's attention (Bitgood, 2006). Using space effectively also involves implementing compact storage layouts that still allow easy access to, and properly preserve, the artifacts. Often times, there is a trade-off between a museum's ability to employ proper storage techniques and the space available for storage (Cumberland, 1990). Storage and preservation are of particular importance to small museums because they have limited space to store an often growing collection of artifacts.

The use and organization of space is a prime concern for the staff of the Fire Services Museum of Victoria (FSMV) located in Melbourne, Australia. As a small non-profit organization with little government funding, it does not have the fiscal means to expand in the near future. Also, the FSMV is run entirely by volunteers who would benefit from knowing how a professional curator would utilize the available space. The availability of space is an issue for the FSMV staff because the Museum features the largest, and still growing, collection of fire services artifacts in Australia. The current exhibit and storage layout, while adequate for the Museum's operation, is not optimal. It is important to note that these are not distinct problems

but rather interdependent considerations. The ability to find a balance between maximizing artifact preservation and visitor experience would aid the FSMV staff in fulfilling the purpose of a museum; preserving artifacts for the creation of an educational and enjoyable atmosphere.

This project identified better ways to use storage space to preserve artifacts and to support new exhibits; better ways to use exhibit space to engage visitors; and better ways to use volunteer staff to support such engagement. Our detailed suggestions for improving visitors' experience integrate museum best practices, the findings from visitor surveys and observations, and our interviews of the Museum staff. The main consideration in creating exhibit layouts was the movement patterns of the average visitor, obtained from our tracking of selected visitors. Details of storing documents, uniforms, and vehicles were explored and prioritized to employ the best feasible practice to improve packing efficiency, and therefore space utilization. The recommendations would help the FSMV staff members design exhibit layouts that create an engaging visitor experience. It would also allow the museum staff to make informed choices in how they stored artifacts to maximize the available space for exhibiting artifacts. As a key component of improving the use of space, we created an updated floor plan of the Museum, which included its on-site storage and its vehicle storage and repair facility in Newport. We also developed a new brochure that uses the new floor plan to give them more information on the exhibits and the Museum. Overall, our deliverables allowed the staff to achieve the one goal of all museums: to preserve artifacts for the purpose of educational endeavours.

2. Background

This chapter describes the Museum's background as well as the best practices of museum professionals that provide part of the supporting framework for our recommendations at the end of this report.

2.1. Background of the Museum

The Fire Services Museum Victoria (FSMV) in Melbourne, Australia is a relatively small, volunteer-run museum established in 1979. The museum's mission is to educate the public about the history and operation of the fire services. In fact, the Museum's motto is "Dedicated to the Preservation of Fire Brigade Memorabilia" (Russell, 2007). This award-winning museum also proudly features the largest collection of fire-fighting equipment in Australia, with artifacts dating back to the 19th century.

The FSMV's exhibit area is housed in the old head office of the Metropolitan Fire Brigade (MFB). This building contains the exhibits and the main artifact storage area. There is also a workshop located in Newport, a suburb of Melbourne. This much larger facility, consisted of 5 warehouses and a water tower converted for storage use, is the maintenance and repair site for the Museum's extensive collection of vehicles.

While the volunteers who run the FSMV have had years of experience in operating the museum, their use of the Museum's available space is not optimal. The museum staff agreed that the Museum needed to improve its storage practices and update its exhibits.

In this chapter, we will review literature related to artifact storage, environmental conditions, and storage techniques and how they can affect museum storage. Additionally, a

discussion on how artifact placement and visitor movement patterns affect the amount of information that an exhibit can present to visitors, is included.

2.2. Storage Considerations

This section introduces storage considerations, such as proximity of use or the grouping of artifacts, which will help the FSMV use the limited storage space to house its large, and still growing, collection of memorabilia.

2.2.1. Proximity to usage location

Having an object stored close to where it will be used is a simple method for improving storage efficiency. Close proximity storage is regarded as "a widely accepted principle for space planning" (Kim & Park, 2003) that can have an effect on the efficiency of a storage system. Consideration for proximity minimizes the amount of work required to move an object from storage to the location where it will be used by minimizing the distance between them (Kim & Park, 2003). Even though museums generally store objects for longer periods of time (Wendy), close proximity storage can still help the Museum staff save energy when moving artifacts.

2.2.2. Grouping of items within storage

Grouping items within a given storage area can improve the storage organization, which allows for easier management of items in storage (Ward, 1963). Grouping items by any well defined set of characteristics is helpful because it allows an item to be placed among a smaller subset, giving it a more definite location among all of the items in storage (Ward, 1963). For museums, it is often most beneficial to group items by type, as this allows special storage conditions to be met without the use of multiple micro-environments (Wendy). For example, if all the paper documents in the Museum's possession are stored together, it will be easier to find a

4

paper document because its location is confined to one room. Also, it is easier to meet the light and humidity conditions for storing paper if the conditions only have to be maintained in one room instead of multiple rooms.

By grouping items by type, a particular item is easier to locate, thus reduces the time and effort needed to find it, or to find an appropriate place to store it. This can ensure minimal movement time from storage to display or vice versa (Kim & Park, 2003). This is especially helpful if a particular type of object is moved in and out of storage frequently, as the group can be easily located and accessed. This will be discussed further in the next section.

Grouping and proximity considerations often work well together in that one does not need to be sacrificed for the other to occur (Ritzman, Bradford, & Jacobs, 1979). This makes them useful tools in creating an effective storage plan.

2.2.3. Labelling of Artifacts

In order to keep all the item groups organized and easily located, it is critical that a labelling system be utilized (Public Storage, 2009). It does not matter what type of labelling system is used, only that all items are labelled and all spaces are labelled with their contents. However, a common system is to use an electronic spreadsheet or database. A labelling system ensures that anyone can use the storage system effectively by providing the ability to easily locate objects.

2.2.4. Prioritizing Objects for Accessibility

There are three main characteristics that define where an object will be located within a certain room. The first, and most important, is the frequency with which the object will be moved in and out of storage. The greater the frequency of movement of a certain item, the closer

to the entrance, and the more accessible it should be (Extra Space Storage, 2009). If followed, this will ensure that the process of moving an object in and out of storage will be simple and quick due to the high accessibility.

The other two considerations for prioritizing objects are size and shape. If an object is large compared to the rest of the items in the room, it should be stored along the back wall from the entrance with a clear path to the entrance (Extra Space Storage, 2009). If an object is large and awkwardly shaped, it should be stored away from objects that are of average size and shape to each other (Extra Space Storage, 2009). These two considerations will allow access to a wider range of objects within a single storage room.

2.2.5. Packing Efficiency

Packing efficiency is the practice of maximizing the number of objects stored in a given area (Smith, 1980). One-hundred percent packing efficiency means that all space was devoted to storage and there were no gaps between objects. Realistically, this is near impossible to achieve. Also, due to the delicate nature of many of the Museum's artifacts, it is impractical to strive for perfect packing efficiency (Ward, 1963). However, there are techniques involved in creating high packing efficiency that can help maximize space used, even in the context of a museum. These techniques include orthogonal placement, perimeter placement, and isle placement which will be discussed in the following sections.

In developing a storage layout with high packing efficiency, the most difficulties often arise with oddly shaped objects; conversely, the easiest method of achieving an efficient layout is using orthogonally placed rectangles or boxes (Smith, 1980). Orthogonal placement should be

kept in mind so long as an appropriate level of accessibility is maintained through the use of isles (Robson, 1975a).

When designing the layout of a storage area, the best options for a balance between high packing efficiency and high accessibility are perimeter placement, isle placement, or a combination of both. In perimeter placement, objects are placed around the outside edges of the storage space. This is effective for smaller storage areas as it leaves the middle open and therefore does not sacrifice access to the objects. Isle placement is simply aligning the objects into rows such that isles are created between them and there is room to manoeuvre (Extra Space Storage, 2009). If a storage area is very large and very open then the most effective way to pack material is to use perimeter placement along the walls and isle placement in the centre, very much like a grocery store (Robson, 1975b). It is critical to keep in mind that the entire storage area is highly ineffective if there is not enough room to manoeuvre objects into and out of storage (Robson, 1975a).

2.2.6. Summary of Storage Practices

The aforementioned topics pertain only to the general storage of objects. If utilized, the result would be a compact, organized, and accessible storage layout. However, in the context of a museum, storage efficiency alone is not enough, there needs to be a strong emphasis on the preservation of the objects as well.

2.3. Artifact Preservation

While it is important to keep packing efficiency and accessibility in mind when designing storage areas, the type of artifacts that are to be stored is an even more important consideration. Different types of artifacts are susceptible to damage from different environmental conditions;

7

meaning that storage systems appropriate to the artifact type and environmental conditions must be used to ensure preservation. According to the National Park Service Museum Handbook, "museum collection storage is both a space and a process," since it is not only the space "[dedicated] to storing museum objects […] and archival items" but is also the "process of properly containing and caring for the museum collection while it is in [storage]" (Cumberland, 1990). This means proper museum storage planning considers the storage and environmental conditions of the type of artifacts being stored.

At the FSMV, the some of the most common types of artifacts are printed material (i.e. documents, articles, and books), media material (i.e. VHS, CD/DVD, etc.), photos and paintings, uniforms and other clothing articles, and vehicles.

2.3.1. Printed Material Storage

When storing printed materials, the most important factors to consider are the storage containers, as well as environmental conditions such as relative humidity and light. Depending on the type of printed material, the National Park Service (NPS) Museum Handbook recommends the use of boxes, folders, or photo enclosures. Boxes are used primarily for storing books and general documents. They should be made of acid-free, buffered board or inert, corrugated polypropylene or polyethylene to protect their contents from light, acids, as well as, in the case of plastic boxes, water damage (Cumberland, 1990). Folders are used for storing historic documents that may be brittle. Like boxes, they should be made of acid-free, buffered cardstock. Lastly, photo enclosures are used to protect photographic prints and negatives from overexposure to light as well as from acid. Again, they should be made of acid-free paper.

Printed material, being made of layered organic materials, becomes brittle when exposed to very low relative humidity, but is prone to rotting when exposed to high humidity (Pavlogeorgatos, 2003). The danger of rotting becomes even greater when the storage area is located in a warmer climate, as is the case with the FSMV, since this favours the growth of bacteria. Another potential problem with high humidity is that it accelerates the transformation of different oxides into acids that are harmful to cellulose, as is found in paper.

Printed material is also greatly affected by overexposure to light, specifically ultraviolet light. Natural light especially has a high UV radiation rate that is damaging too many types of artifacts, not just printed material. Specifically, it can "discolour, fade, or blacken [printed material]" as well as "raise [it's] fragility level" (Pavlogeorgatos, 2003). While artificial fluorescent lighting has a much lower UV radiation rate than natural light, this low radiation rate can still damage printed material over time. Finally, overexposure to light has the potential to cause unwanted heating, which can lead to a higher rate of bacteria growth as well as a higher level of fragility (Pavlogeorgatos, 2003).

2.3.2. Media Material Storage

When storing VHS tapes, CD's, and DVD's, the common storage system is shelving as the artifacts themselves are already protected by their sleeves or boxes. The most important factors affecting their storage process are relative humidity, light, and temperature. Additionally, CD's and DVD's can warp if they are not stored upright (Byers, 2003).

CD's and DVD's are made of multiple layers. The layer that contains the data on the disk is usually impregnated on the plastic layer that gives the disk its structure. On lower quality disks, surface of the data-carrying layer is not always properly sealed. High relative humidity

can cause moisture to enter this layer, which can dissolve it (Byers, 2003). In VHS tapes, high relative humidity will cause moisture to build up potentially damaging the tape itself (Van Bogart, 1995).

VHS tapes, CD's, and DVD's are harmed more by UV radiation than by high relative humidity. In CD's and DVD's, UV light attacks the dyes of the data layer, increasing their degradation rate (Byers, 2003). This eventually causes the data layer to become transparent so that data stored on it cannot be read. The magnetic tape in VHS tapes starts to disintegrate under UV radiation as the molecules of its structural layer break up (Van Bogart, 1995). This causes the tape to stretch, causing the image to blur and increasing the likelihood that the tape will come off its track.

High temperatures cause the data layers in VHS tapes, CD's, and DVD's to disintegrate (Byers, 2003). The magnetic tape of VHS tapes also expands as it heats up, causing the image to blur and increasing the likelihood that the tape will come off its track. Heat build-up can cause disks to warp, especially in lower quality disks, since the disk may not expand evenly (Byers, 2003). Lastly, as heat builds up, the data layers of disks become damaged since the dyes degrade when heated.

2.3.3. Acetate Film

16mm film using cellulose esters, also known as acetate, diacetate, or triacetate film, is inherently unstable due to the composition of the esters (Cumberland, 1990). These films deteriorate even without outside influences, however high relative humidity and temperatures as well as UV radiation speed up the process. Therefore, they are best put in cold storage or converted to a different format.

As cellulose ester films deteriorate they produce acetic acid. The process is autocatalytic, that is, as acid is created, the remaining tape deteriorates even faster, creating still more acid (Cumberland, 1990). Because acetic acid has a vinegar-like smell, the process is commonly called the "vinegar syndrome." The common storage method, sealed containers, further speeds up the process as the acid cannot escape keeping it in close contact with the remaining film. As the image layer of the film deteriorates, it forms bubbles and raised channels, ruining the images on it. It also becomes mirror-like over time so that the images on it are not projected. Not only does acetic acid damage the image layer of the film, it is also a health hazard (Cumberland, 1990).

High relative humidity speeds up the natural decomposition process of acetate film. High relative humidity can cause moisture to build up between the image layer and the base layer, creating bubbles (Cumberland, 1990). The base layer can warp as it takes in moisture, warping the whole film or causing the layers to delaminate from each other.

Temperatures above -18°C are unsuitable for the long-term storage of acetate films. For every 10° increase in temperature, the life expectancy of acetate films is cut in half (Cumberland, 1990). The higher the temperature, the faster the chemical reactions take place that decompose acetate films.

2.3.4. Photographs and Paintings Storage

Photographic prints are commonly stored in plastic or acid-free paper folders stored in boxes to protect them from UV radiation as well as acids. Thus, the most important factors affecting their storage are relative humidity and temperature.

High relative humidity damages photographic prints in a variety of ways, depending on the materials used in the prints. In prints with a silver image finish, high relative humidity accelerates the oxidation of this finish, causing the image to become dark and mirror-like (Cumberland, 1990). It can also stain the binder layer that fixes the finish layer to the base layer of the print. Finally, high relative humidity can cause the base layer to deform or disintegrate, especially if it contains cellulose. Very low relative humidity, however, may cause deformation, cracking and embrittlement in photographic prints (Cumberland, 1990). Therefore, they are best stored between 30% and 50% relative humidity.

High temperatures speed up the decomposition caused by high relative humidity. Also, they can cause different materials in the prints to expand at different rates, warping the prints or causing layers to delaminate (Cumberland, 1990). High temperatures also cause many of the dyes used in photographic prints to decompose, causing the prints to fade over time. This is especially the case with colour prints, which are best stored below 5°C.

Paintings are easily damaged by the same factors that affect photographic prints; relative humidity, temperature, and light. Pollution can also have a damaging effect on them.

High relative humidity causes the different materials in a painting to expand at different rates, leading to warping (Cumberland, 1990). This warping can either stretch the canvas or cause it to go slack as well as cause paint to flake off the surface. This is especially the case in older paintings as the paint becomes brittle and cannot conform to changes in the canvas (Cumberland, 1990). High relative humidity also causes the varnish layer to discolour, making the image darker. Low relative humidity causes the materials of a painting to become brittle as

they lose moisture. At the same time it causes them to shrink, which can again lead to warping as well as flaking off of paint.

High temperatures increase the rate at which the varnish of a painting discolours. They can also cause some dyes and paints to soften, especially in combination with high relative humidity (Williams & Jaggar, 2005). Lastly, high temperatures create a favourable environment for mold to grow, which attacks all parts of a painting.

UV radiation can easily cause irreversible damage to paintings (Cumberland, 1990). It attacks various pigments, causing them to fade or discolour. The damage done by UV radiation is cumulative (Williams & Jaggar, 2005). Once a painting is exposed to it, it starts to be irreversibly damaged. Additionally, extended UV radiation exposure can cause the paint and varnish layers of a painting to detach from the canvas (Cumberland, 1990).

Pollutants usually damage paintings in combination with other factors. In combination with moisture caused by high relative humidity, they can form acids that break down the paint and varnish layers (Cumberland, 1990). Dust and grime settle on the surface, eventually staining it. They can also enter cracks in the surface, irreversibly changing the image. Particulates that settle on the surface can also act as catalysts for chemical reactions that break down the paint and varnish layers.

2.3.5. Uniform and Clothing Storage

When storing uniforms and other articles of clothing, the most commonly used storage system is a clothing cabinet, such as those found in any household (Cumberland, 1990). The most important factors affecting the storage process are environmental conditions such as relative humidity, light, and biological pests.

Relative humidity can affect clothing in much the same way as it does to printed material. When exposed to high relative humidity, organic materials in clothing, such as most textiles, have a higher tendency to rot, while many dyes used to colour textiles fade more quickly (Cumberland, 1990). Also, many fabrics, especially those associated with fire-fighting, contain metal components as well, which have a higher tendency to corrode at a higher relative humidity (Pavlogeorgatos, 2003). While most textiles don't become brittle unless exposed to extremely low relative humidity, leather components in clothing do have a tendency to become brittle and flaky when exposed to dry environments.

Overexposure to light, specifically ultraviolet light, can be especially damaging to clothing, at times even more so than to printed materials. It is also important to note that some light-sensitive materials such as certain dyed organic materials (found in some textiles) and leather will be damaged by any amount of incoming light (Cumberland, 1990). Specifically, overexposure to light, especially UV radiation, accelerates the fading process of most dyes used on textiles. UV radiation also directly attacks the fibres of many textiles, degrading them and causing costumes to become brittle (Pavlogeorgatos, 2003). Lastly, UV radiation acts as a catalyst in the oxidation of many chemicals found in dyes, which can result in discolorations.

Biological pests that attack clothing include fabric, moisture, and general pests. Fabric pests, such as carpet beetles and clothes moths, are some of the most common pests that attack clothing. Their larvae feed on animal products used in museum collections, such as wool and silk (Cumberland, 1990). In museums, clothes moths often damage old uniforms (Cumberland, 1990). These pests tend to be wary of light, which means that they are most often found in dark storage areas. Moisture pests like molds and psocids, also known as booklice, can occur at medium relative humidity, but tend to be most prolific when the relative humidity is high. Molds

14

can be very damaging to clothing as they cause damage or disintegration in any organic matter, such as fabric or leather (Cumberland, 1990). Also, when the right conditions are met, they can spread across entire clothing in a matter of hours. Psocids tend to infest books, but can also infest clothing as they feed on the mold infesting these artifacts. While they themselves do not cause damage, they are an indicator of "a moisture problem and the likely presence of […] mold" (Cumberland, 1990).

Lastly, general pests such as cockroaches, crickets, or silverfish are simply household pests that have gotten into a museum. While not all of them actually attack clothing, they can cause damage through their nesting and feeding behaviour, as well as attract other pests that do eat parts of clothing (Cumberland, 1990). The three general pests named specifically do attack clothing as they will eat textiles and leather.

2.3.6. Vehicle Storage

While vehicles are certainly more durable than most clothing and printed material artifacts, they are still susceptible to damage from varying environmental conditions. These include relative humidity, light, and air pollution. Since most vehicles, especially antique ones such as those found at the FSMV, are constructed of many different materials, these environmental conditions can have very different effects on different parts of vehicles or different vehicles altogether.

The storage of vehicles is relatively straightforward in that it largely involves simply shielding them from damaging environmental conditions such as humidity or UV radiation. One of the simplest ways to protect vehicles from the elements is the use of dust covers. In general, these should be used for any artifact not stored in a container, a category in which vehicles fall

under. It is important to note that the dust covers themselves should be chemically neutral so that they don't attack vehicle surfaces with which they come into contact.

High relative humidity is one of the most damaging environmental conditions to almost any vehicle, modern or antique, as it can have detrimental effects on almost every part of it. High relative humidity accelerates the corrosion of most metals, an example of which is rusting in any structure that contains iron (Pavlogeorgatos, 2003). This is especially common in older vehicles or vehicles that have surface damage to the protective paint on them. The lack of a protective layer in the damaged surface areas leads to corrosion when moisture is present. This can very quickly compromise the structural integrity of a vehicle, as well as cause more paint to separate from the vehicle surface, thus further accelerating the process of deterioration. Older vehicles often contain wood as a structural material. While it does not rust, wood has a tendency to expand and warp when subjected to high relative humidity. This is because it absorbs water from the surrounding atmosphere, thus causing parts to "swell up" (Pavlogeorgatos, 2003). If subjected to high relative humidity for extended periods of time, wood loses its structural integrity as the cellulose fibres are pushed further and further apart by water. Conversely, a very low relative humidity will cause wooden vehicle parts to become brittle or shrink, since wood loses its flexibility when too much water is extracted from it. Also, if a vehicle is constructed of different materials that are susceptible to changes in relative humidity, there is an additional danger of parts detaching from the vehicle as they expand or contract at different rates than other parts of the vehicle (Pavlogeorgatos, 2003).

While light, specifically UV light, has little to no effect on metal, it can have a great effect on other materials that are part of a vehicle's construction. UV radiation damages paint on a vehicle's surfaces, causing it to fade and flake off. This in turn makes any underlying metal

susceptible to corrosion from high relative humidity. UV radiation also causes many inorganic materials such as plastics, specifically rubber, which is commonly used in vehicles for sealing gaskets as well as in tires, to become brittle and disintegrate. This can have adverse effects on how protected the inside of a vehicle is from various factors such as moisture. Lastly, UV radiation also raises the brittleness of wooden vehicle components, raising the likelihood of their failure (Pavlogeorgatos, 2003).

Air pollution affects vehicles chiefly in combination with other factors such as relative humidity and UV radiation. It is divided into two types: "gaseous pollutants" such as formic and acetic acids and "particulate pollutants" such as dust or mold spores (Cumberland, 1990).

Gaseous pollutants can come from a variety of sources both inside and outside a museum. The most common outdoor gaseous pollutants are sulfates, nitrates, and ozone, all of which form acids in combination with moisture which attack any vehicle component they come in contact with, or, in the case of ozone, simply react with different materials and cause damage to them even without the presence of moisture. Most indoor gaseous pollutants come from the museum building itself (Cumberland, 1990). Common indoor pollutant sources include wood, carpeting, unfinished concrete, and plastics. These can all release acids or other gases that attack vehicle components. Lastly, gaseous pollutants may come from the vehicles themselves or from other museum artifacts (Cumberland, 1990). As mentioned above, wood and plastics may give off acidic fumes as they deteriorate. Also, many paints release solvents as they deteriorate. These solvents are particularly damaging to plastics and will liquefy most rubber or plastic vehicle components very quickly if present in sufficient amounts. This means that if a vehicle is stored in a location with little or no airflow, it contributes to its own deterioration as it is damaged by environmental influences.

Particulates are small solids suspended in the air. While some particulates attack vehicle surfaces and components on their own, they generally form a layer that gives the vehicle an unclean appearance. In combination with gaseous pollutants, however, particulates can cause severe damage to every part of a vehicle. When they interact with gaseous pollutants, particulates may act as a "source for sulfates and nitrates," which become acidic on contact with moisture, as a "catalyst for [the] formation of acids from [gaseous pollutants]," and as an "attractant for moisture and gaseous pollutants" (Cumberland, 1990).

2.3.7. Other Storage Considerations

According to the NPS Museum Handbook, "housekeeping [in the context of museum collections management] involves monitoring the effectiveness of environmental controls, monitoring for pests, and monitoring the condition of museum [artifacts]" as well as cleaning (Cumberland, 1990). In this context, the cleaning and restoration of artifacts is a measure of last resort because environmental control and the monitoring of artifact conditions are meant to prevent the need for such measure. When cleaning is needed however, it is important to be thorough and gentle in order to ensure that artifacts aren't damaged (Cumberland, 1990). Also, the more thorough the cleaning routine is, the less it must be done, thus minimizing the potential for damage to artifacts.

2.4. The Storage Space

Using storage systems appropriate to the types of artifacts goes a long way towards protecting artifacts from the detrimental effects of environmental conditions. The storage space itself can be designed to minimize the occurrence of these environmental conditions in the first place. This can be achieved through the use of equipment to monitor and control the storage area

environment, as well as through a design process that allows the designer to recognize potential environmental problems, thus allowing him to design countermeasures to these conditions.

2.4.1. Components of Storage Space

Since there are various environmental conditions that can be detrimental to the artifacts, it is important for a museum to employ monitoring and control systems for the storage and exhibit environments. The process of environmental monitoring and control involves many different systems that work together in order to create a suitable environment for the types of artifacts in storage and on display (Cumberland, 1990). These systems include Heating, Ventilation, an Air Conditioning (HVAC) systems, dehumidifiers or humidifiers, air purifiers, and UV filters. In addition, regular housekeeping is an important factor in maintaining an environment suited to the types of artifacts in the museum (Cumberland, 1990).

HVAC systems are used to control the environment for a large area of a museum or even the whole museum (Pavlogeorgatos, 2003). The benefits of using an HVAC system are that, when installed properly, it can monitor and control the environment of the whole museum, thus allowing settings to be made from a common source. Also, an HVAC system automatically monitors and controls the museum environment according to preset limits to temperature and relative humidity. The drawbacks of using an HVAC system include its inability to simply target specific areas of a museum, which may lead some storage or exhibit areas to be subjected to unwanted environmental conditions (Cumberland, 1990). Also, the use of an HVAC system may have detrimental effects on the museum building, especially if it is historic, since the installation of such a system tends to require openings to be created in outer walls for vents, a process which may cause damage to the structure, both aesthetic and physical (Cumberland, 1990). Lastly, the

installation of an HVAC system can be quite expensive, especially if the historic nature of the museum building requires that it not be altered by said installation.

For smaller museums and in cases where an HVAC system is too expensive, humidifiers and/or dehumidifiers may be used in combination with heaters and/or air conditioners (Cumberland, 1990). Humidifiers are used to quickly raise the relative humidity of a small area such as a single room. Dehumidifiers lower the relative humidity of the air and are split into two categories: refrigerant and desiccant dehumidifiers. Refrigerant dehumidifiers lower the relative humidity of air by cooling it, thus lowering the amount of moisture it can hold. This type of dehumidifier is especially useful in warmer climates (Cumberland, 1990). Desiccant dehumidifiers lower relative humidity through the use of moisture-absorbing materials and are used in colder climates where refrigerant dehumidifiers may ice over. It is important to note that the use of humidifiers/dehumidifiers in combination with heaters or air conditioners tends to require the use of fans to maintain air circulation.

In order to reduce the impact of particulate and gaseous pollutants, it is important to install air filters on all air intakes to an HVAC or ventilation system (Cumberland, 1990). If an HVAC system is in use, the use of pollution filters can extract particulate and gaseous pollutants from the air before it enters the museum (Pavlogeorgatos, 2003). It is, however, important to make sure that the filtering system doesn't produce ozone. If an HVAC system is not in use, activated-carbon filters may be used instead to filter particulates from the air. These don't, however, filter as many gaseous pollutants from the air as the filtering systems found in HVAC systems (Cumberland, 1990).

Due to the damage UV radiation and excessive light can cause to museum artifacts, it is important to take measures to protect artifacts from radiation (Hunt, 2009). In order to protect artefacts from UV radiation, UV filters are used on windows (Cumberland, 1990). It is important to note that plastic, not glass filters should be used as they are more effective at blocking UV radiation (Pavlogeorgatos, 2003). In addition, incandescent lights, such as tungsten lights, should be used instead of fluorescent ones since they emit less UV radiation (Cumberland, 1990; Pavlogeorgatos, 2003). In the event that fluorescent lighting is used, UV filters should be considered if artifacts are present that are especially sensitive to UV radiation. In addition to filters, awnings should be drawn in front of windows whenever rooms are not in use or the museum is closed. This not only blocks UV radiation but also helps to avoid artifacts being subjected to excessive lighting (Cumberland, 1990). Lastly, windows in storage areas should be covered at all times since lighting should only be on when these areas are being used.

2.4.2. Creating a Storage Space

When using a space for storage or planning for such a use, it is important for a museum and its staff to develop floor plans that accurately reflect the existing space (Cumberland, 1990). This allows them to determine what changes, if any, need to be made to the space to make it suitable for the storage of specific artifact types as well as any limitations the space sets on storage.

The floor plan of the existing storage space must accurately reflect the area designated for this usage so that any storage systems used may be properly placed (Cumberland, 1990). The most important features of the floor plan are: the dimensions of the designated space and the location of access points, the location of utilities hubs, the location of environmental monitoring

and control equipment, the location of fire protection equipment and the location and dimension of existing storage systems.

The dimensions of the designated space do not consist simply of the overall dimensions of the space, but also include the arrangement of different sections of this space as well as any structural features such as beams or posts that may limit storage options (Cumberland, 1990). In addition, the location of access points such as doors, stairs, and windows is important. The location of these may limit the arrangement of storage systems. The dimensions of doors and stairs must also be known since they limit the dimensions of artifacts that can be stored within the designated storage space (Pavlogeorgatos, 2003). Lastly, it is important to know the locations of any windows in the storage space since these should be covered to protect against excessive lighting.

The location of utility hubs, such as fuse boxes and plumbing valves, is important as their placement within the designated space decreases its suitability for storage. The more such hubs are situated within the space and the further inside it they are, the greater the risk of accidental damage to artifacts during maintenance. At the same time, hubs such as outlets may be necessary for some storage systems, in which case their location will determine the placement of such storage systems. The location of environmental monitoring and control equipment can have the same effect on the designated space as the location of utility hubs since this equipment needs servicing. On the other hand, this equipment is often necessary to ensure that the designated space is suitable for storage (Cumberland, 1990).

The presence and location of fire protection equipment is important to note on the floor plans as it is a major factor in determining the suitability of a space for storage, as well as being a

major safety factor for the museum in general. This is especially true if the storage area is to contain highly flammable artifacts such as documents and clothing. It is important to note, however, that the presence of fire protection equipment such as sprinklers makes the use of waterproof containers for the storage of the aforementioned artifacts a necessity to protect them from undue water damage (Cumberland, 1990).

Lastly, the locations and dimensions of existing storage systems are important to note on the floor plans, especially if they are semi-permanent systems built into the structure of the museum building (Don Cumberland, 1987). Examples of such semi-permanent systems are sliding racks used for high density storage systems or storage closets similar to walk-in closets found in many homes. These semi-permanent systems may determine what type of artifact is stored in certain sections of the designated space as they are often designed to store a specific type of artifact and may be difficult or expensive to relocate. They may also, like doors and stairs, place limits on the dimensions of artifacts that can be stored in the space. Because of this, it is important to note the width of aisles between such storage systems (Cumberland, 1990; Dean, 1996).

Once floor plans reflecting the current space have been made, the museum staff can compare the available space to the requirements of the types of artifacts to be stored in it with regard to the environment, storage systems, and space needed to store these artifacts. In this way, the suitability of the space for storage and any changes necessary to make it suitable may be determined (Cumberland, 1990).

2.5. Exhibit Layout Considerations

To improve the overall floor plan of a museum, the staff should plan where, and how, to display the artifacts when they are not in storage. Most museums try to design their exhibits to be more inviting to the visitors. There are several considerations involved in designing the layout and final look of each exhibit and how all the exhibits fit together as a whole. One of these considerations is the movement of visitors through the museum, which determines what each visitor will see and learn since different paths will take the visitor to see different exhibits. Also, the placement of artifacts can give the visitor a clear path to follow or multiple paths to choose from. These effects, if utilized correctly, can create an enjoyable and educational environment for visitors. These considerations will be discussed in the following sections.

2.5.1. Movement Patterns of Visitors

Previous studies on visitor movement patterns show how the layout of the building and exhibits can affect visitors' movement through a museum. "How visitors circulate through museums determines what visitors will see, where they focus their attention and, ultimately, what they learn and/or experience" (Bitgood, 2006 pg 1). Although the movement patterns of visitors may seem disorganized at first glance, there have been numerous studies that have been able to find specific paths that are common among visitors. The studies have looked at how the layouts themselves affect the way people move (Choi, 1999 pg 1) and their own natural instinct of which exhibit to examine next (Bitgood, 2006 pg 1). Museum visitors "rarely follow the exact sequence of exhibit elements intended by the developers. […] Visitors will fulfil their own agendas, for example turning right or leaving from the first available exit" (Bitgood, 2006 pg 1). Visitors generally take the shortest path to an exhibit of interest, instead of a longer path that will

take them through the museum (pg 1). This behaviour can be explained by the "general value principle" (Bitgood, 2006 pg 2).

According to the general value principle, visitors will unknowingly consider the positive and negative values associated with the paths they use to move around the museum. Instead of picking the path with the most positive value; visitors generally pick the path with the least negative value. Case in point: some visitors use less energy and time to see different exhibits and just go straight to exhibits that interest them. Many visitors will take the shortest path throughout the museum, skipping any long labels or plaques and only read short ones (Bitgood, 2006 pg3).

Another way for visitors to minimize the negative value is by taking as few steps as possible while circulating through the exhibits. Studies done in the United States have shown that most people will walk on the right side of hallways and in exhibits rooms. When a visitor comes to a "traditional four-path, perpendicular arrangement" (Bitgood, 2006 pg 3), the turn with the least number of steps for the visitor would be the right turn. This means more visitors would take the right turn, rather than walking straight across or turning left. If a visitor wanted to take a left turn at the same intersection, he or she would move from the right side of the hallway to the left side before entering the intersection. This method, like turning right at an intersection (in the United States), helps reduce the number of steps the visitors have to take to change the path they are on (Bitgood, 2006 pg 3). Although most of the visitors will walk on the right side of the hallway, some of the visitors will go against the majority and walk along the left side. When they enter a four-way hallway intersection, these visitors are more likely to turn left since left turns will now take fewer steps than the amount of steps turning right would take.

In addition to turning right, another way museum visitors reduce their number of steps is to go straight across an intersection. Similar to the physics inertia principle, where an object will move in a straight line unless another force acts upon it, people have the "tendency to walk in a straight line unless some other factor captures their attention and pulls them away" (Bitgood, 2006, pg 5). When visitors decide to walk straight instead of turning, they are able to take the path that uses the least amount of energy, making it the most beneficial choice when referring back to the positive/negative value ratio. In addition, in some museums, walking straight will keep a visitor on the main pathway, which will give the visitor the shortest route from the entrance to the exit. Some of the movement patterns have shown that exhibits located along "the shortest pathway between the entrance and exit of a gallery [will] receive the most attention" (Bitgood, 2006, pg 5).

Some museums have paths that force visitors to backtrack through the museum to see all the exhibits the museum offers. Since backtracking takes more energy and wastes time, studies have shown that visitors find it undesirable and will avoid it even if it means not seeing all the exhibits offered by the museum. For example, in a study at the Steinhart Aquarium in San Francisco, California, the only visitors who had seen the entire aquarium were visitors who were familiar with the layout of the aquarium and saw different parts during different visits so that they did not have to backtrack (Bitgood, 2006 pg 6).

Backtracking may become necessary when there are displays on both sides of the room. If visitors do not backtrack in such a room, they will end up walking down only one side of the room and only see half of the displays. Rarely will visitors cross back and forth between the sides of the room in order to see all of the displays. When a museum owner wants all the exhibits to be seen, the best option is to put all the displays on one side of each room and in a layout

26

where the visitor will be able to follow a path that will let them use the least amount of energy (Bitgood, 2006 pg 6).

2.6. Summary

In this chapter, we have identified some storage and exhibit planning considerations mentioned in existing literature. First, for a museum to use its space effectively, it should consider the benefits and disadvantages of different storage and display layouts. In storage, the placement of objects can have drastic effects on the storage capacity and accessibility of a room. In the case of a museum, many objects require special environmental conditions, which add another level of complexity in storage planning by bringing the quality of storage into consideration.

Also, the placement of objects on display can have important effects on how visitors move through the exhibit area. The movement patterns of visitors affect which displays they are more likely to see, which can affect their museum visit.

The next section discusses the methods that were used to collect necessary data to produce the deliverables of this project.

3. Methods

This chapter describes the research methods that were used to help the FSMV staff best use its available space to create an interactive visitor experience while at the same time preserving its artifacts. To accomplish this goal, we:

- Evaluated current storage layout and practices based on organization, packing efficiency, and preservation practices

- Evaluated current exhibit layout based on visitor and staff opinions and visitor movement patterns

- Interviewed museum staff about their perceptions of the Museum and the purpose of the FSMV

- Surveyed visitors about their expectations and their experience of the Museum

- Observed visitors' movement throughout the Museum

The information collected from these methods allowed us to create a new set of exhibit guides and a new floor plan. Furthermore, the floor plan served as a starting point for recommendations on improving storage organization and efficiency as well as exhibit grouping and layout. In the following sections we will describe each of these tasks.

3.1. Measuring Floor Space

One of the deliverables for this project was a set of up-to-date, accurate floor plans for both the FSMV building and the Newport Restoration site. Using the latest set of floor plans provided by the Museum and a standard measuring tape, we verified existing measurements and collected new measurements that were not shown on the FSMV's current set of floor plans. These included the dimensions of each room, door, and hallway at each site. The dimensions were used to create a functional floor plan using the CAD program AutoCAD® 2009 that can be used in the exhibit guide and in planning new exhibits. The floor plan was made available to

28

Museum staff members both in raw Autodesk® DWG and Adobe® PDF file formats for easy editing and printing.

3.2. Artifact Inventory

Another deliverable for this project was a recommendation on how to reorganize storage to make artifacts more conveniently accessible and better preserved while still being stored compactly. To create the storage recommendation, we first needed to know the types and quantities of artifacts the Museum possessed. Since the total collection of the FSMV is too large to complete a full inventory during our time on-site, we used an existing but incomplete inventory provided by Tony Paynter, the museum curator. It was Mr. Paynter who proposed that we focus on items missing from the inventory, which included a collection of VHS tapes, 16 millimetre films, and CD/DVD's. The collections were sorted and entered into the existing inventory. The new entries included the item's title, the year it was published, the number of duplicates, and the item's location within the Museum's collection. The inventory exists as a spreadsheet in the computer program Microsoft® Excel® and a copy is attached at the end of this report.

3.3. Visitor Observations

A major part of exhibit design is to identify which exhibits are most attractive to visitors so that they can be used as leverage points to guide the visitor through the Museum. The overall "attractiveness" of an exhibit can be measured by its attracting power and its holding power. Attracting power is the ability of the exhibit or display to draw the attention of a visitor. Attracting power can be measured by how many visitors view a given exhibit or in what order they visit each. Holding power is the ability of the exhibit to keep the attention and interest of the visitor and it can be measured by how long a visitor stays at a given location. An exhibit with

high attracting power and high holding power would be considered very interesting to visitors (Carlyle, 2008).

To measure exhibits' attracting and holding powers, we tracked visitors' movement throughout the Museum. These measurements were taken without the visitor knowing as it may have affected their movement pattern. The information was captured by viewing the visitors' movement through a set of security cameras and occasionally physically following the visitor.

To collect information on the attracting power, the tracker was responsible for recording the order in which the rooms were visited or if they were skipped over. The information was recorded by numbering the order in which each of the seven exhibition rooms were visited.

To gather information on the holding power of exhibits, the tracker recorded the time spent in each exhibition room and the total time spent in the Museum. This information was recorded using a stopwatch to measure these time spans.

Table 3.1 – Visitor Observation Recording Form

Room Name	Visitor Description (Example: Parents w/ 2 kids; Foreigner Couple; etc.)	
	Order of Visit	Time Spent in Room (sec)
Board Room		
Chief's Room		
Engine Room		
Watch Room		
International Room		
CFA Room		
Medal Room		
	Total Visit Time	
	Tour/ No Tour	
	Additional Observation (Example: was given tour after visiting 3 rooms, etc.)	

Additional notes were added for certain visitors. For example, it was noted for a mother and child that the child decided which rooms to go to and what to look at. The data for each observation was recorded in tables identical to the one shown below:

3.4. Visitor Surveys

Another research question for this project was the visitors' expectations and if they were met after visiting the Museum. We surveyed visitors both before and after their museum visit to learn about their expectations.

3.4.1. Survey Format and Contents

A two-page survey was distributed to the visitors: the first page was to be filled out before entrance to the Museum, the second as they departed the Museum. The two-page format allowed us to keep track of the visitors' before and after responses without having to keep track of who the visitors were.

The questions were designed to elicit information in four main areas: Who is coming to the site, their reasons for visiting, and their opinions on both existing and proposed exhibits. Collecting information in these areas is a common method for general museum evaluation (Kinsey, 2002). The responses were analysed to make generalizations about visitor demographics and the visitors' experience. The full list of questions used is shown below:

 First page, to be filled out before museum visit:

1.   How did you hear about the FSMV?

2.   Why have you decided to visit the FSMV today? (check all that apply)

3. Have you been here before? If so, when was your last visit and why did you decide to return?

4. What level of knowledge would you say you have in terms of the history of fire services?

5. What do you expect to learn from your museum visit?

Second page, to be filled out after museum visit:

1. Did you enjoy your visit? Why/why not?

2. What did you most enjoy learning about during your visit?

3. Was your visit what you expected? Why/why not?

4. What did you enjoy most about your visit? Why?

5. Did you find the exhibit guide useful? Why/why not?

6. What would you like to see in a new exhibit?

The questions shown are the third revised edition of the survey. The first two editions were used as pre-tests to modify the survey method and can be found in Appendix B- Versions of Visitor Surveys. Initial surveys were more general to show us which questions should be rephrased to elicit more specific responses as recommended by Judy Diamond (Diamond, 1999).

Specifically question 6 of the second page was rephrased to include a list of possible new exhibits. It was discovered in testing that most visitors did not have predetermined ideas of what a new exhibit should be. It was much more effective to have visitors select their preference from

a list of proposed exhibits. This also permitted our team to record information on exhibit preferences quantitatively. Quantitative responses are advantageous as they provide findings that can be generalized to larger populations (Diamond, 1999).The

3.5. Staff Interviews

While the visitors' expectations and wishes were important to consider, the Museum staff's expectations and wishes were equally important. The staff interviews were designed to find the staff's perceptions of the Museum's purpose and goals; what the staff wants to do with the available space; and any ideas they may have concerning storage, exhibit layout, and exhibit guide design. These perceptions were compared with visitor survey responses. The comparison permitted us to make recommendations that took both groups' opinions into consideration.

3.5.1. Interview Format

These unstructured interviews were conducted in private and were based around a few simple questions with open-ended answers. Each staff member was asked about:

1. His or her reason for joining the FSMV; the history, as well as the length of his or her involvement with the fire services;

2. His or her perception of the Museum's most frequent types of visitors

3. His or her personal favourite aspect and/or exhibit of the Museum;

4. Which exhibit he or she thinks is the most attractive to visitors;

5. What information or lesson does he or she want the visitors to leave with;

6. What ideas or concerns he or she may have concerning storage, exhibit layout or the new exhibit room;

7. What he or she personally wants to see in the exhibit guide;,

8. What does he or she think the purpose or goal of the FSMV is

The next chapter will discuss how useful information was extrapolated from the data collected through these methods. The chapter will also describe how this information contributed to final recommendations.

4. Data and Analysis

The data analysed in this chapter reveal the strengths and weaknesses of the Museum's current use of space, both for exhibition and storage. Additionally, findings that may be useful to the Museum staff are including how visitor move throughout the museum and how to improve storage and exhibit space.

4.1. Methods and Findings Overview

This section will discuss the findings obtained from four major methods of data collection:

- Physical Measurement
- Visitor Observation
- Visitor Surveys
- Staff Interviews

These findings will be analysed to yield useful information for the Museum as well as be combined with background research from Chapter 2 to formulate recommendations.

4.2. Physical Measurements

The measurements taken to determine the size of rooms, hallways, and doors were combined to make an updated set of floor plans for the FSMV. The floor plans were created for both the Eastern Hill Station and the Newport Restoration Facility. They will be referenced throughout this chapter and the following chapter. For clarity the floor plans are labelled below. More detailed versions can be seen in Appendix J – Floor Plans for Eastern Hill and Newport.
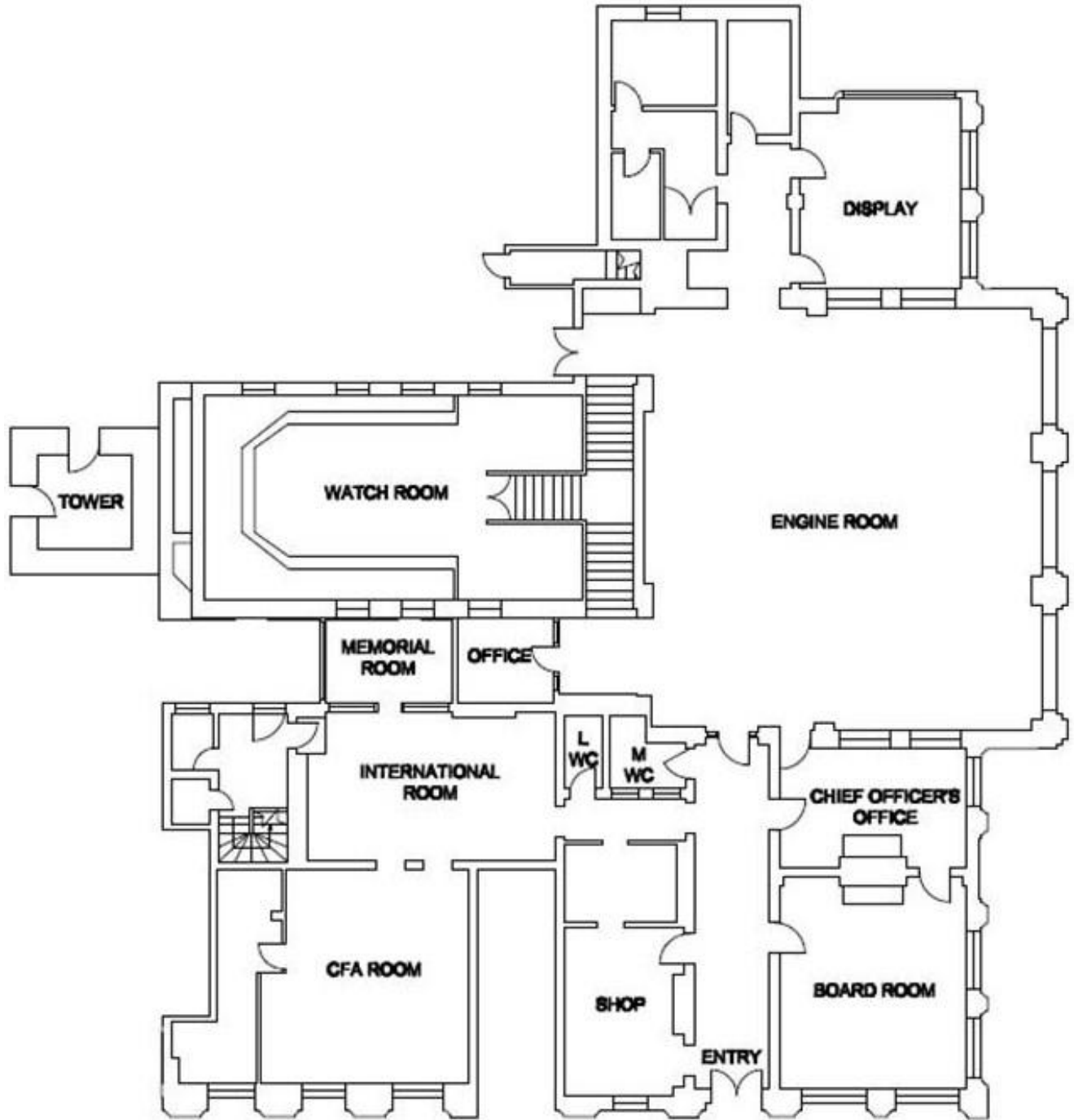
Figure 4.1 – Floor Plan of the Exhibit Area of the Fire Services Museum of Victoria

4.3. Visitor Observations

Table 4.1 – Average Time Visitors Spend in Each Room displays the average time the fifteen unguided groups of visitors we observed spent in each room.

Table 4.1 – Average Time Visitors Spend in Each Exhibit Room

Room Name	Average Time with a Tour		Average Time without a Tour	
	Minutes	Seconds	Minutes	Seconds
Boardroom	3	30	1	12
Chief Officer's Office	4	57	1	22
Engine Room	15	00	6	16
Watchroom	13	38	N/A	N/A
International Room	2	36	2	37
Memorial Room	9	30	1	07
CFA Room	4	00	3	34

4.4. Visitor Surveys

Visitors were surveyed, a copy of the surveys are located in Appendix B – Versions of Visitor Surveys, to discover their background, expectations, exhibit preferences, and what they enjoyed most about their tour. We found that 20% of visitors had fire brigade connections or were fire fighters themselves. We also discovered that 85% of visitors had general or very little knowledge of fire service history. Table 4.4 – Visitors' Thoughts on the Display for the New Exhibit shows the visitors' preferences for a new exhibit based on 10 choices. Table 4.5 – Features Visitors Enjoyed Most shows what visitors enjoyed most about their experience at the Museum.

Table 4.2 – Reasons Visitors Visit the FSMV

Reason the Visitor Visited	Percentage
Leisure/Recreation	34%
You or a relative is a member of a fire brigade	20%
Interest in Fire Services history and equipment	16%
It was recommended	8%
To see a specific/special exhibition	7%
Desire to learn about Fire Services	2%
For study purposes	0%
Other	13%

Table 4.3 – Level of Knowledge Visitors Enter the Museum With

Level of Knowledge	Percentage
Little to None	45%
General Knowledge	40%
In-depth Knowledge/ Professional Experience	15%

Table 4.4 – Visitors' Thoughts on the Display for the New Exhibit Room

New Exhibit Name	Percentage
History of Uniforms with a Hands-on Section	13%
Modern Fire Equipment	12%
How Fires Start and Spread	12%
A Day in the Life of a Melbourne Fire Fighter Throughout the Years	12%
Bush Fires	11%
History of Gear/ Tools/ Chemical Suits	8%
Fire Safety Designs in Buildings	6%
History of Alarms/ Methods of Extinguishing Fires	6%
Progression of Pumps	6%
History of Women in Fire Fighting	5%
Newspaper Articles/ Heroic Stories about Fire Fighters	5%
Fire Prevention	4%

Table 4.5 – Features Visitors Enjoyed Most

Features	Percentage
Fire Appliances/Trucks	38%
Watchroom	22%
History	16%
Equipment	8%
Other	16%

4.5. Staff Interviews

Staff members were interviewed to determine their views of the Museum's purpose and goals and their ideas on possible changes to exhibit and storage space. Table 4.6 – Reasons the Staff Members Joined shows the reasons why each member had decided to join the museum

staff. It also shows that 70% of the members were part of the Metropolitan Fire Brigade (MFB) or Country Fire Authority (CFA) prior to joining the museum staff. In addition, we wanted to hear the staff's ideas as to what the display in the new exhibit room should be, this is shown in Table 4.7 – Staffs' Ideas for Displays to be put in the New Exhibit Room. We also wanted to understand what the staff believes needs to be changed within the storage and exhibit space. The results are displayed in Table 4.8 – What Staff Members Believe should be Changed in the Museum. Table 4.9 - Staffs' Thoughts on the Features Visitors Enjoy Most shows what the staffs believes the visitors' favourite features of the Museum are. Summaries of all the staff interviews are located in Appendix C – Visitor Survey Results.

Table 4.6 – Reasons the Staff Members Joined the Museum Staff

Reasons for Joining	Percentage
Member of the MFB	60%
Interest in History/Trucks	30%
Member of the CFA	10%

Table 4.7 – Staffs' Ideas for Displays to be put in the New Exhibit Room

Ideas for New Exhibit Room	Percentage
Picture/Photo Gallery	31%
History of Uniforms	13%
Smaller Items	13%
Sprinklers	9%
Camera in the Watchtower	9%
History of Recent Bush Fires	9%
History of Fire Fighting in Melbourne	4%
History of Big Fires	4%
Fire Safety	4%
DSE Room	4%

Table 4.8 – What Staff Members Believe should be Changed in the Museum

What should be changed	Percentage
CFA Room needs to be Updated/ Black Saturday Exhibit	22%
Newport needs to be Cleaned/ Inventoried	12%
Move Artifacts from Tony's Office and Use the Office as another Exhibit Room	10%
More Information Plaques Placed throughout the Museum	10%
Rotate Exhibits	10%
Storage Needs to be Organized	7%
New Counters for the Gift Shop	5%
Get Rid of the Pack Rat Mentality	5%
Bring out some New Artifacts	5%
Need Some CFA Medals Displayed in the Memorial Room	5%
Not all Artifacts need to be Displayed at Once (i.e. Fire Extinguishers)	3%
More Hands-on/ Interactive Activities	2%
More Uniforms on Display	2%
Place More Compactors in the Basement	2%

Table 4.9 – Staffs' Thoughts on the Features Visitors Enjoy Most

Feature	Percentage
Fire Appliances/Trucks	42%
Watchroom	11%
Engine Room	11%
Memorial Room	11%
Building Itself	10%
Tours	10%
Helmets	5%

4.6. Analysis of Our Findings

Through analysis of the findings shown in the previous section we were able to arrive at the following conclusions:

- Some of the exhibits should be redesigned to improve visitor experience

- Board Room and Chiefs office are low interest rooms

- CFA room, helmets, fire extinguishers, and fire marks have unfocused displays from a visitor's prospective

- Organization and storage layouts should be improved at the Museum and at the Newport Restoration Facility.

- Proper storage conditions are not being met for

  o VHS tapes

  o 16mm film

  o CD's/DVD's

  o Uniforms

  o Paper documents

  o Vehicles

- The staff and visitors ideas of the most enjoyed aspects of the museum are dissimilar

- New exhibit preferences collected from staff and visitors displayed some commonalities.

4.6.1. Exhibit Space Improvements

The following discussion will demonstrate which aspects of the Museum's exhibit space need to be improved. For example, the evidence presented here shows specifically:

- The Board Room, the Chief Officer's Office and the Memorial Room lack informational panels, causing visitors to lose the visitors lose interest and exit the room quickly

- The CFA Room and the Engine Room displays needed to be changed to display a clearer theme.

4.6.1.1. High and Low-Interest Rooms

The visitor observation results show that the Board Room and the Chief Officer's Office are the first two rooms that visitors pass through. However, visitors generally spend the least

amount of time in these two rooms. For visitors without a tour guide, the average time spent in each room was less than one and a half minutes. The visitor observation results show similar statistics for the Memorial Room: about one minute for visitors without a tour guide.

However, the recorded time in a room does not take in to account the relative size of the room. Visitors who are equally engaged by two rooms will still traverse the smaller room more quickly than the large one. To measure how fast visitors move through a room independently from the size of the room, we used the Sweep Rate Index (SRI) to calculate the area that the visitors move through in one minute. The SRI is calculated by dividing the area of a particular room by the average time that the visitors spent in that room. Then, the percentage of the room area covered by the visitors per minute is calculated by dividing the SRI by the room's area (Bollo & Pozzolo, pg. 5). A large percentage means that the visitors pass through most of the room in only one minute. The area of a particular room, the average time that a visitor spend within that room without a tour guide, the calculated SRI and the percentage of that room covered per minute are shown in Table 4.10 – Average Visitor Time in Rooms with SRI.

Table 4.10 – Average Visitor Time in Rooms with SRI

Room Name	Area (m^2)	Average Time without a Tour		Sweep Rate without a Tour (m^2/min)	Percentage of Room Area per Minute
		Minutes	Seconds		
Memorial Room	10.6	1	07	9.48	89.4
Board Room	38.3	1	12	32.00	83.5
Chief Officer's Office	19.9	1	22	14.52	72.9
International Room	37.3	3	25	10.92	29.2
Engine Room	179	6	16	28.52	15.9
CFA Room	42.9	8	01	5.45	12.7

The values for percentage of a room covered per minute in Table 4.10 – Average Visitor Time in Rooms with SRI shows that an average visitor moves as much as six or seven times

more rapidly through the space in one of the low-interest room than in the CFA room. In other words, visitors' quick tours of the low-interest rooms are not a consequence of their size.

One possible explanation for this result is that the visitors were not presented with enough information to put the displayed artifacts into historical context. Some staff members seem to agree with our explanation: 10% of the staff members said that there needs to be more information displayed about the artifacts throughout the Museum. The lack of historical or other context is a key omission because "objects in a museum are seldom so intrinsically interesting that they can be presented to the public on their own. They need to be interpreted to the visitor" (Bertram, pg. 3). From this point on, the Board Room, Chief Officer's Office and the Memorial Room will be referred to as the low-interest rooms because of the low level of interest that the visitors exhibit when passing by these rooms.

In contrast to the low-interest rooms, the visitors exhibited a higher level of interest when passing by the Engine Room. Table 4.10 – Average Visitor Time in Rooms with SRI shows that the average visitor without a tour can cover about 16% of the room per minute. This low percentage indicates that the visitors slowed down while moving through the exhibits in the Engine Room. About 38% of the visitors specifically indicated on their survey that they enjoyed seeing the fire appliances. This claim is further supported by the staff interview results: 12 out of 15 staff members interviewed said that the fire appliances in the Engine Room are the most attractive display to the visitors. The second most popular room is the Watchroom, where 22% of the visitors specifically indicated it as their most enjoyed aspect of the Museum. Mr. Ron Baker stated that "the Watchroom is the heart of the fire station." This attests to its popularity with the visitors. The Watchroom and the Engine Room will be collectively referred to as the high-interest rooms for the rest of this chapter.

43

It would be beneficial for the Museum to know why the visitors exhibit a higher level of interest in high-interest rooms than they do in the low-interest rooms. The next section identifies and discusses possible factors that affect the visitors' level of interest.

4.6.1.2. Factors that Affect Visitors' Level of Interest

We discovered that the following factors may have an effect on the visitors' level of interest:

- The amount of information about the featured artifacts presented to the visitors;
- The level of visualization presented to the visitors;
- The level of interaction between the visitors and the exhibit.

A marked difference between high interest and low interest rooms is the amount of information that reaches the visitor. High-interest rooms always portray information to the visitors while low interest rooms frequently do not. The most apparent example being the fire appliances in the Engine Room: each fire engine has extensive background information displayed next to it. For the Watchroom, visitors are not allowed to enter without a staff member. This means the visitors are always presented with the room's background information every time they visit the room. Additionally, the staff members are generally more enthusiastic about the vehicles and the Watchroom compared to other exhibits in the Museum. In fact, three staff members mentioned that they worked in the original Watchroom during its time in service, and about one-fourth of the staff joined the Museum out of personal interest in vehicles and photography.

Beside the background information to help the visitors put the artifacts into historical context, Mr. John Schintler phrased it best when he said that the Engine Room also has a lot of visuality and it's interesting to see the old versus the new.   In the Engine Room, the fire appliances are organized in chronological order to show the progression of fire appliances over

the years. The visitors are also allowed to look inside an old electromechanical fire alarm to see its inner workings. For the Watch Room, the fact that it was restored to its original state is very enjoyable for the visitors. Beside the 22% who indicated the Watchroom as their most enjoyable aspect of the Museum, there were two visitors who mentioned that they worked in the Watchroom during their time in the fire services. Bertram also pointed out in his book that "a museum visit is a series of small experiences, the recognition of a photograph, the discovery of how something works, the smell of a forge" (pg. 4).

The visitors are allowed to touch many of the items on display in the Engine Room. For example, the children are permitted to climb on the deck of one of the fire appliances, put on a plastic helmet and take pictures. The visitors can also activate an old street alarm and see the gears turning. These examples are just two of the many hands-on sections that the Engine Room presents to the visitors. An older marketing and business plans for the FSMV identified hands-on exhibits as the most popular type of display (Holistic Business Consultants, 1994), consistent with the experience of museums professionals who point out that "tactile sense is a very strong source for information" (Bertram, pg.10). Even though the visitors are not allowed to touch the switch boards in the Watchroom, they can get close enough to see the intricate electrical wiring of the boards.

4.6.1.3. Rooms without Clear Themes

Based on the staff interviews and our own observations, many of the exhibits needed to be changed in order to display a clearer theme. During the interviews, a third of the staff members indicated that the CFA Room displays needed updating. From our own observation, we concluded that some of the displays in the Engine Room needed to be clarified as well.

In the CFA room, we noticed many duplicate items on display; "duplicates…should be taken off display and put into reserve…" (Bertram, pg.3).   The duplicates create many small displays within the room that have no obvious connection with other displays around them. We also noticed that many artifacts in the CFA room were in need of restoration to prevent further deterioration. An example of this can be seen in Figure 4.2 – An Example of a Deteriorating Items in Need of Restoration. The old pipe is covered in cement residue and has suffered extensive water damage. Furthermore, one staff member mentioned that the pipe's lining contains asbestos and was not sealed before placing it on display; which may pose a health hazard to visitors and staff.

Figure 4.2 – An Example of a Deteriorating Item in Need of Restoration

Through our own observations, we realized that without a tour guide, it was difficult to determine the overarching theme of the displays in the CFA Room. The staff originally dedicated the room to display the history and equipment used by the CFA, but a number of

artifacts in the room did not seem to relate to the CFA. An example of this was the glycol ball launcher, as seen in Figure 4.3 – Glycol Ball Launcher, which was used by the Department of Sustainability and Environment (DSE) instead of the CFA. Some of the museum staff members stated that some displays in the room, like the bushfire display, were out of date by more than a decade. Mr. Bryan Douglas mentioned during his interview that this caused the display area to become "static," so that returning visitors saw the same artifacts on display they had seen there years before.

Figure 4.3 – Glycol Ball Launcher

Visitor survey responses and observations indicated that the Engine Room was quite popular with visitors, as shown in Table 4.5 – Features Visitors Enjoyed Most (page 38). However, some of the smaller displays such as the helmet, fire extinguisher, and fire mark

displays, suffered from the same lack of informational displays as in the low-interest rooms. "Each display should have a starting point, something that attracts the attention of the visitor and says what the exhibit is about" (Bertram, Pg. 11). The information provided for these displays merely identified them as helmets, fire insurance marks, and fire extinguishers; making a guided tour necessary to understand the differences between the varying models.

Another problem with the helmet and extinguisher displays was that artifacts from different eras or countries were not displayed as having an order or categorization. This was especially apparent with the helmet display, where helmets were grouped by country of origin, but that information was not displayed. In addition, these exhibits display multiple duplicates which clutter the exhibit space without adding informational value to the display. The combination of multiple artifacts of the same model and a lack of clear organization made it necessary for visitors to have a guide to explain the displays to them.

The lack of organization and information caused many visitors to overlook the smaller displays in the engine room and simply notice the vehicles. The results from the visitor surveys made this apparent as can be seen in Table 4.5 – Features Visitors Enjoyed Most. Many visitors identified the fire appliances as their favourite aspect, but only a few mentioned other displays in the engine room.

4.6.2. Comparisons of Visitor and Staff Expectations

This section analyses visitor surveys and staff interviews to uncover similarities in their opinions of current exhibits. It will also identify similarities in terms of ideas for a new exhibit.

4.6.2.1. Ideas on Most Attractive Exhibits

As shown in Table 4.5 – Features Visitors Enjoyed Most (page 38), a 38% majority of the visitors specifically identified fire appliances as the aspect of the Museum they most enjoyed. A 42% majority of staff members also responded that the fire appliances are the most attractive exhibit meaning that the opinions are similar for both groups.

From the visitor surveys, 24% indicated that the guided tour was the most enjoyable aspect and 22% indicated the Watchroom as their favourite aspect of the Museum. This is a deviation from the staff responses where only 2 out of 15 staff members identified the Watchroom as the most enjoyed aspect and 2 out of 15 indicated the guided tour. It is unclear why the majority of the staff did not indicate the Watchroom and the guided tour as the Museum's most attractive aspects. This may uncover a discrepancy in how the Museum's staff tends to think of their exhibit space and how a visitor thinks of it. It may be that the staff places more value on the condition of individual artifacts while visitors place more value on their museum experience.

4.6.2.2. Ideas for New Exhibit

Table 4.11 – Summary of Staff and Visitor Preferences

Staff Preferences	Percentage	Visitor Preferences	Percentage
Photo/Painting Gallery	31%	History Of Uniforms with a Hands-On Aspect	13%
Uniforms Display	13%	How Fires Start and Spread	12%
Display Cases with Small Items	13%	Modern Fire Equipment	12%

We collected opinions on what that new exhibit space should become, and the top 3 results are shown for both staff and visitors in Table 4.11 – Summary of Staff and Visitor Preferences below.

The only exhibit idea for which the visitor and staff responses were similar was a uniform display. Although only Mr. Bryan Douglas, the current vice president of the Museum, specifically mentioned hands-on exhibits, a survey that a school group conducted for the FSMV in 1994 concluded that "Hands-On" was the most popular type of exhibit. (Holistic Business Consultants, pg. 29). Also, Bertram states that "The tactile sense is a very strong source for information." (Bertram, pg 10). For an exhibit, this means that the ability to touch an object would contribute to the visitor learning more than just viewing the artifact would. It is clear that a hands-on exhibit involving uniforms would best satisfy both the visitors and staff.

Even though all the other exhibit types listed in the table were mentioned by either staff or visitors, they can be combined to satisfy both sides. For example, a photo gallery can be incorporated into the History of Uniforms with a Hands-On Aspect, showing the progression of uniforms over the years. Another example is incorporating the Modern Fire Equipment display with the existing exhibits throughout the Museum by including modern equipment into the displays.

4.6.3. Storage Evaluation

The way in which the FSMV makes use of their exhibit space is only half of the considerations for space usage. How the FSMV organizes its storage space can have multiple effects on the condition of the artifacts, as well as the exhibit layout. When compared against

background research, the storage practices at the FSMV, as well as the Newport Restoration Facility, could be improved in several areas. Specifically:

- Improvement of object layout to maximize accessibility

- The inventory should be updated

- The inventory should be more descriptive

- The preservation practices can be improved upon

4.6.3.1. Eastern Hill Museum

For the Eastern Hill Museum, the potential efficiency of its storage space is not met. A meeting with the board of museum directors revealed that, in general, the mentality of the museum is to collect as many artifacts as possible. This is generally beneficial to a museum, but without a plan on how to store these new artifacts, problems with organization and preservation soon arise. The FSMV has a reasonable amount of resources for improving storage and preservation; they simply just need help to begin incorporating these resources.

4.6.3.1.1. Organizational Improvements

One major problem, as identified by the museum curator, Mr. Tony Paynter, is that the current inventory is only 80% complete and that the existing entries do not describe the location of the item. This means that locating an object in storage is entirely dependent upon the memory of the staff members. This is a very ineffective method as staff members who know the location of an item may not be present when an artifact needs to be found.
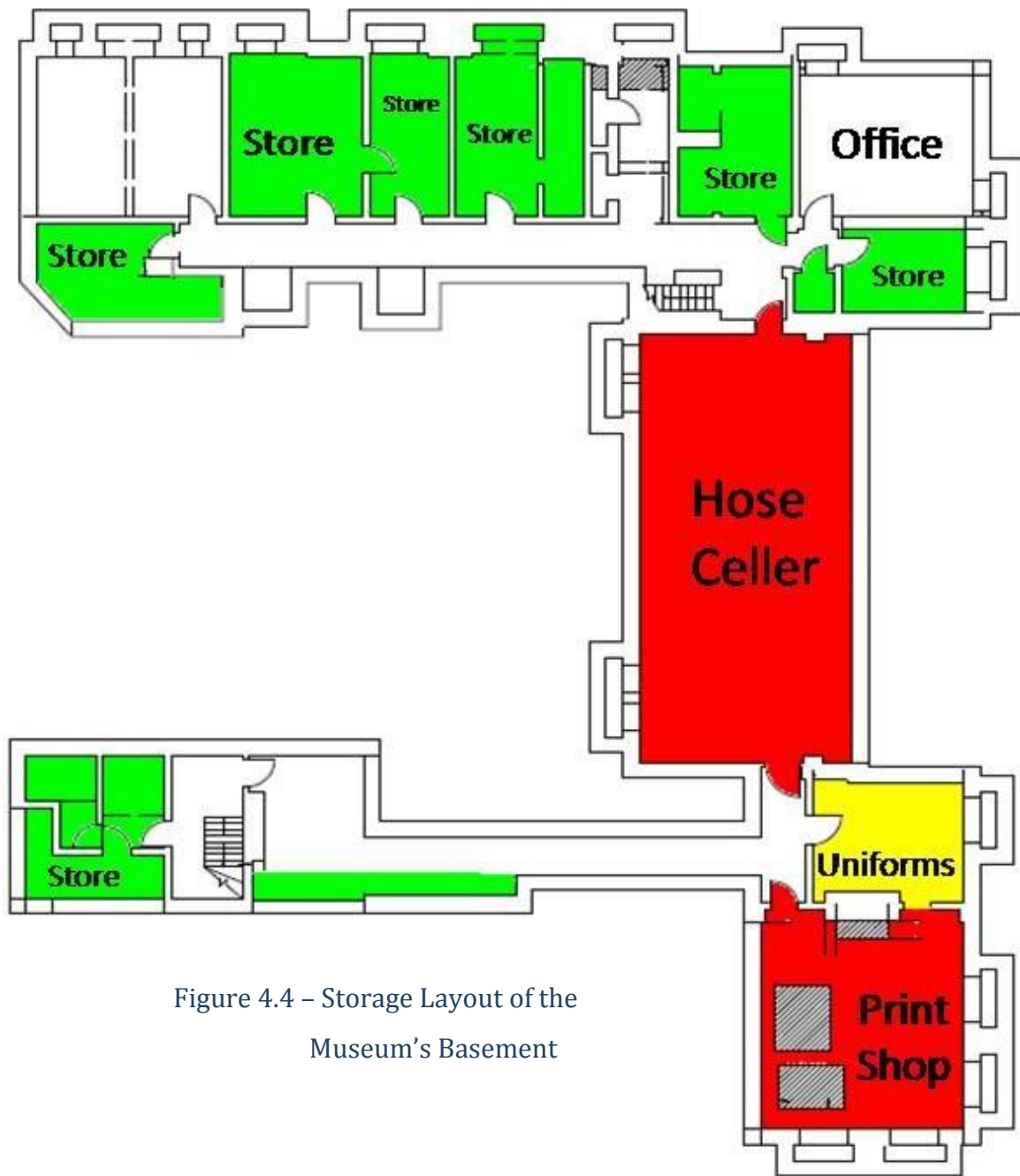
Figure 4.4 – Storage Layout of the
Museum's Basement

This problem is exacerbated by the fact that the Museum's total collection is stored throughout many different storage areas as highlighted in Figure 4.4 Storage Layout of the Museum's Basement and Figure 4.5 – Storage Layout of the Museum's Ground Floor. For instance, uniforms are stored in the yellow rooms as shown in both figures. If a specific uniform needs to be located it would require a staff member who knew the location of all the uniforms and in which room the particular uniform was located.
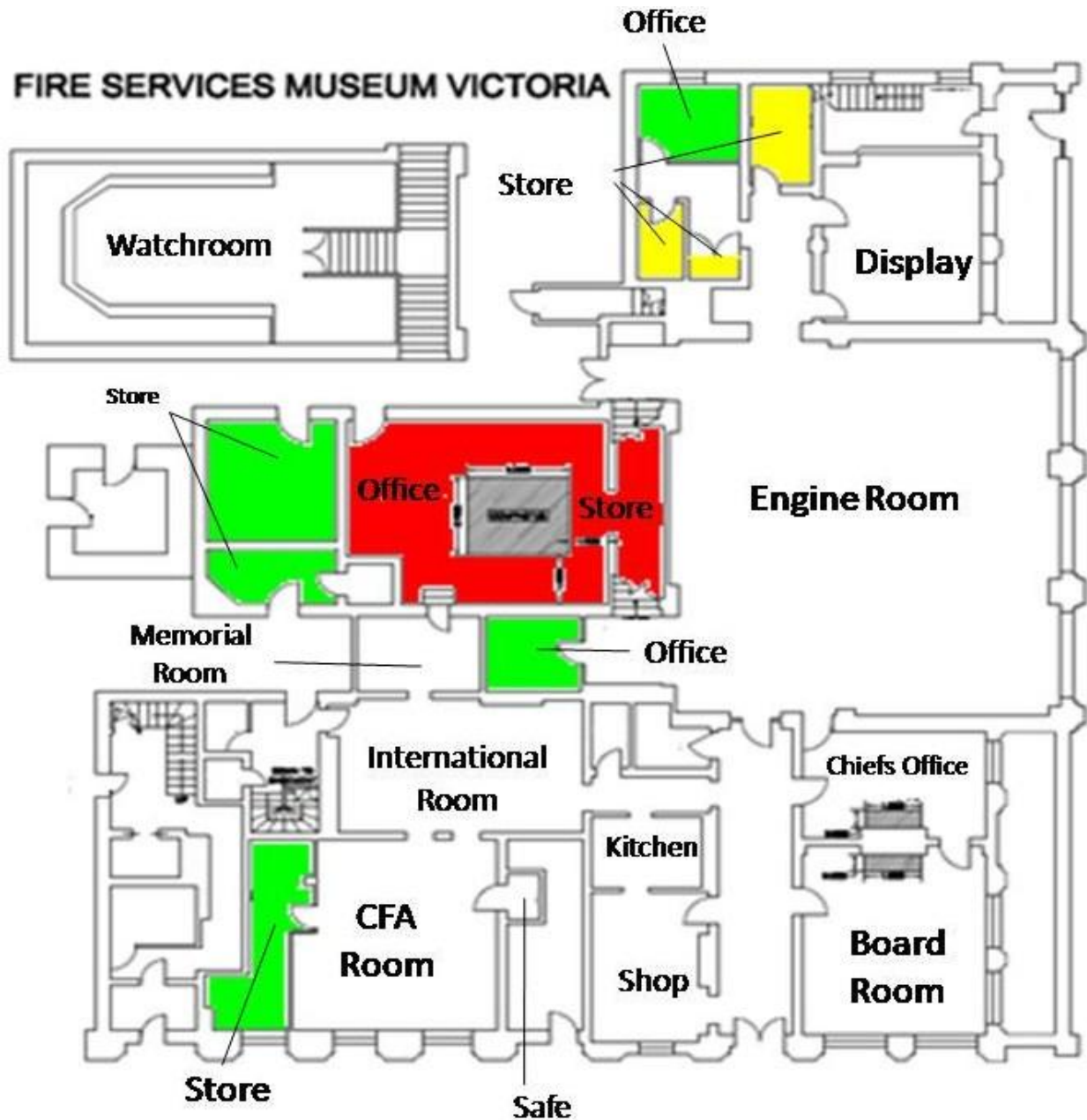
Figure 4.5 – Storage Layout of the Museum's Ground Floor

If a full inventory were available and could describe the locations of artifacts within storage then any staff member could locate any item. Good storage practices, as discussed in Chapter 2, show that artifacts of the same type should be stored together to facilitate easy location.

Easily identifying the location of an artifact is only half of the challenge of proper organization. Proper storage practice also includes allowing items to be accessible within their given storage space. The Museum's storage layout, and hence accessibility, could be improved in several areas, which are highlighted in red in both Figure 4.4 – Storage Layout of the Museum's Basement and Figure 4.5 – Storage Layout of the Museum's Ground Floor. In the Hose Cellar, the staff utilized a perimeter storage layout as shown in Figure 4.6 – Examples of Perimeter Storage. This is generally beneficial for packing efficiency; however, the boxes are stored such that the ones against the wall are difficult to get to without first moving a number of other boxes.

Figure 4.6 – Examples of Perimeter Storage

Overall, the storage practices of the Eastern Hill Museum Facility needed improvement. The main challenges for this facility are: an incomplete inventory, scattered storage, and poor

layout. Improvement in these areas would yield a much more organized storage where artifacts are easily located and accessed.

4.6.3.1.2. Preservation Techniques

The FSMV staff also needed to improve their preservation techniques. This requires recognition of where preservation practices are not ideal within the total museum storage. Table 4.12 – Comparison of Ideal and Current Preservation Practices, shown below, provides a comparison of ideal preservation practices with the staff's current practices for various items.

Table 4.12 – Comparison of Ideal and Current Preservation Practices

Artifact Type	Ideal Conditions	Current Conditions
Vehicles	24-25°C < 35% RH No direct sunlight Clean Pollution filters reduce particulate and gaseous pollutants in storage area	24-25°C No (de)humidifier Holes in roofs and walls allow sunlight, rain, pollutants, and pests in Many vehicles show signs of deterioration (rust, chipped paint, etc.) Most vehicles do not have a dust cover
Documents	15 -20°C 45 - 55% RH Dark Protected from water damage	Varying temperatures (depending on storage location) Varying relative humidity (depending on storage location) Most documents stored in dark rooms Most windows have UV filters and/or curtains Many albums show signs of water damage and are disintegrating
Uniforms	18 - 24°C 45 - 60% RH Low-No Lighting Clean	Varying temperatures (depending on storage location) Varying relative humidity (depending on storage location) Most uniforms stored in dark rooms Most windows have UV filters and/or curtains

		Uniforms are at best protected by a dust cover
		Some areas smell of mildew
VHS/magnetic tapes, CD's, & DVD's	15 - 20°C 30 - 50% RH Dark Stored upright	Varying temperatures (depending on storage location) Varying relative humidity (depending on storage location) Most tapes/disks stored upright in sleeves/cases
Acetate Films	< -18°C 30% RH Dark Stored upright	Varying temperatures (depending on storage location) (all are above 15°C ca. 60% RH films protected from light by cases cases stored on their sides
Photographs	< 20°C 30 - 50% RH Dark	
Paintings	18 - 24°C 40 - 65% RH Dark Hung or supported evenly on side	Stored at room temperature No (de)humidifier Some paintings covered by sleeves Frames not evenly supported on storage racks

As shown in Table 4.12 – Comparison of Ideal and Current Preservation Practices, the storage conditions for all these artifacts are not ideal. This is understandable as the FSMV is a volunteer-based organization that operates on donations and ticket sales to support them financially. It is not reasonable to expect the storage conditions to be perfect.

However, there are storage areas at the museum that have adequate storage conditions that are not being utilized to their full potential. There are also storage areas that exhibit clear degradation of the artifacts.

The Hose Cellar, as shown in Figure 4.4 – Storage Layout of the Museum's Basement, is a very useful storage space. It can be maintained at a stable temperature and humidity level, has

no unwanted light sources, and it has 87 m^2. The large size allows for many artifacts to be stored there. The temperature, humidity, and light conditions are also able to fit an appropriate storage range for uniforms, paper documents, and paintings. This means the space can be used to properly store different types of artifacts.

The museum also has a large safe, labelled in Figure 4.5 – Storage Layout of the Museum's Ground Floor, which can maintain stable conditions much like the Hose Cellar. The safe is relatively small when compared to other storage areas; it is only 17 m^3. However, due to its stable environment, it has the potential to be a storage area for small collections that require specific conditions. Also, because it is small, regulating temperature and humidity is easier to do than with a larger room. The safe has some items already in storage but room can be made for more artifacts.

As for rooms with improper preservation techniques, the major problem areas are uniforms in the store room across from the new exhibit space and the paintings in the office beneath the store room. The uniforms in the room across from the new exhibit space are showing signs of mildew and mold growth. This means that proper humidity conditions are not being employed for this room. The paintings in the office beneath the storeroom are stored where they are exposed to light and stored leaning against one another, damaging the frames. These two types of artifacts are showing clear signs of degradation and should be given priority when planning new storage.

4.6.3.2. Newport Facility

The Newport Restoration Facility exhibits its own set of problematic storage practices. The main problem, as identified by the staff, is that the space is overcrowded, which limits accessibility. Newport contains 89 fire appliances dating from the 1800's to modern fire appliances. These appliances are dispersed throughout 5 main storage bays. The floor plans for the two biggest storage bays, where we observed most of the Newport facility's problems on preservation and accessibility, are shown in Figure 4.7 – Vehicle Layout for Main Storage Bay 1 and Figure 4.8 – Vehicle Layout for Main Storage Bay 2. The vehicles are coloured-coded to show how many vehicles have to be moved to get access to a particular vehicle. The meaning of each colour is shown in the Table 4.13 – Number of Vehicles that Need to be Moved to Access a Given Vehicle as Shown in Fig. 4.7 and 4.8 below:
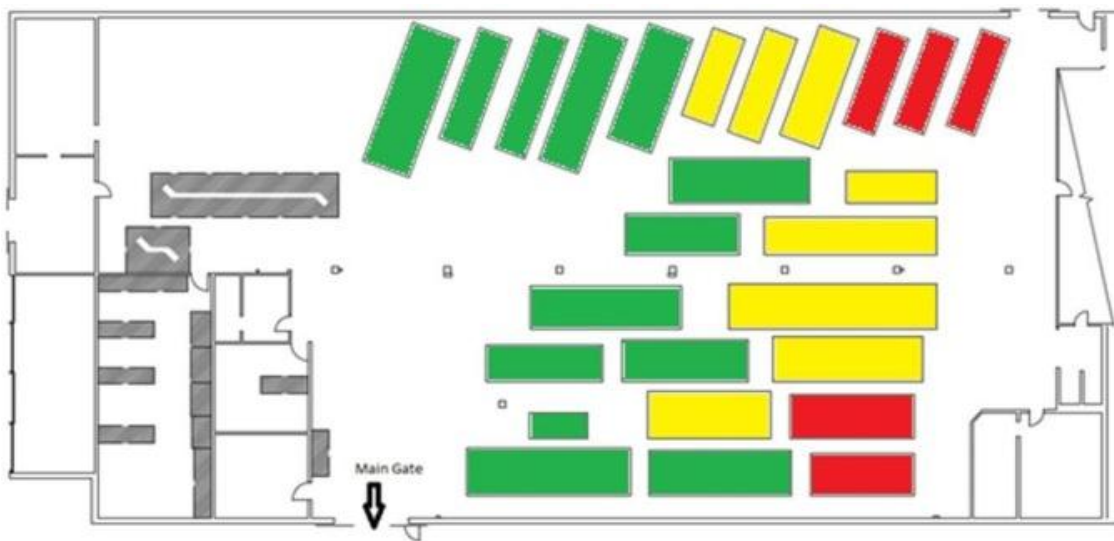

Figure 4.7 – Vehicle Layout for Main Storage Bay 1

Figure 4.8 – Vehicle Layout for Main Storage Bay 2

Table 4.13 – Number of Vehicles that Need to be Moved to Access a Given Vehicle

Colour	Number of Vehicles that Need to be Moved
Green	None to 1
Yellow	2
Red	3+

As shown in Figure 4.9 – Major Storage Bay 2 in Newport, the floor space at the Newport facility is simply covered with fire appliances, fire fighting equipment and other miscellaneous items like spare parts and scrap wood. As seen in Figure 4.9 – Major Storage Bay in Newport there are also dilapidated structures that block valuable floor space. Allowing 1,189 m^2 of equipment to be stored in only 4,025 m^2 of floor space causes major problems with accessibility.

The current layout of appliances for the Newport facility is shown in Figure 4.7 – Vehicle Layout for the Main Storage Bay 1 and Figure 4.8 – Vehicle Layout for the Main Storage Bay 2. In order to move one vehicle the staff may have to move as many as 4 other vehicles. This lack

of accessibility is not an ideal storage layout and makes it difficult to repair and restore many of the vehicles.

Figure 4.9 – Major Storage Bay 2 in Newport

To compound the problem of poor accessibility, many of the vehicles are immobile and the size of the staff is only about 5 people. This makes it difficult to implement any changes as there are simply not enough people to take on the task of repairing so many vehicles.

Preservation practices for the vehicles at Newport are minimal. At most a fire appliance will have a dust cover to keep it clean and a mildly dark area to be stored in. Many of the vehicles are exposed to direct sunlight, varying temperatures, bird droppings, and moisture. These storage conditions will in no way facilitate the longevity of these historic vehicles.

4.7. Conclusion

The findings discussed in this chapter permitted our team to discover the major problems and the major positive aspects of the FSMV. Major issues with exhibit space pertain to lack of information and coherency within certain exhibits. Problems with storage space are caused by lack of organization and poor preservation techniques. These problems are counterbalanced by a few very well designed exhibits and a very passionate staff.

Our findings also permitted us to identify feasible options for future changes to the Museum, which is the focus of the last chapter. The next chapter will discuss in detail the creation of the exhibit guide.

5. Exhibit Guide Design

We produced a simplified black-and-white version of a new exhibit guide and a full colour version of an informational booklet for the Museum. The simplified version is given out free-of-charge as visitors enter the exhibits, and the colour version is sold as a souvenir.

These brochures provide background information on the exhibits and guide visitors around the museum. Additionally, the coloured version could help to attract future patronage to the FSMV by projecting a brighter and fresher image of the museum.

To accomplish these goals, we integrated professional expertise on exhibit guide design, the wishes of the FSMV staff gathered during our interviews, and the expectations of visitors sampled through our surveys.

5.1. Professional Design Principles

The Economic Planning Group of Canada (n.d.) has identified three distinct types of brochure, a classification that applies as well to exhibit guides:

- Informational – mostly descriptive;
- Promotional –aim to sell an attraction or business;
- Lure –promote a destination or attraction.

For promotional and lure brochures, "the conventional wisdom stresses adherence to the principle called AIDA (Attention, Interest, Desire, Action). The cover of the brochure is meant to grab the attention of the brochure 'browser'. This can be accomplished through the use of bright colours and the illusion of the appearance of size (Martin 1983), or through a primary selling message or positioning statement" (Reid 1989). For the purpose of an exhibit guide, promotional and lure types are the same because they both try to attract more visitors. Compared

to promotional and lure types, informational brochures, "such as directories and travel guides" (Getz & Sailor, 1993), are only meant to provide information to the reader; and thus typically do not adhere to the AIDA principle.

Essentially, an exhibit guide is informational because it provides information to the visitors about the exhibits. To be informative, an exhibit guide should offer guidance, as well as background information about the items on display. This information can be historical facts, personal stories, or background information on a donor, to list a few possibilities. This does not mean that the exhibit guide cannot be promotional and luring. In fact, "a brochure can encompass all three [brochure types]" (Getz & Sailor, 1993).

The decision to design a museum exhibit guide that covers one or every type belongs to the museum staff. This decision is crucial to the design process because it affects the focus, as well as the appearance and contents, of the exhibit guide. To help the FSMV staff make this decision, we studied sample exhibit guides from different museums. The goal is not to discover a template on how to design an exhibit guide but rather the guiding principle behind it.

To achieve this goal, we had to discover how exhibit guides of a particular type, i.e. promotional, informational, and lure, are designed. If we know how to design exhibit guides of a particular type, then designing one that encompasses multiple types would only be a matter of combining the design elements of those types.

We selected three museums: the Western Australian Maritime Museum (WAMM), the Rock and Roll Hall of Fame Museum (RRHFM), and the United States Holocaust Memorial Museum (USHMM). These three museums were chosen because their respective exhibit guides seems to belong either in informational or promotional/lure type.

For criteria, we looked at each museum's theme, the image it projects, whether the exhibit guide projects the same image, as well as the focus of the exhibit guide.

From these museums, we discovered that:

- The exhibit guides project the same image as their respective museums, both in content and appearance;

- The exhibit guide can belong to any combination of the three brochure types;

- The focus of the design is whatever information that best convey the museum's message to the visitors.

Further explanation and evidence of our findings is discussed in the case studies, where we analyse the exhibit guides and their respective museums using the criteria mentioned above.

5.1.1. Case Study: The United State Holocaust Memorial Museum

The USHMM intends its exhibits to be self-guided, as stated on the first page of the exhibit guide itself. Without a tour guide, the visitors have to rely on the exhibit guide alone to get the full picture. This would require the exhibit guide to explain the background of the items on display, as well as the relationships between the items, just to list a couple of possibilities. Achieving such a goal would make the exhibit guide close to being exclusively informational.

Figure 5.1 – USHMM Exhibit Guide
Cover

Indeed, the exhibit guide provided plenty of background information. Historical facts and quotes helped put the items on display in historical context. Pictures were included to guide the visitor's attention to the appropriate artifacts. There was also information about related exhibits that are not displayed in the same area. Finally, the guide included a detailed map showing the exhibit layout and even suggested an exhibit viewing order.

The colour scheme seemed bleak, as if to match the contents of the exhibit guide. There also seems to be a lack of promotional phrases. Even the contact information takes up a very modest space at the back of the exhibit guide.

It is no surprise that both the USHMM and its exhibit guide seem to project a very solemn image since the theme of the museum is a commemoration of the horrific events during the Holocaust. It is also clear that the focus of the exhibit guide is to provide as much

background information as it takes for the visitors to fully grasp the gravity of the museum's message.
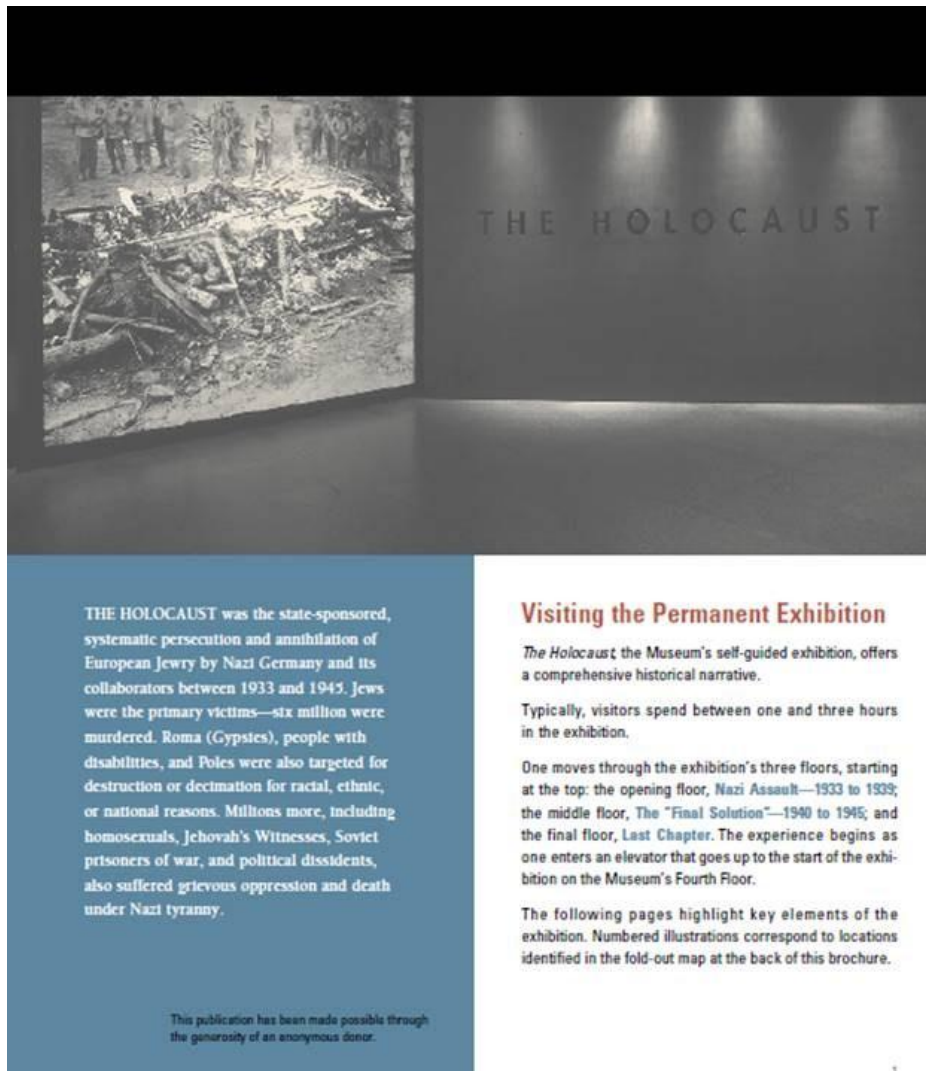

THE HOLOCAUST was the state-sponsored, systematic persecution and annihilation of European Jewry by Nazi Germany and its collaborators between 1933 and 1945. Jews were the primary victims—six million were murdered. Roma (Gypsies), people with disabilities, and Poles were also targeted for destruction or decimation for racial, ethnic, or national reasons. Millions more, including homosexuals, Jehovah's Witnesses, Soviet prisoners of war, and political dissidents, also suffered grievous oppression and death under Nazi tyranny.

This publication has been made possible through the generosity of an anonymous donor.

Visiting the Permanent Exhibition

The Holocaust the Museum's self-guided exhibition, offers a comprehensive historical narrative.

Typically, visitors spend between one and three hours in the exhibition.

One moves through the exhibition's three floors, starting at the top: the opening floor, Nazi Assault—1933 to 1939; the middle floor, The "Final Solution"—1940 to 1945; and the final floor, Last Chapter. The experience begins as one enters an elevator that goes up to the start of the exhibition on the Museum's Fourth Floor.

The following pages highlight key elements of the exhibition. Numbered illustrations correspond to locations identified in the fold-out map at the back of this brochure.

Figure 5.2 – USHMM Exhibit Guide First Page

5.1.2. Case Study: The Rock and Roll Hall of Fame Museum

In contrast to the USHMM's exhibit guide, the RRHFM's guide seems close to being exclusively promotional and lure type. The reason is partly because the guide adheres, almost strictly, to the AIDA principle.

On the cover, the exhibit guide attempted to promote the museum as a tourist attraction using bright colours, a picture of the facility and promotional phrases. Within the exhibit guide, pictures of popular items were shown, along with a brief background of each. Public information about the operation of the museum (i.e. operation hours, ticket prices, etc.) was included. Advertisement of other events at the museum was also shown. Finally, instead of a map, the guide had a list of events or exhibits of interest for each floor.
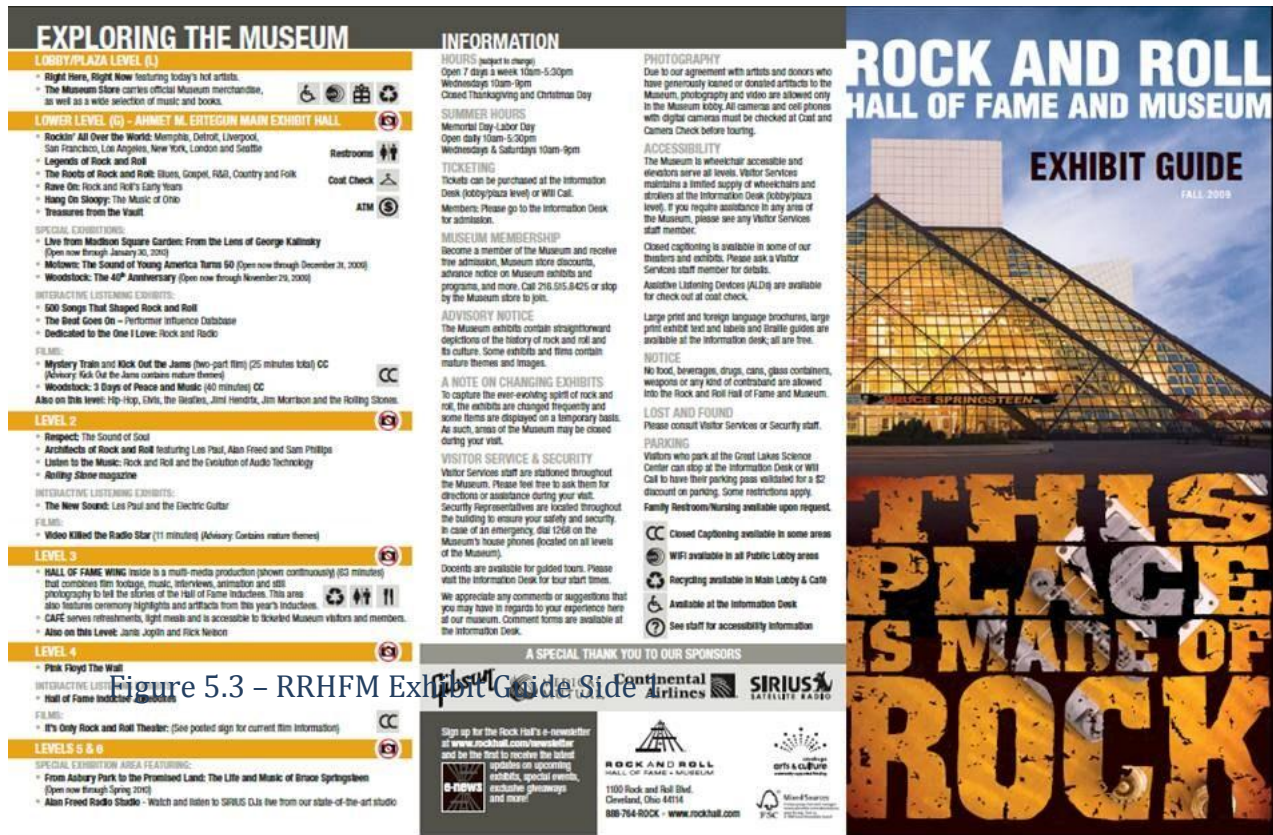
Figure 5.3 – RRHFM Exhibit Guide Side

The guide provided very brief background information on the items on display. This lack of background information means the guide's focus is not the exhibits. Instead, the guide seems to focus more on the museum itself. In fact, more than half of the exhibit guide was filled with promotional phrases and information about the museum.

Again, the RRHFM and its exhibit guide both project the same bright image. This seems fitting, as the theme of the museum is a celebration of the important musical figures and their careers throughout the years.

Figure 5.4 – RRFM Exhibit Guide Side 2

The focus of the exhibit guide was attracting more visitors to the museum. Even though the guide's focus did not directly coincide with the theme of the museum; it is a part of the museum's message. It is clear that the visitors provide the financial means for any and all museums to operate. Therefore, attracting more visitors is an integral part of any museum's message.

5.1.3. Case Study: The Western Australia Maritime Museum

Similar to the RRHFM's exhibit guide, the WAMM's guide also adhered to the AIDA principle, with little focus on the exhibits themselves. In this aspect, the WAMM's guide is

68

identical to the RRHFM's guide, which made both exhibit guides close to being exclusively promotional/lures type.

On the cover, we can clearly see design elements that are recommended by Martin (1983) and Reid (1989): a bright colour scheme, a picture, as well as the logo, of the museum; and the promotional phrase: "The most exciting museum afloat". Inside the exhibit guide, a brief information on the exhibits is included; as well as public information about the operation of the museum. Additionally, a map of the exhibit layout is included to help the visitors navigate through the museum.

Figure 5.5 – WAMM Exhibit Guide Side 1

The WAMM's theme is the history of maritime activities (fishing, naval defence, etc.), which does not necessarily project a bright image. However, the exhibit guide seems to project a bright image. This difference may be an attempt to brighten up the WAMM's image using the exhibit guide.

Finally, even though the guide focuses more on the museum, it still helps convey the museum's message. The reasoning is the same as the case study on the RRHFM's guide. This seems even more likely, considering the possibility of an attempt to brighten up the museum's image appeal to a wider audience.
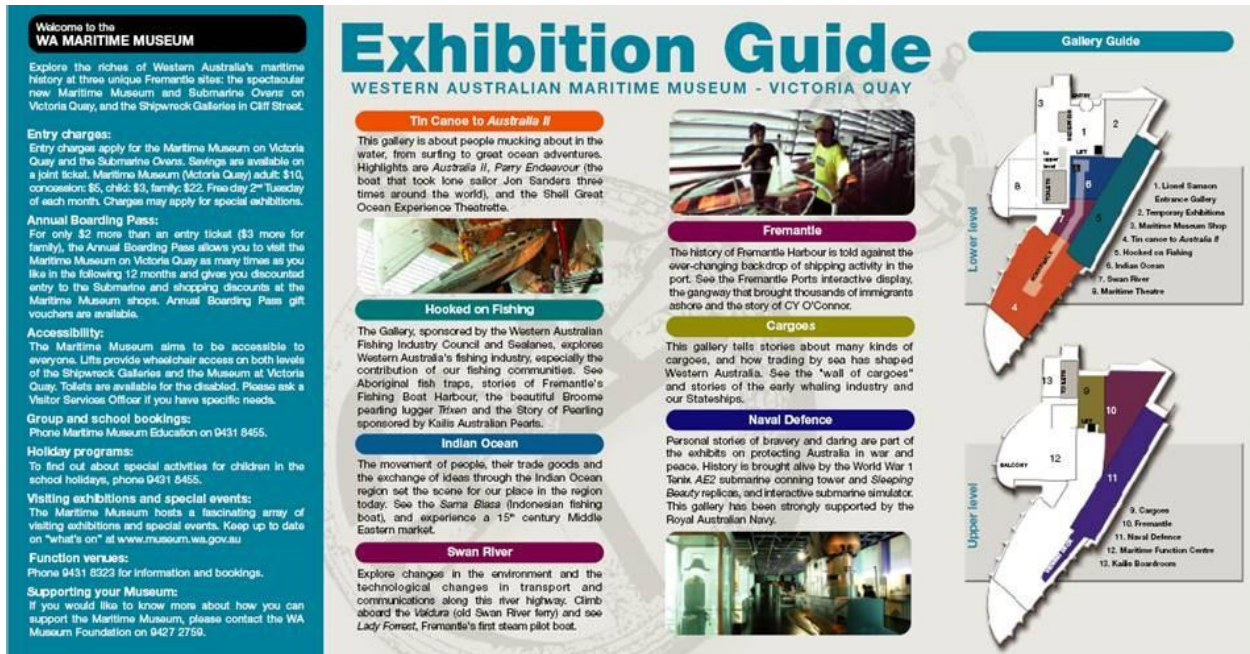
Figure 5.6 – WAMM Exhibit Guide Side 2

5.2. Visitor and Staff Expectations

As mentioned at the beginning of this chapter, we needed to find out the staff's wishes, as well as the visitors' expectation, to accomplish the exhibit guides' goal. To find out what these wishes and expectations are, we need to know the following information.

- What information does the staff think should go into the brochure
- What information the visitors should know before they enter the Museum
- What information may the visitors expect to see in the Museum

Since the museum staffs ultimately decides the final design of the exhibit guide, important to know what their wishes are early on to avoid discrepancies.

At first glance, the exhibit guide should give visitors an idea of what the FSMV is about, without overwhelming them with too much information. In other words, the exhibit guide should "prepare" the visitors by giving them an idea of what to expect from their museum visit, but not too much that it becomes overwhelming.

Giving the visitors an idea of what to expect from the museum would work for those that have never heard of the FSMV before; however it would not be as effective toward those who have already formed their own ideas. For these visitors, their own ideas may or may not be similar to the idea suggested in the exhibit guide. If these ideas are too dissimilar, these visitors may lose interest in what the FSMV has to offer. To avoid this situation, possible visitors' ideas and expectations from the museum should be anticipated and catered to.

This information was collected using visitor survey and staff interviews. The details of these methods were discussed in Chapter 3. Full listings of the questions are shown in Appendix C – Visitor Survey Results and Appendix E – Staff Interviews.

5.3. Data Findings

The following important findings were extracted from the visitor survey and the staff interview results.

First, the museum staff had a clear idea of what information should be included in the exhibit guides. A list of all the information that the staff wished to be included was given to us and is shown in Appendix I – Information Included in the New Brochures. This information consisted of background information on the exhibits, the museum, as well as the staff members.

Second, 60% of the staff said that the purpose of the FSMV is to preserve the history of the artifacts as well as the Museum building itself. Also, more than ¼ of the staff members wanted to educate the public about the history and operation of the fire services.

Finally, about 67% of the staff said that the Museum's target audience is the general public. Based on our observations, the staff's perception of who the target audience is matches the type of visitors the visit the Museum most frequently. In fact, 85% of the visitors said that they had either none to little, or general knowledge about the fire services history. The visitors seemed to have an accurate idea of what the Museum is about, even without the use of the exhibit guide. Also, there seems to be no major discrepancies between the visitors' expectation and what the Museum has to offer.

5.4. Formulated Guiding Principles

The following guiding principles were devised from combining the professional design principles, and their application, with the visitors' and staff's expectations:

- The exhibit guide should encompasses all three types of classification, with emphasis on the informational aspect;
- The exhibit guide should project a brighter, fresher image of the FSMV that would appeal to a large audience.

The first principle caters to the staff's wish to preserve the Museum's collection of history as well as educate the public about the fire services. Putting emphasis on the informational aspect of the exhibit guide means the visitors will be presented with enough information to put the artifacts into historical context; and as pointed out numerous times by Bertram (1982) in Chapter 4, the historical context is a major attracting point for museums.

The second principle encourages the visitors to use the exhibit guide more frequently during their visit by presenting the information in a visually appealing manner.

5.5. Excerpts of the Exhibit Guides

Excerpts of the coloured exhibit guide are shown below to illustrate how the guiding principles were used to create the exhibit guides. The coloured exhibit guide was created using Microsoft Publisher 2007 and the simplified version was created using Microsoft Word 2007. The exhibit guides are available in their original file formats for easy editing.

FIRE SERVICES MUSEUM OF VICTORIA

Fire Services Museum of Victoria

"Dedicated to the preservation of Fire Brigade Memorabilia"

Opening Hours
Thursdays and Fridays 9am-3pm
Sundays 10am-4pm
Group Tours By Arrangement
Secretary 39 Gisborne Street. East Melbourne. 3002.
Phone/Fax: 9662 2907
Email: fsmvic@alphalink.com.au

FIRE SERVICES MUSEUM OF VICTORIA

39 Gisborne Street
East Melbourne 3002
Phone/Fax: 9662 2907
Email: fsmvic@alphalink.com.au

Figure 5.7 – FSMV's Exhibit Guide Cover

The cover of our exhibit guide adheres to the AIDA principle, which emphasizes the importance of grabbing the reader's attention. The name and picture of the FSMV, the motto of

the museum staff, and the Museum's public information are all parts of the AIDA principle. Also, the bright colour scheme was used as an attempt to brighten up the FSMV's image. Similar layouts were also seen in the case studies.

The inside of our exhibit guide follows the first guiding principle by putting more emphasis on the contents than the presentation of the information; although a bright colour scheme was still used to project a fresher image of the FSMV.

Figure 5.8 – Excerpt of the Exhibit Guide's Contents

6. Recommendations and Conclusions

The findings from Chapter 4: Data & Analysis will be interpreted in this chapter. Recommendations on exhibit space usage and storage and preservation of artifacts will guide the Museum in making decisions about future changes. The recommendations will be validated in the following sections and include:

- Exhibit Space Recommendations

    o Permit information on the artifacts to reach visitors with or without a tour

    o Update the CFA room to include a Black Saturday Display

    o Redesign certain exhibits to add theme coherency and informational displays

        ▪ Fire Marks

        ▪ Fire Extinguishers

        ▪ Helmets

- Create a hands-on history of uniforms in the new exhibition space

- Storage and Preservation Recommendations

    o Eastern Hill Station

        ▪ Rearrange storage locations to improve preservation practices

    o Newport Restoration Facility

        ▪ Enact a five-step plan to improve storage layout

- Other Recommendations

        ▪ Record the stories and experiences of current staff members so the stories are not lost when staff members retire

6.1. Exhibit Space Recommendations

From our visitor observations we have been able to determine that the best way for a visitor to learn about the artifacts in the Museum is through a tour guided by a staff member.

Since there are few information panels throughout the Museum, the visitors' main way of learning about the exhibits is through the staff. We recommend that the staff give as many tours as possible. The personal tour offers a more engaging experience for visitors by allowing visitors to establish a personal relationship with their guide, and lets them ask questions specific to their interests. One-third of the visitors we surveyed said that they enjoyed the personal tours the most. Also the Watchroom, which was identified as a favourite exhibit by both staff and visitors, can only be seen when a tour is given.

We also recommend that staff members create information panels that capture some of the information that visitors would learn from a tour guide. At the moment, there are only a few plaques located in the Engine Room and very few in the other rooms. Our observations showed that visitors without a guide will spend about a minute on average in the Boardroom and in the Chief's Office, probably because there is little information for the visitor to learn without a tour. Information panels will interpret artifacts to visitors, much like a guided tour. A set of guidelines for creating effective information plaques appears in Appendix G – Guidelines for the Creation of Informational Plaques.

Staff interviews and our own observation revealed that most exhibits in the Museum are designed well and are able to engage the visitors although a few need alterations to help make the visitors' experience more interactive. Nine of the fifteen staff members interviewed mentioned a need for updating the CFA room, pictured in Figure 6.1 – CFA Room. The displays in the room have not been changed in years and no longer represent the complete history of the CFA. Also, there are duplicates displays such as the kerosene torches in Figure 6.2 – Kerosene Torches. The kerosene torches are displayed twice and pictured once throughout a single exhibit and make the exhibit space cluttered.

Figure 6.1 – CFA Room

EARLY KEROSENE TORCHES

These torches had a wick and contained kerosene they were carried on fire engines for lighting purposes prior to battery operated torches.
Circa 1890 - 1930

Figure 6.2a – Kerosene Torches

Figure 6.2b – Kerosene Torches

We also recommend that the updated CFA exhibit incorporates a Black Saturday display. Ian Munro suggested the idea of before-and-after pictures of specific areas affected on Black Saturday for visitors to be able to visualize the damage that can be done by a bush fire. Staff interviews revealed that visual exhibits are likely to be engaging. Also the topic of Black Saturday is an important aspect of Australian fire services history and is likely to have significance for the 20% of visitors who are involved with the fire services.

In addition to alterations in the CFA room, staff interviews and research into exhibit practices revealed that some of the displays have too many artifacts and too little information. Staff members believe that the fire insurance marks, helmets, and fire extinguisher displays have this problem. The number of artifacts and the lack of information displayed can be seen in Figure 6.3 We recommend that the Museum staff reduce the number of items on display, reorganize the order of the items, and display more information on the remaining items on display for each of

the mentioned displays. A detailed recommendation for alterations to each display can be found in Appendix F – Detail Recommendations for Exhibit Alterations.

These recommendations will create a new look each time the artifacts are rotated without having to change the whole exhibit. Reducing the number of artifacts on display will also free up the space necessary to place the recommended information panels. For the fire extinguisher display, the panels will be able to explain what the different fire extinguishers are, and the history of how they became what they are today. They will also display similar information on the helmet and insurance mark displays.

Figure 6.3 – Location of the New Exhibit Room

79

The FSMV currently has a newly renovated room that the Museum staff would like to dedicate to a new exhibit. It is adjacent to the Engine Room as shown in Figure 6.3 – Location of the New Exhibit Room. The exhibit idea that best encompasses the interests of both visitors and staff is a history of uniforms with a hands-on section where visitors can try on various parts of a uniform. When asked what the visitors would like to see in a new exhibit, 13% of visitors responded with a history of uniforms with a hands-on section. We also observed a group of twenty-year-old, American, college students, who thoroughly enjoyed a chance to try on a brass helmet. This idea for a new exhibit will provide an opportunity for the staff members to take some of the old uniforms out of storage and put them on display.

In addition to the history of uniforms, 31% of staff members wanted to place a picture and photo gallery in the new exhibit. This idea could help the Museum display more of the large number of pictures and photos that are in storage. It is also easy to rotate the pictures to create a new feel to the exhibit. Also, the pictures and photos could be easily incorporated into the history of uniforms exhibit.

6.2. Storage and Preservation Recommendations

Our analysis showed that the Museum's storage practices could be improved in several areas. General organization and layout of storage is not optimal, and artifacts such as uniforms, paper documents, and vehicles could be better protected. The following recommendations detail a plan to make the use of current storage space more efficiently by implementing better packing efficiency, accessibility, and preservation techniques.

6.2.1. Eastern Hill Station

The simplest way, though time-consuming, for the Eastern Hill Station to improve its storage organization is to complete the current inventory and include the storage location of artifacts. Two out of fifteen staff interviewed specifically mentioned the challenge of locating specific items within the Museum's 435 m^2 of storage area. If the inventory records the entire collection as well as the location of the artifacts then this problem would be solved.
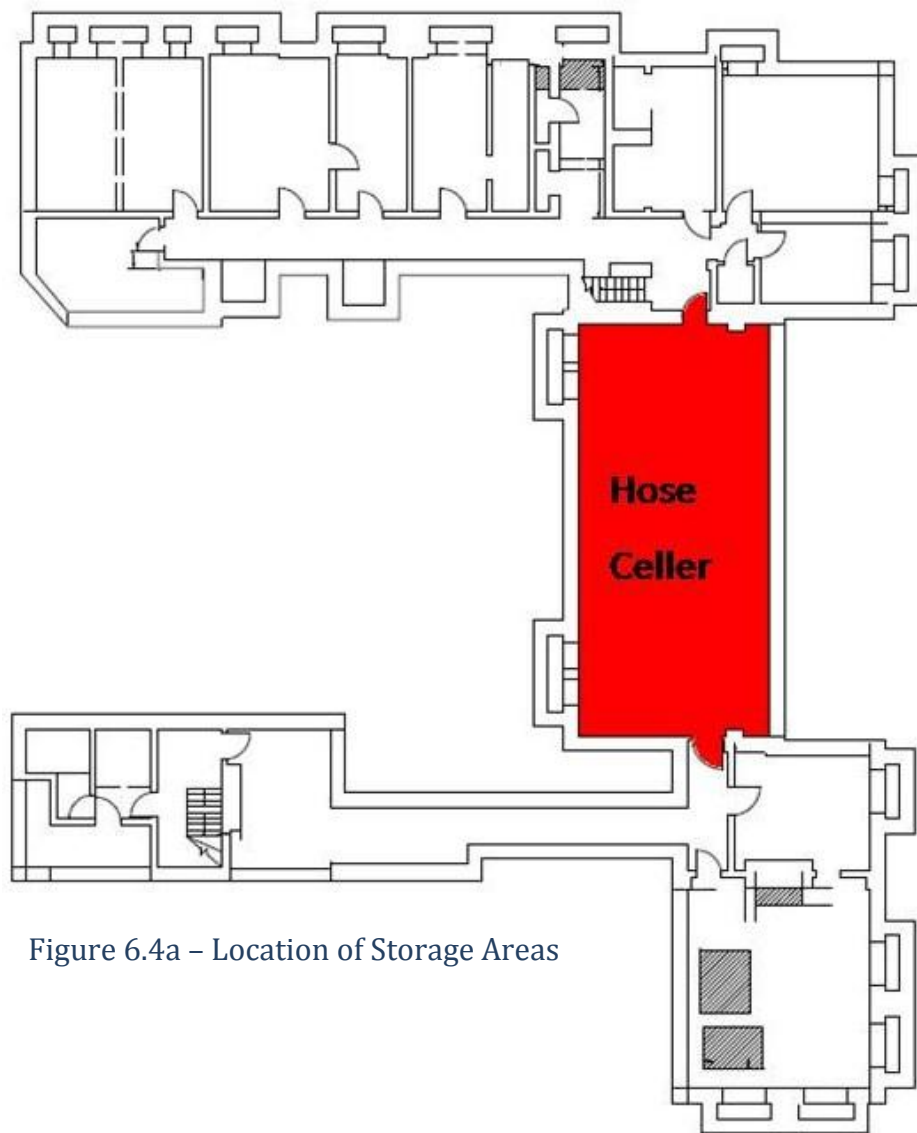
Figure 6.4a – Location of Storage Areas
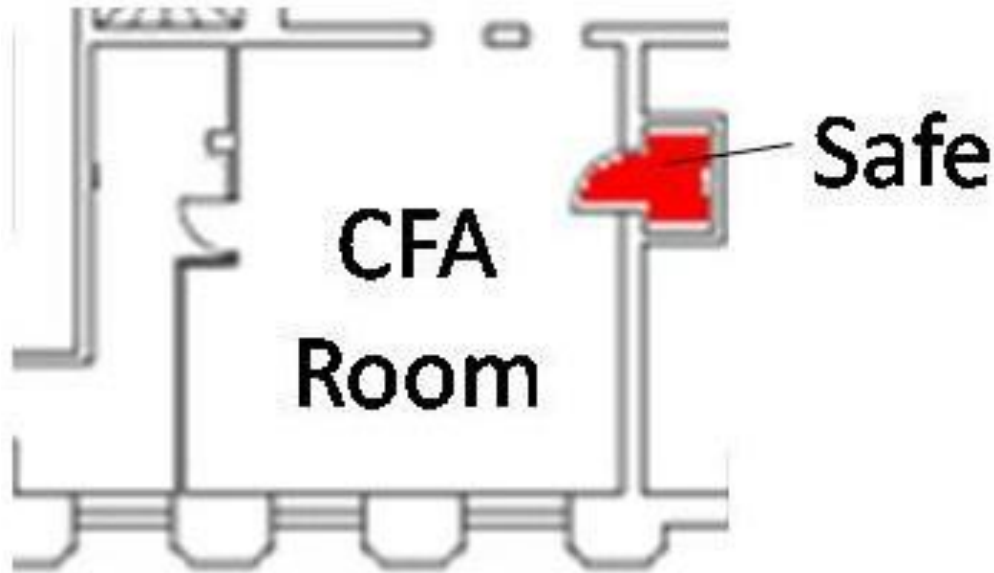
Improvements in both preservation and storage layout can be realized by reorganizing the use of two storage areas shown in Figure 6.4 – Locations of Storage Areas. The large basement room has 87 m^2 of floor space but currently misuses perimeter storage and is generally disorganized. The following paragraph suggests an improved storage strategy for this room. All uniforms and paper documents could then be moved to this room for storage.

The problem with the current layout is that it uses a perimeter storage layout that makes certain artifacts very difficult to access, as shown in Figure 6.5 – An Example of Poor Perimeter Storage. The perimeter storage also protrudes approximately one meter from the wall, thus sacrificing effective use of the wall space above the storage items. To solve this problem we suggest that the 206 boxes of ledger books pictured in Figure 6.5 – An Example of Poor Perimeter Storage and Figure 6.6 – Ledger Book Storage be moved into the compactor unit that is currently being installed. When completed, the compactor will give approximately 24.4 m^3 of space. The boxes of ledger books will only take up 3.75 m^3, still leaving 20.6 m^3 of unused storage space in the compactor.

Figure 6.5 – An Example of Poor Perimeter Storage

Figure 6.6 – Ledger Book Storage

After reorganizing the Hose Cellar, we recommend storing all uniforms and paper documents there. As shown in Table 4.12 – Comparison of Ideal and Current Preservation

Practices in Section 4.6.3.1.2, the acceptable storage condition for uniforms and documents is 18˚C - 20˚C and 45% - 50% relative humidity. By meeting these storage conditions, only one environment needs to be maintained to store both types of artifacts in the same room. The room allows no light in and is capable of maintaining a steady environment, which, currently is approximately 21˚C and 60% relative humidity. The adjustable dehumidifier can be used to create a drier environment that falls within the 45% - 50% humidity range, thus meeting the acceptable storage conditions.

The 20.6 m of unused compactor space could be used to store paper documents. In addition, there are 8.7 m of linear hanging space available for hanging uniforms. The total uniform collection requires approximately 10.8 m of hanging space; however, mobile clothing racks could supplement the existing wall racks.

If implemented, the aforementioned recommendations will make use of 26.4 m^3 of previously unused space, while meeting proper storage conditions for uniforms and paper documents. Another advantage is that the Museum's entire collection of uniforms will be stored in one room, making storage more organized and uniforms easier to locate.

In the same vein, we recommend that the staff move the Museum's collection of VHS tapes, 16 mm films, and CDs/DVDs to the vault located adjacent to the CFA room. These three types of artifacts also have an overlapping range of storage conditions: dark storage, 15˚C - 20˚C, and 30% - 50% relative humidity.

The vault is on the ground floor of the Museum so temperature in the vault is only slightly below room temperature of 24˚C. This is not the ideal temperature for long term storage

of VHS tapes, 16mm films, and CD's/DVD's, but it is the best that can be achieved without refrigeration.

The total volume of the vault is fairly small, only 17 cubic meters. A dehumidification device could easily regulate the humidity of such a space. The heavy vault door also ensures that there is little moisture exchange between the vault and the rest of the Museum.

In total there are 8.6 m^2 of floor space in the vault plus an additional 10.8 m^2 of space when shelving is considered. The total space occupied by the items to be stored in the vault would only require 2.9 m^2 of space.

These recommendations would greatly improve the preservation practices for six types of artifacts that are currently being stored in less than adequate conditions. They would also make use of approximately 30 m^3 of space that was previously unused or ineffectively used. Also the space made available through improving packing efficiency can be used for other current or future needs of the Museum.

6.2.2. Newport Restoration Facility

The Newport restoration facility consists of five major storage bays with a total 4,235 m^2 of floor space. Staff interviews and our own observations revealed their natural desire to accept every artifact offered to the Museum. While beneficial to building the collection, this practice challenges the availability of space and staff at the Newport Facility.

As is shown in Figure 6.7 – Overcrowded Vehicle Storage at Newport, the facility suffers from an overabundance of vehicles, with poor accessibility as a consequence. As shown by the current vehicle layouts in Figure 6.8, accessing or moving any one vehicle can be an arduous task. While some vehicles are easily accessible, requiring no vehicles or only one to be moved to

reach them (shown in green), others may require two to three (shown in yellow) or even more (shown in red) to be accessed. To compound the problem there are only 5 volunteers who regularly work on restoring the collection of over 80 fire appliances. As a result, the volunteers are forced to waste their time on moving vehicles when it could be used to restore vehicles

Figure 6.7 – Overcrowded Vehicle Storage at Newport
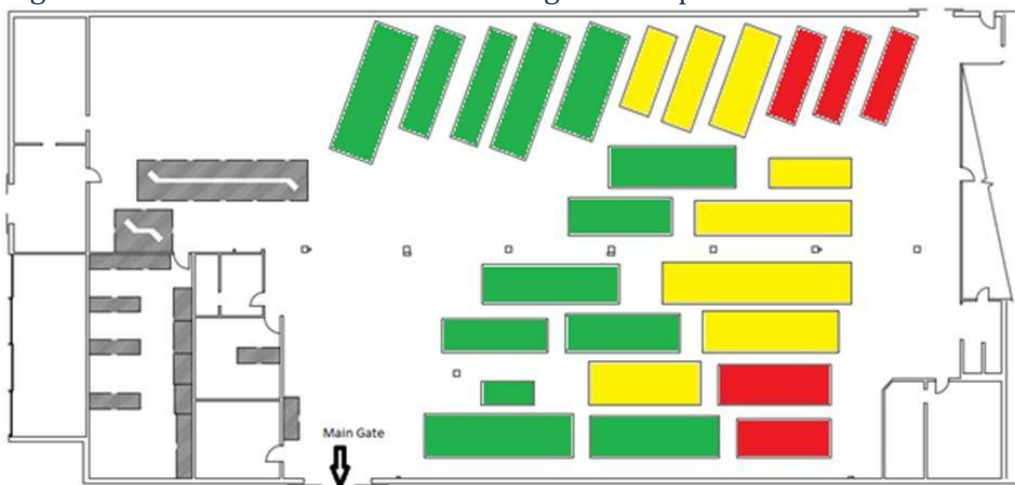
Figure 6.8a – Newport Shed 1 Current Vehicle Layout

Figure 6.8b – Newport Shed 1A Current Vehicle Layout

To assist in solving these problems we recommend a five-step plan that will help the limited staff manage the large collection. The five steps are listed below:

- Inventory the vehicles and other artifacts;

- Assess what is necessary;

- Remove what is not needed from the site;

- Reorganize vehicle layout;

- Redistribute preservation capabilities

Our group has already started an inventory of the vehicles, but have not started with any of the other artifacts, present at the Newport facility. This permits the staff to view information on each vehicle, such as if it is operational, without having to go to every storage bay. It is recommended that the staff inventory other artifacts such as fire extinguishers and ladders so they are not overlooked in the assessment in step two.

Once the collection at the Newport Facility has been inventoried, the staff must assess what is necessary for the facility to continue restoring vehicles. The volunteer staff members

have the final decision in determining what is not necessary; however, we suggest that the following items be considered for removal:

- Scrap wood and spare parts that likely will not be used

- Dilapidated structures that serve no purpose

- Vehicles that are highly unlikely to be restored in the next 10 years

- Vehicles that are not under the ownership or personal care of the staff

These items are the main cause of the overcrowding issue, which hinders the staff's ability to properly care for the collection. Vehicles that have almost no chance of being restored take up space while they simply deteriorate. Disposing these items would assist in treating the problem at its source by having the staff assess what is needed instead of keeping everything.

The third step is to remove the items that are not necessary from the Newport site. It does not matter where the items are moved to, they simply need to reside somewhere else so that the floor space can be use more efficiently.
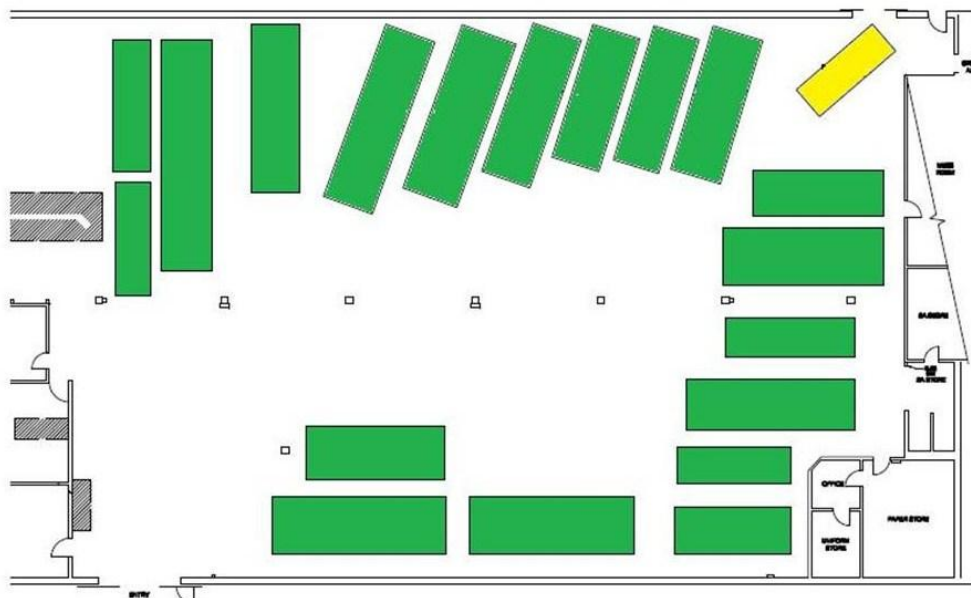
Figure 6.9a – Newport Shed 1 Recommended Vehicle Layout
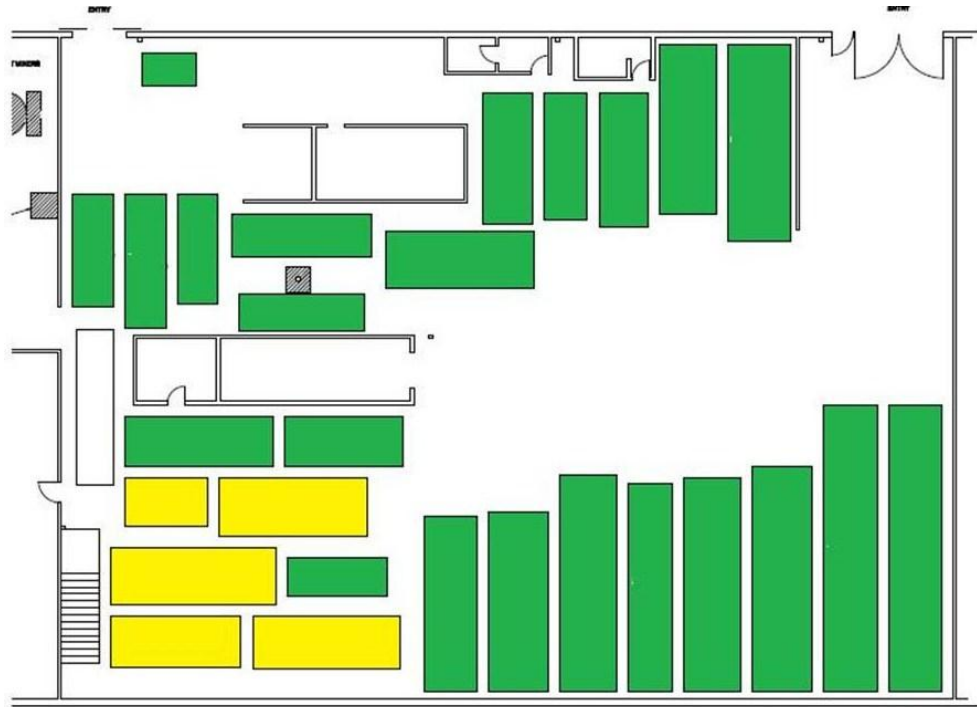
Figure 6.9b – Newport Shed 1A Recommended Vehicle Layout

Once the unnecessary items are removed from the site, the remaining vehicles can be rearranged in a more accessible layout. A new layout is pictured in Figure 6.9 – Recommended Vehicle Layout below. In this layout, only four vehicles were removed as they will soon leave the site, the rest are simply rearranged. For simplicity, any vehicle that is currently immobile has not been moved. Each number corresponds to a vehicle in the inventory. Both the trucks and the room are shown to scale. A detailed layout can be found in Appendix H – Newport Vehicle Layout.

The vehicles highlighted in red are those that require more than three other vehicles to be moved to access them. Although the new layout is greatly improved, it still suffers from a few areas with poor accessibility due to overcrowding.

Once various items and vehicles are removed, any resources devoted to their preservation can be distributed among the remaining vehicles. Many of the vehicles at Newport are exposed

to direct sunlight, dust, varying temperatures, and often times bird droppings. These conditions promote deterioration of the vehicles. Improvements to current preservation practices will reduce maintenance and future restoration.

6.3. Preserving Knowledge

The preservation practices discussed in the previous sections pertain strictly to artifacts. Preservation of artifacts is an important part of museum practice; however, the FSMV should also focus on preserving the experiences of its volunteers. Many of the staff members are retired from fire fighting and will one day have to retire from volunteering at the FSMV. We recommend that the leaders of the Museum ensure that the knowledge and experience of the current staff is not lost as these individuals retire.

The guided tour of the Museum is the key to visitors' interpretation of the space and the artifacts. The tour is so valuable because it uses the stories and experiences of real fire fighters to explain the significance of artifacts. If these stories and experiences are lost as the staffs retire, then much of the value of a tour will be lost as well. To prevent this from happening, we recommend the Museum staff to collect and record all stories and experiences of the current staff, using either audio tape or paper document. One suggestion for this process is to simply record the guided tour as the staff member gives it. Recording the guided tours would simplify the process and save time for the staff members.

7. References

Bertram, B. (1982). Display Technology for Small Museums. Ultimo, New South Whales, Australia: Museums Association of Australia.

Bitgood, S. (2006). An analysis of visitor circulation: Movement patterns and the general value principle. *Curator, 49*(4), 463.

Bollo, A., Pozzolo, L. *Analysis of Visitor Behavior Inside A Museum: An Empirical Study.* Fondazione Fitzcarraldo.

Bozer, Y. A., Meller, R. D., & Erlebacher, S. J. (1994). An improvement-type layout algorithm for single and multiple-floor facilities. *Management Science, 40*(7), 918-932. Retrieved from http://www.jstor.org/stable/2632922.

Choi, Y. K. (1999). The morphology of exploration and encounter in museum layouts. *Environment and Planning B, 26*, 241-250.

Commission on Preservation and Access & National Media Laboratory. (1995). *Magnetic Tape Storage and Handling: A Guide for Libraries and Archives*. St. Paul, MN: Van Bogart, John W. C.

Council on Library and Information Resources & National Institute of Standards and Technology. (2003). *Care and Handling of CDs and DVDs - A Guide for Librarians and Archivists*. Gaithersburg, MD: Byers, Fred R.

Cumberland, D. e. a. (1990). *National park service museum handbook, part 1: Museum collections* (2006 Edition ed.). Washington, D.C.: National Park Service Museum Management Program.

Dean, D. (1996). *Museum exhibition: Theory and practice* Routledge.

Diamond, J. (1999) *Practical Evaluation Guide: Tools for museums and other informal education settings*. Lanham, Maryland: Atkins Press.

Dickman, S. *Visitor Research Made Easy.* Victoria, Australia: Arts Victoria.

Don Cumberland, J. (1987). Museum collection storage. *APT Bulletin, 19*(2) Retrieved from http://www.jstor.org/stable/1494165.

Extra Space Storage. (2009). ***Packing efficiently for storage***. Retrieved Nov/26, 2009, from http://www.extraspace.com/storage-tips/packing-efficiently-for-storage.aspx.

Getz, D., & Sailor, L. (1993). Design of destination and attraction-specific brochures. *Communication and Channel Systems in Tourism Marketing,* 111–31.

Hunt, E. G. (2009). Study of museum lighting and design. *University Honors Program,* 99.

Kim, K. H., & Park, K. T. (2003). A note on a dynamic space-allocation method for outbound containers. *European Journal of Operational Research, 148*(1), 92-101. doi:DOI: 10.1016/S0377-2217(02)00333-8.

Kinsey, B. (2002). *Visitor Surveys: Getting to Know Your Audience*. Retrieved from www.vcu.edu/cppweb/urban/GRTA%20 handout.

Pavlogeorgatos, G. (2003). Environmental parameters in museums. *Building and Environment, 38*(12), 1457-1462. doi:DOI: 10.1016/S0360-1323(03)00113-6.

Public Storage. (2009). *Self storage and packing tips.* Retrieved Nov 30, 2009, from http://www.publicstorage.com/storage-tips.aspx.

Reilly, J. (1996). *IPI Storage Guide for Acetate Films.* Image Permanence Institute: Rochester, NY.

Ritzman, L., Bradford, J., & Jacobs, R. (1979). A multiple objective approach to space planning for academic facilities. *Management Science, 25*(9), 895-906. Retrieved from http://www.jstor.org/stable/2630241.

Robson, J. N. (1975a). Storage and shelf life. *Proceedings of the Royal Society of London.Series B, Biological Sciences, 191*(1102, A Discussion on Food Technology in the 1980s), 185-191. Retrieved from http://www.jstor.org/stable/76915.

Robson, J. N. (1975b). Storage and shelf life. *Proceedings of the Royal Society of London.Series B, Biological Sciences, 191*(1102, A Discussion on Food Technology in the 1980s), 185-191. Retrieved from http://www.jstor.org/stable/76915.

Russell, E. (June 2007). Fire Services Museum of Victoria: an Assessment of Significance. History@work.

Ward, J. H.,Jr. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association, 58*(301), 236-244. Retrieved from http://www.jstor.org/stable/2282967.

Wendy. *The P.T. Barnum Museum*. Bridgeport, CT:

Williams, Don & Jaggar, Louisa. (2005). *Saving Stuff: How to Care for and Preserve Your Collectibles, Heirlooms, and Other Prized Possessions*. New York, NY: Fireside.

8. Appendix A – Work Schedule
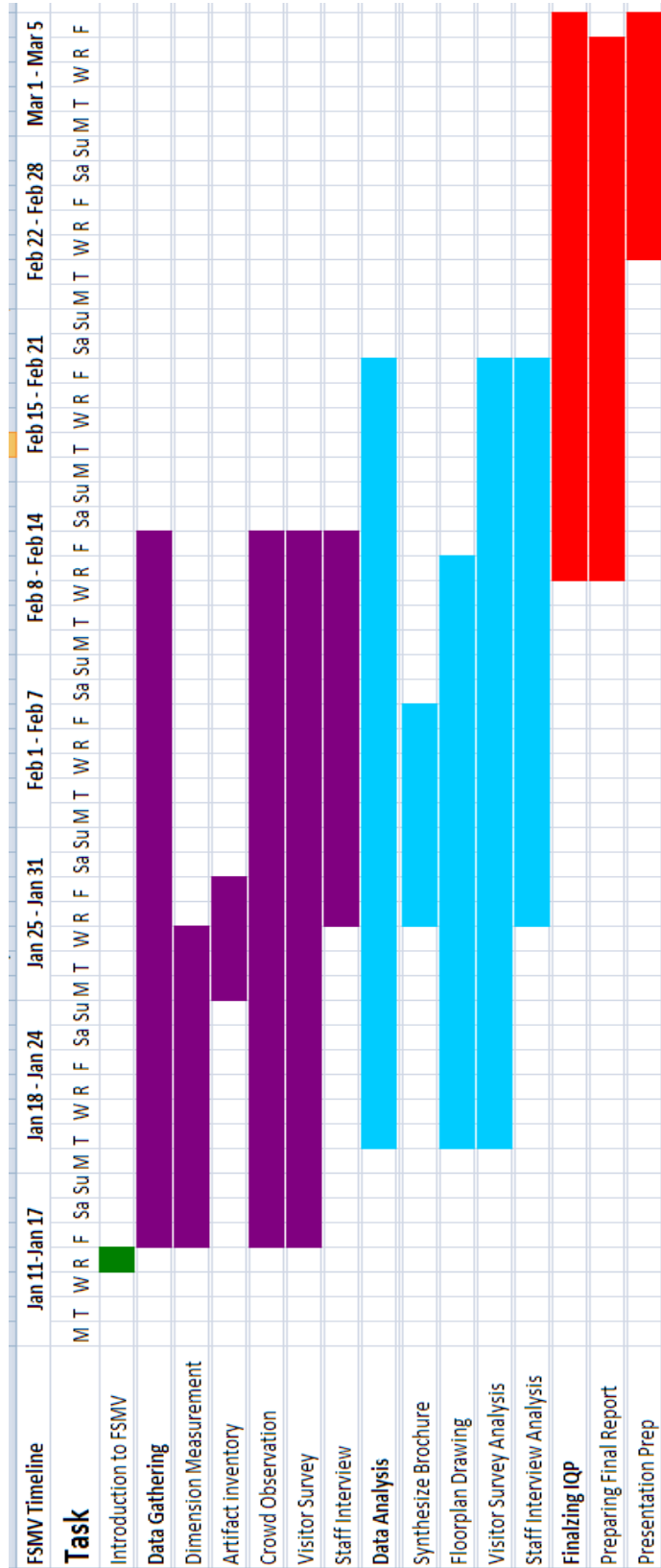
Figure 8.1 – Gant Chart of Our Work Schedule

9. Appendix B – Versions of Visitor Surveys

9.1. Version 1

In use 15/1/2010

Before Your Visit

1 - How did you hear about the FSMV?

- ☐ Walked by
- ☐ Friend/Relative
- ☐ Internet/Website
- ☐ Tour Guide
- ☐ Other: _____

2 - Why have you decided to visit the FSMV today? (check all that apply)

- ☐ Leisure/Recreation
- ☐ You or a relative is a member of a fire brigade
- ☐ Interest in Fire Services history and equipment
- ☐ Desire to learn about Fire Services
- ☐ Other: _____

3 - Have you been here before? If so, when was your last visit and why did you decide to return?

4 - What do expect/want to see? Why?

5 - What do you expect to learn from your museum visit?

6 - What level of knowledge would you say you have in terms of the history of fire services?

- ☐ None to Little
- ☐ General Knowledge
- ☐ In-depth Knowledge/Professional Experience

Please don't read the second part till after your visit. Thank you.

After Your Visit

1 - Did you enjoy your visit? Why/why not?

2 - What did you learn from your museum visit?

3 - Was your visit what you expected? Why/why not?

4 - What did you find most interesting about your visit? Why?

5 - What room did you spend the most time in? Why? What room did you spend the least time in? Why?

6 - Did you find the exhibit guide useful? Why/why not?

7 - Did the grouping of artefacts make sense to you? If not, why?

9.2. Version 2

In use 17/1/2010 – 21/1/2010

Before Your Visit

1 - How did you hear about the FSMV?

- ☐ Walked by
- ☐ Friend/Relative
- ☐ Internet/Website
- ☐ Tour Guide
- ☐ Other: _____

2 - Why have you decided to visit the FSMV today? (check all that apply)

- ☐ Leisure/Recreation
- ☐ It was recommended
- ☐ You or a relative is a member of a fire brigade
- ☐ Interest in Fire Services history and equipment
- ☐ Desire to learn about Fire Services
- ☐ To see a specific/special exhibition
- ☐ For study purposes
- ☐ Other: _____

3 - Have you been here before? If so, when was your last visit and why did you decide to return?

4 - What do you expect to learn from your museum visit?

5 - What level of knowledge would you say you have in terms of the history of fire services?

- ☐ None to Little
- ☐ General Knowledge
- ☐ In-depth Knowledge/Professional Experience

Please don't read the second part till after your visit. Thank you.

After Your Visit

1 - Did you enjoy your visit? Why/why not?

2 - What did you most enjoy learning about during your visit?

3 - Was your visit what you expected? Why/why not?

4 - What did you enjoy most about your visit? Why?

5 - Did you find the exhibit guide useful? Why/why not?

9.3. Version 3

In use 23/1/2010 – 14/2/2010

Before Your Visit

1 - How did you hear about the FSMV?

- ☐ Walked by
- ☐ Friend/Relative
- ☐ Internet/Website
- ☐ Tour Guide
- ☐ Other: _____

2 - Why have you decided to visit the FSMV today? (check all that apply)

- ☐ Leisure/Recreation
- ☐ It was recommended
- ☐ You or a relative is a member of a fire brigade
- ☐ Interest in Fire Services history and equipment
- ☐ Desire to learn about Fire Services
- ☐ To see a specific/special exhibition
- ☐ For study purposes
- ☐ Other: _____

3 - Have you been here before? If so, when was your last visit and why did you decide to return?

4 - What do you expect to learn from your museum visit?

5 - What level of knowledge would you say you have in terms of the history of fire services?

- ☐ None to Little
- ☐ General Knowledge
- ☐ In-depth Knowledge/Professional Experience

Please don't read the second part till after your visit. Thank you.

After Your Visit

1 - Did you enjoy your visit? Why/why not?

2 - What did you most enjoy learning about during your visit?

3 - Was your visit what you expected? Why/why not?

4 - What did you enjoy most about your visit? Why?

5 - Did you find the exhibit guide useful? Why/why not?

6 - What would you like to see in a new exhibit?

- ☐ Modern Fire Equipment
- ☐ History of Gear/ Tools/ Chemical Suits
- ☐ Progression of Pumps and other
- ☐ History of Alarms methods of Extinguishing Fires
- ☐ Bush Fires
- ☐ How Fires Start and Spread
- ☐ Newspaper Articles/ Heroic Stories about Fire Fighters
- ☐ A Day in the Life of a Melbourne Fire Fighter throughout the years
- ☐ History of Uniforms with a Hands On Section (Kids can put them on)
- ☐ Fire Prevention
- ☐ History of Women in Fire Fighting
- ☐ Fire Safety Designs in Buildings

10. Appendix C – Visitor Survey Results

10.1. Survey Administered Prior to Museum Entry

1 - How did you hear about the FSMV? (56 Surveyed)

- Walked by
- Friend/Relative
- Internet/Website
- Tour Guide
- Other: _____

Question 1 Responses

Table 10.1 – Page 1 Question 1 Responses

Method	Number of Responses
Walked-by	6
Friend/relative	8
Internet/website	6
Tour guide	8
Other	12
Tram Flyer	5
Brochure	2
Invitation	1
Retirees Club	2
Used to work at Eastern Hill Station	1
Intended to go for 7 years	1

Comments on Question 1:

- Visitors 28 through 35 were asked to visit the museum for study purposes and their responses are not included on the table

2 - Why have you decided to visit the FSMV today? (check all that apply) (50 Surveyed)

☐ Leisure/Recreation

- ☐ It was recommended
- ☐ You or a relative is a member of a fire brigade
- ☐ Interest in Fire Services history and equipment
- ☐ Desire to learn about Fire Services
- ☐ To see a specific/special exhibition
- ☐ For study purposes
- ☐ Other: _____

Question 2 Responses

Table 10.2 – Page 1 Question 2 Responses

Response	Number of Responses
Leisure/Recreation	19
It was recommended	6
You or a relative is a member of a fire brigade	8
Interest in fire services history	9
Desire to learn about fire services	1
To see a specific/special exhibit	4
For study purposes	0
Other	7
To entertain kids	5
Retirees Club	2

3 - Have you been here before? If so, when was your last visit and why did you decide to return? (56 Surveyed)

Question 3 Responses

Table 10.3 – Page 1 Question 3 Responses

Yes	No	N/A
4	45	7

Comments on Question 3

- Of the visitors who were returning only two responded when their last visit was. One answered "1 year ago" and one answered "When I was a child"

4 - What do you expect to learn from your museum visit? (50 Surveyed)

Question 4 Responses

Table 10.4 – Page 1 Question 4 Responses

Response	Number of responses
History	27
Fire Fighting Equipment	7
To teach kids	2
General Knowledge	2
How fire men work	1
Operation of fire station	2
Memories	1
To see differences	1
N/A	14

5 - What level of knowledge would you say you have in terms of the history of fire services?

(56 Surveyed)

☐ None to Little
☐ General Knowledge
☐ In-depth Knowledge/Professional Experience

Question 5 Responses

Table 10.5 – Page 1 Question 5 Responses

Response	Number of Responses
None/little	25
General	22
In-depth/professional knowledge	8

10.2. Survey Administered After the Museum Visit

1 - Did you enjoy your visit? Why/why not? (56 Surveyed)

Question 1 Responses

Table 10.6 – Page 2 Question 1 Responses

Response	Number of Responses
Yes	51
No	1
N/A	4

Comments on question 1:

- Visitors 36 and 38 did not fill out the second page of the survey

- Visitor 34 answered No and stated "The Museum was somewhat crowded with stuff"

- Visitor 26 responded Yes and stated "My son got a lot out of it"

2 - What did you most enjoy learning about during your visit? (50 Surveyed)

Question 2 Responses

Table 10.7 – Page 2 Question 2 Responses

Response	Number of Responses
Fire Engines/equipment	17
History	6
Everything	6
Watch Room	9
Other	7
Uniforms	2
Badges	1
Street Fire Alarm	2
The rescue process	1
History of major fires	1
N/A	7

3 - Was your visit what you expected? Why/why not? (56 Surveyed)

Question 3 Responses

Table 10.8 – Page 2 Question 2 Responses

Response	Number of Responses
Yes	38
No	2
Better than expected	7
N/A	9

Comments on Question 3:

- Visitor 32 responded no and stated they thought the visit "would be more structured"

- Visitor 34 responded no and stated that they "thought there would be a Black Saturday Display"

4 - What did you enjoy most about your visit? Why? (50 Surveyed)

Question 4 Responses

Table 10.9 – Page 2 Question 4 Responses

Response	Number of Responses
Fire engines	13
History	4
Guided Tour	11
Other	7
Fire Chief's Office	1
Learning	1
Information	1
Watchroom	2
Relaxed atmosphere	1
9-11 display	1
N/A	13

Comments on Question 4:

- Visitor 8 responded that the fire engines were his favourite part because they were interactive

5 - Did you find the exhibit guide useful? Why/why not? (50 Surveyed)

Question 5 Responses

Table 10.10 Page 2 Question 5 Responses

Response	Number of Responses
Yes	20
N/A	36

Comments on Question 5:

- Many of the visitors who responded N/A commented that they either did not receive an exhibit guide or they did not need one because they had a tour

6 - What would you like to see in a new exhibit? (45 Surveyed)

- ☐ Modern Fire Equipment
- ☐ History of Gear/ Tools/ Chemical Suits
- ☐ Progression of Pumps Over Time
- ☐ History of Alarms methods of Extinguishing Fires
- ☐ Bush Fires
- ☐ How Fires Start and Spread
- ☐ Newspaper Articles/ Heroic Stories about Fire Fighters
- ☐ A Day in the Life of a Melbourne Fire Fighter throughout the years
- ☐ History of Uniforms with a Hands On Section (Kids can put them on)
- ☐ Fire Prevention
- ☐ History of Women in Fire Fighting
- ☐ Fire Safety Designs in Buildings

Question 6 Responses

Table 10.11 – Page 2 Question 6 Responses

Response	Number of Responses
Modern Fire Equipment	16
History of Gear/Tools/Chemical Suits	10
Progression of Pumps Over Time	7
History of Alarms and Methods of Extinguishing Fires	8
Bush Fires	14
How Fires Start and Spread	16
Newspaper Articles/Heroic Stories of Fire Fighters	7
A Day in the Life of a Melbourne Fire Fighter Throughout the Years	15
History of Uniforms With a Hands-on Section	17
Fire Prevention	5
History of Women in Fire Fighting	7
Fire Safety Design in Buildings	8
Other	4

11. Appendix D – Visitor Observation Results

15 Groups Observed Total

11.1. Observed Visitors

Table 11.1 – Visitor Observations without Timing

Group Description	Old Man	Man With Child In stroller	Group of 11 Children	Large Group	Retired Group	Elderly man	Elderly Couple
Tour? (Yes/No)	Yes	No	Yes	Yes	Yes	Yes	Yes
Room Order							
Board Room	1	1	1	1	4		1
Chief's Room	2	4	2	2	5		2
Vehicle Room	3	2	3	3	6	2	3
Watch Room		3	4	4	7	3	4
Uniform Room			5	5	1		
Medal/Memorial Room			6	7	2		
CFA Room			7	6	3	1	

11.2. Timed Visitors

Table 11.2 – Visitor Observations with Timing

Group Description	Man With Small Child		2 Women With 2 Children		Old Man		Old Man with 2 Children	
Tour? (Yes/No)	No		No		No		No	
		Time		Time		Time		Time
Room Order								
Board Room	1	0:21	1	0:34	1	0:36	3	0:50
Chief's Room			2	1:16	2	0:42	2	1:22
Vehicle Room	2	13:19	3	6:07	3	3:38	1	3:57
Watch Room					4	11:32		
Uniform Room	4	4:22	4	5:04			4	2:20
Medal/Memorial Room							6	0:10
CFA Room	3	7:09	5	12:57			5	16:26

Table 11.3 – Visitor Observations with Timing

Group Description	Woman With Handicapped Group		Grandmother, mother and Child		Woman With Child in Stroller		Old Man	
Tour? (Yes/No)	No		No		No		Yes	
		Time		Time		Time		Time
Room Order								
Board Room	1	1:23	1	3:03	3	1:40	1	3:30
Chief's Room	2	1:32	2	2:02	2		2	4:57
Vehicle Room	3	6:40	3	5:09	1	5:00	6	15:00
Watch Room							7	15:43
Uniform Room	4	0:33	6	7:25	4	0:46	3	2:36
Medal/Memorial Room	6	2:19	5	0:52			4	9:30
CFA Room	5	0:43			5	2:50	5	4:00

Table 11.4 – Visitor Observation with Timing

Group Type	Foreigner Couple		Young Family w/ 2 kids		Foreigner Couple	
Tour? (Yes/No)	Yes		Yes		Yes	
		Time		Time		Time
Room Order						
Board Room			1		1	
Chief's Room			2		2	
Vehicle Room	1	19:38	3	20:47	3	9:06
Watch Room			6	4:05		
Uniform Room	2	6:04	5	0:56		
Medal/Memorial Room	4		4	2:52		
CFA Room	3					

12. Appendix E – Staff Interview Summaries

Interview 1

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

   a. N/A

   b. Professional experience; 37 ½ yrs MFB

2. How long have you been involved with the Fire Services Museum?

   a. 4 yrs

3. Would you say the museum has a target audience? If so, who?

   a. For general public

4. Who would you say visits the museum most frequently?

   a. Fire fighters (intl.)

5. What is your favourite aspect of the museum? What is your favourite exhibit?

   a. Aspect: one of the best volunteer-run museums around (very proud of it)

6. What exhibit do you think has the most attracting power?

   a. Watch room

   b. new exhibit room when done (have photos and paintings)

   c. Money is an almost always an issue with getting new projects done

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

      a. N/A

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

      a. Current medal room: CFA medals; book with CFA members who received medals need to be added

      b. CFA room: needs to be updated; mural depicting fire fighters through the ages in the CFA. This room was made by the CFA and maybe they will help to update it

      c. Memorial to be moved so it is alongside the "Saved" painting

      d. Newport: too big/too many vehicles, not enough people to control everything and look after it

9. Do you have any ideas for rotating exhibits?

      a. N/A

10. What would you like to see in a new exhibit?

      a. Smaller items on display (new room), they are currently just sitting in storage, need display cases for these items

      b. History of fire fighting in Melbourne

      c. A recent history of bush fires in Australia

      d. Get a camera in the Watch Tower so people can see what the view is like

      e. Photos

11. What information would you want to go into the museum guide?

      a. Try to integrate audio tour; useful if everyone is busy

      b. People love the guided tours but there is not always a staff member available to give one

      c. The museum needs to preserve the oral history that exists among the members

12. What do you see as the purpose or goal of the FSMV?

    a. Fire education, Perhaps this should be included alongside the Friday demos by the MFB next door

    b. Memorial to history of MFB and CFA

    c. To show people what a brigade is

Interview 2

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

    a. Joined because of interest in fire trucks

    b. No prior involvement in fire services

2. How long have you been involved with the Fire Services Museum?

    a. 7 yrs

3. Would you say the museum has a target audience? If so, who?

    a. For general public

4. Who would you say visits the museum most frequently?

    a. Retirees

    b. School groups

    c. Fire Fighters

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. Aspect: fire trucks

    b. Exhibit: watch room (well-restored, room for other exhibits), has a lot of potential for an interactive portion if the alarms could be made to work

6. What exhibit do you think has the most attracting power?

    a. Fire trucks

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

a. Appreciation of fire services history

b. Appreciation of volunteers' efforts

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

a. Archives: difficult to manage because of limited space; difficult to find things

b. Preservation practices need to be stepped up where possible

9. Do you have any ideas for rotating exhibits?

a. Uniforms (history of uniforms)

b. Gear

c. Paintings and photos

10. What would you like to see in a new exhibit?

a. Uniforms (history of uniforms)

b. Gear

c. Paintings and photos

d. Need more display cases and permission from the heritage trust to make these changes a reality

11. What information would you want to go into the museum guide?

a. Advertisements for other services offered by museum (hire fire trucks, functions, etc.

b. Donations needed

c. Volunteers needed

12. What do you see as the purpose or goal of the FSMV?

a. Preserve some aspect history of fire services in Victoria

Interview 3

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire
    Services?

    a. Joined MFB Historical Society in 1973 because of interest in old trucks

    b. Joined MFB in 1974 (requirement for being in MFB Historical Society)

2. How long have you been involved with the Fire Services Museum?

    a. 1973-1980; 1985-present

3. Would you say the museum has a target audience? If so, who?

    a. Mostly for people involved in fire services

    b. Trying to broaden audience

4. Who would you say visits the museum most frequently?

    a. Retirees

    b. School groups

    c. Special needs/handicapped visitors

    d. Fire fighters

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. N/A

    b. Exhibits: watch room and fire trucks

6. What exhibit do you think has the most attracting power?

    a. Engine room (trucks and helmets)

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. N/A

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. CFA room: update; cover safe (more display room); CFA medals

    b. Storage: move things out of Tony's office into large basement room; put carpeting on picture storage; store newspapers above picture storage

    c. Shop: new counters to store sails items in

    d. Newport: general clean up

    e. Exhibits: more information on exhibits

9. Do you have any ideas for rotating exhibits?

    a. Rail system for new exhibit room (rotating painting and photo exhibits)

    b. Rotating family displays

10. What would you like to see in a new exhibit?

    a. Uniforms (history of uniforms)

    b. Voice-overs for chief's office and board room

    c. Wire up watch room

11. What information would you want to go into the museum guide?

    a. Flyer to spark interest

12. What do you see as the purpose or goal of the FSMV?

    a. Show history of fire services in Victoria; how they have developed

b. Not sure museum should teach fire safety (job of MFB)

c. History of equipment used

Interview 4

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire

   Services?

   a. Joined MFB 50 yrs ago; station officer 38 yrs ago

2. How long have you been involved with the Fire Services Museum?

   a. 3 yrs

3. Would you say the museum has a target audience? If so, who?

   a. Retirees

   b. Fire fighters (intl.)

   c. Young families

   d. School groups

4. Who would you say visits the museum most frequently?

   a. Retirees

   b. Fire fighters (intl.)

   c. Young families

   d. School groups

5. What is your favourite aspect of the museum? What is your favourite exhibit?

   a. Aspect: tours

   b. Exhibits: watch room and fire trucks

6. What exhibit do you think has the most attracting power?

   a. Fire trucks (history behind them)

b. Medal/memorial room (remember sacrifices made)

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. Knowledge of operation of fire brigade
    b. General fire safety knowledge (retirees)

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. More exhibit information
    b. Audio information on exhibits

9. Do you have any ideas for rotating exhibits?

    a. Paintings/photos
    b. Small items

10. What would you like to see in a new exhibit?

    a. Small items
    b. Working watch room
    c. Paintings and photos
    d. Bush fire exhibit in CFA room

11. What information would you want to go into the museum guide?

    a. Keep visitor guide "flowing"
    b. Self-guided audio tour (comprehensive), maybe using push-buttons

12. What do you see as the purpose or goal of the FSMV?

    a. Show people history and operation of fire services

b. Give credit to volunteers

Interview 5

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

    a. Founding member

    b. Was in MFB; joined MFB Historical Society in 1972

2. How long have you been involved with the Fire Services Museum?

    a. Since founding

3. Would you say the museum has a target audience? If so, who?

    a. N/A

4. Who would you say visits the museum most frequently?

    a. N/A

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. Exhibit: fire marks

6. What exhibit do you think has the most attracting power?

    a. N/A

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. N/A

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. Newport: too crowded; too many vehicles, not enough people

9. Do you have any ideas for rotating exhibits?

    a. N/A

10. What would you like to see in a new exhibit?

    a. History of sprinkler heads

    b. Get print shop running again

11. What information would you want to go into the museum guide?

    a. N/A

12. What do you see as the purpose or goal of the FSMV?

    a. N/A

Interview 6

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire

    Services?

    a. Joined because of interest in history and antiques

    b. Worked in MFB engineering workshops for 34 yrs

2. How long have you been involved with the Fire Services Museum?

    a. N/A

3. Would you say the museum has a target audience? If so, who?

    a. For general public, especially people interested in fire services

4. Who would you say visits the museum most frequently?

    a. Retirees

    b. School groups

    c. Fire fighters

    d. Car clubs

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. Exhibits: Pierce-Arrow and steamer

6. What exhibit do you think has the most attracting power?

    a. N/A

7. After a full visit, what information and/or knowledge do you want the visitors to leave

    with?

    a. Awareness of history of fire services

    b. Awareness of current services

    c. Knowledge of operation of fire brigade

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. Renew/upgrade smaller exhibits

    b. Modern display cabinets

    c. Keep items out of reach of children so they can't get damaged

9. Do you have any ideas for rotating exhibits?

    a. Not enough staff/items/organization to rotate exhibits regularly (at most once a year)

10. What would you like to see in a new exhibit?

    a. Uniforms (history of uniforms)

    b. Paintings and photos (show history of station and service)

11. What information would you want to go into the museum guide?

    a. Large guide: history, pictures, photos, colour

12. What do you see as the purpose or goal of the FSMV?

    a. Preserve history of fire services

    b. Educate on fire services history

Interview 7

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

   a. Interested in the history and heritage

   b. 35 years as a fire fighter

2. How long have you been involved with the Fire Services Museum?

   a. About 30 years, was the previous secretary

3. Would you say the museum has a target audience? If so, who?

   a. Members of the MFB and other fire brigades

   b. The General Public

      i. Those interested in the fire services

      ii. Older people reconnecting with the past

      iii. Historical vehicle groups

4. Who would you say visits the museum most frequently (e.g. families, school groups, age groups)?

   a. School groups

   b. Retiree clubs

5. What is your favourite aspect of the museum? What is your favourite exhibit?

   a. The Archives and the historical research that gets done, history of the CFA valour medal

   b. The Newport vehicle restoration

   c. Photographs that the museum has in storage

    d.   Favourite Exhibit: watch room, used to work that job

6. What exhibit do you think has the most attracting power?

    a.   Most people like the vehicles

    b.   Some people are very interested in the building itself

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a.   There is a debate about whether they should push a direct fire safety message and whether it should be that of the MFB, the CFA, or the DSE

    b.   It is not the museums job to push one services message on fire safety but perhaps it should be included a bit more than it is now

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a.   There needs to be an inventory performed at Newport so that they can get rid of junk and keep things that are useful

    b.   Does not like the Pack rat mentality that exists right now

    c.   A little at odds with current opinions in the leadership of the museum

    d.   The CFA room needs to change

    e.   A picture gallery needs to go on display

    f.   Perhaps move compactors from Tony's office to the basement so the office can be used for display space

    g.   Not everything needs to be on display all the time (example the fire extinguishers, do they all need to be there?)

9. Do you have any ideas for rotating exhibits?

    a.   Remove some of the fire marks replace them with information about the fire marks still on display and then have them rotate

    b.   Change the vehicles every so often

    c. Perhaps reduce the total number of items on display so there can be more rotation

10. What would you like to see in a new exhibit?

    a. Something to do with the watch tower

    b. An exhibit on how sprinklers work with a closed system hand pump to move the water through the pipes

    c. A bit of conflict5 exists between various members, if something works leave it alone

    d. Older members are now starting to see some of the value of display technology like DVD players.

    e. There are piles of photos lying around that need to go up on display

    f. Wants to make sure the three agencies (MFB, CFA, DSE) are displayed equally

11. What information would you want to go into the museum guide?

    a. A cutaway view of the lady don so people can visualize how the pump works

    b. Story boards alongside the displays, especially the vehicles

    c. Want to make sure the oral history that exists is not lost, the knowledge needs to be preserved properly so that it does not get skewed over time

12. What do you see as the purpose or goal of the FSMV? (Why is the FSMV here?)

    a. Everything was going to be scrapped and someone wanted to save it

    b. The whole thing came together a little piece meal but that is how the museum was started

Interview 8

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

   a. Not On Staff

   b. Chief Fire Officer for the MFB (31 yrs with MFB)

2. How long have you been involved with the Fire Services Museum?

   a. Not technically involved with museum

3. Would you say the museum has a target audience? If so, who?

   a. Not Really

4. Who would you say visits the museum most frequently (e.g. families, school groups, age groups)?

   a. Young Children (Especially on Fridays)

5. What is your favourite aspect of the museum? What is your favourite exhibit?

   a. Likes the Whole thing

   b. Marketed Well

   c. Enjoys the history of it all

6. What exhibit do you think has the most attracting power?

   a. The Watch Room

   b. The Medal/Memorial Room

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. General sense of fire safety procedures

    b. History of the MFB

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. There has been a lot of growth in 30 years

    b. The museum should keep making group decisions about what to put on display

    c. Rotating exhibits are necessary to cope with limited space

9. Do you have any ideas for rotating exhibits?

    a. Like the idea of having rotating exhibit but no ideas on what to put in them

10. What would you like to see in a new exhibit?

    a. Something to do with fire safety or the function of the MFB

    b. The role of the MFB is to ensure community safety and emergency response

11. What information would you want to go into the museum guide?

    a. The themes of each room need to be made clearer perhaps in the exhibit guide

12. What do you see as the purpose or goal of the FSMV? (Why is the FSMV here?)

    a. N/A

Interview 9

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire

    Services?

    a. Wanted to be involved with the memorabilia

    b. His friends came to work here (Jon Williams)

    c. He used to work in the Williamstown fire station

    d. With the brigade and then the police force for 10 years

2. How long have you been involved with the Fire Services Museum?

    a. 7 years

3. Would you say the museum has a target audience? If so, who?

    a. Anybody

    b. Adults if you want to get the message across

4. Who would you say visits the museum most frequently (e.g. families, school groups, age

    groups)?

    a. A good mix of people

    b. Friday is sort of family day

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. Watch room, used to work there, likes the whole concept of it

6. What exhibit do you think has the most attracting power?

    a. Engine room

    b. A lot of visuality in it (old vs. new)

    c. Something that you can't see everywhere

    d. It creates a sense of wonderment

    e. The museum being an old fire station adds a lot

    f. The guided tours add a real personal aspect and are one of the best assets of the museum

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. A little bit about the personal experiences of the fire fighters of the MFB

    b. Should be something they can relate to

    c. A bit of history

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. There are lots of exhibits in storage that need to be put onto display

    b. There is not enough room at Newport

    c. The heritage trust hinders potential progress

    d. Bring out some new artifacts

    e. Photos of fire men need to go up

    f. Rotating exhibits or artifacts needs to happen

    g. There needs to be more staff

9. Do you have any ideas for rotating exhibits?

    a. Photos of firemen

    b. Dummies with uniforms

    c. Rotate fire marks and put up information for those on display

    d. Rotate photos and documents

10. What would you like to see in a new exhibit?

    a. Make the watch room functional and interactive

11. What information would you want to go into the museum guide?

    a. A legend or map to guide visitors

    b. Detailed information about each display in each room

12. What do you see as the purpose or goal of the FSMV? (Why is the FSMV here?)

    a. Inform general public about fire safety and that the Fire Services are going strong

    b. MFB Motto "Life, then Property"

    c. Teach people how the worst thing to do in a fire is panic

    d. Preserve knowledge of MFB history

Interview 10

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire
    Services?

    a. A retired fire fighter recommended that he work here

    b. Fire fighter for 40 years

2. How long have you been involved with the Fire Services Museum?

    a. 20 years

3. Would you say the museum has a target audience? If so, who?

    a. General public

4. Who would you say visits the museum most frequently (e.g. families, school groups, age
    groups)?

    a. School groups

        i. Some schools come yearly but it is sometimes hard for them to work a
            museum trip into their curriculum

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. The Watch room - used to work there

6. What exhibit do you think has the most attracting power?

    a. The vehicles

    b. The elderly can sometimes relate back to that era

    c. The goal is to relate the past to the visitors

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

   a. A fire safety message

   b. Little educational tad-bits or facts

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

   a. Storage needs to get organized, there are artifacts stored in too many different places

   b. Newport is over crowded

   c. Some of the vehicles kept at Newport are too modern and don't really need to be there

   d. Newport is big, but not an ideal storage environment (bird droppings; doesn't fully protect vehicles from the elements)

   e. The museum should try to find a more ideal location such as an old bus depot to store vehicles and could also store oversize exhibits there

   f. The museum is always getting more stuff and they really don't have the space to put it anywhere

   g. The museum needs to be mindful of changing exhibits – CFA room

   h. There should be some more hands on or interactive activities available in the museum

9. Do you have any ideas for rotating exhibits?

   a. Vehicles should be changed more often

   b. Likes the idea of rotating exhibits in general

   c. Rotate fire marks and put up information on those displayed

10. What would you like to see in a new exhibit?

    a. No specific ideas

    b. The board should meet and discuss what the new space will become, it should be a group decision

    c. Perhaps it shouldn't be a picture gallery

11. What information would you want to go into the museum guide?

    a. The guide should not be cluttered; it should be short and to the point

    b. The guide should lure people in but not tell them everything

12. What do you see as the purpose or goal of the FSMV? (Why is the FSMV here?)

    a. To remain, exist, preserve

Interview 11

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

    a. Joined because he was a member of the CFA for 17 years

2. How long have you been involved with the Fire Services Museum?

    a. 8 years

3. Would you say the museum has a target audience? If so, who?

    a. No

4. Who would you say visits the museum most frequently (e.g. families, school groups, age groups)?

    a. N/A

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. Likes the Breathing apparatus'
    b. Likes the vehicles

6. What exhibit do you think has the most attracting power?

    a. The 1938 dodge

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. Not really

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. Uniforms should be on display more

    b. The heritage trust prevents potential progress

9. Do you have any ideas for rotating exhibits?

    a. No

10. What would you like to see in a new exhibit?

    a. Can't decide, the board should just do the best they can to come up with a new exhibit

11. What information would you want to go into the museum guide?

    a. N/A

12. What do you see as the purpose or goal of the FSMV? (Why is the FSMV here?)

    a. Needs more volunteers

Interview 12

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire
   Services?

   a. Friends with Ronnie when he started the museum

   b. Interested in old equipment

   c. 31 years in the MFB in the special service department

2. How long have you been involved with the Fire Services Museum?

   a. 30 years

3. Would you say the museum has a target audience? If so, who?

   a. No

4. Who would you say visits the museum most frequently (e.g. families, school groups, age
   groups)?

   a. School groups (usually combined with a visit next door)

   b. Keep tours short and sweet for kids

5. What is your favourite aspect of the museum? What is your favourite exhibit?

   a. Likes the international room, the watch room, and the memorial room

   b. Reminds former fire fighters of the camaraderie

6. What exhibit do you think has the most attracting power?

   a. The brass helmets are very good attractors

   b. The vehicles should be used more often for advertisement as they attract many
      people

c. The tours are the key, they should make people feel welcome, feel comfortable, and inform them

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

   a. Nothing specific

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

   a. Vehicles need to rotate more often

   b. Need more dummies to display all the uniforms

   c. Need better signage out front/ better advertisement

   d. The audio tour idea is no good because it doesn't give that personal trust

   e. The CFA room needs to be altered

   f. Not many members are actually involved in the museum

   g. There are a lot of good ideas but they never really get implemented

   h. More fire-fighting-related articles should be sold in the shop

   i. Use Tony's office as a display space

9. Do you have any ideas for rotating exhibits?

   a. vehicles

10. What would you like to see in a new exhibit?

   a. Picture gallery

   b. Display cases with various small items they have all over storage (for example fire brigade badges)

   c. The board room and chief's office should be wired up

11. What information would you want to go into the museum guide?

     a. Make the public more aware of the museum

12. What do you see as the purpose or goal of the FSMV? (Why is the FSMV here?)

     a. Preserve oral history

     b. Find more (dedicated) volunteers

Interview 13

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

    a. More than 20 years volunteering with the CFA, taking pictures.

2. How long have you been involved with the Fire Services Museum?

    a. 6-7 years

3. Would you say the museum has a target audience? If so, who?

    a. Fire fighters; retired fire fighters; general public

4. Who would you say visits the museum most frequently?

    a. The target audience and the general public

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. No favourite

6. What exhibit do you think has the most attracting power?

    a. Fire engines

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. For general public:
        i. Progress over the years of fire services
        ii. Highlight leading practices

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

   a. More compactors downstairs

   b. More filing cabinets and shelves

   c. Hangers for clothing (plus tag and catalogue)

   d. Store paperwork and small items in compactors.

9. Do you have any ideas for rotating exhibits?

   a. Fire Engine Room

      i. At least 4 trucks on display (show progression of fire truck types)

         1. At least 1 hand-drawn

         2. Looking for 3-months cycle

      ii. Also looking at certified MFB vehicles

   b. Other Rooms

      i. System of changeable displays

         1. Can be manufactured at Newport

         2. More display cases (low level)

         3. Lower island type display

         4. Audio/visual display in chief office

            a. Looking to change chief office into a seminar type room for small groups

10. What would you like to see in a new exhibit?

   a. Photographs and text about the museum

   b. Same for big fires

   c. Easy to understand messages.

11. What information would you want to go into the museum guide?

12. What do you see as the purpose or goal of the FSMV?

     a. Record the history of fire services

     b. Collect, store, and display objects and activities.

Interview 14

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

    a.   25 years of involvement with MFB

    b.   Recording photos and videos around Melbourne

2. How long have you been involved with the Fire Services Museum?

    a.   4 yrs

3. Would you say the museum has a target audience? If so, who?

    a.   Tourists

    b.   Young students

    c.   General public

4. Who would you say visits the museum most frequently?

    a.   Older audience

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a.   No favourite

6. What exhibit do you think has the most attracting power?

    a.   N/A

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

a. N/A

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. Storage

        i. There's no real need

        ii. Get more mid-height shelves

    b. Museum

        i. Changing display

        ii. Look needs updating

            1. Brighter, fresher, more vibrating image

            2. More technology

            3. More pictures

    c. Exhibit

        i. Feature the fire services in Victoria more (international room doesn't fit in)

        ii. General updating for exhibits

        iii. More about Black Saturday and recent fires

        iv. More description plaques

9. Do you have any ideas for rotating exhibits?

    a. N/A

10. What would you like to see in a new exhibit?

    a. N/A

11. What information would you want to go into the museum guide?

a.   N/A

12. What do you see as the purpose or goal of the FSMV?

a.   N/A

Interview 15

1. Why did you join the FSMV staff? Do you have a history of involvement with the Fire Services?

    a. Interest in history

    b. Historical Society, 1974

2. How long have you been involved with the Fire Services Museum?

    a. 36 yrs

3. Would you say the museum has a target audience? If so, who?

    a. general public

4. Who would you say visits the museum most frequently?

    a. People in car clubs (down to New Port)

    b. School groups

5. What is your favourite aspect of the museum? What is your favourite exhibit?

    a. The vehicles

6. What exhibit do you think has the most attracting power?

    a. Vehicles

7. After a full visit, what information and/or knowledge do you want the visitors to leave with?

    a. Basic history and uses of the equipments, vehicles, etc.

8. Do you think there are any major changes that need to be made concerning storage and/or the exhibits?

    a. General:

        i. visitors should be able to read description panels from 6-8ft away.

        ii. Simple wording and clear meaning.

        iii. Provide only the basic history, not everything.

        iv. The display cases should be of the same style in each room.

        v. Display cases in Newport are not fit for display in the museum.

    b. New exhibit room:

        i. New display cases

            1. Large in size

            2. 6 in deep – deep enough to display trophies

            3. Have lower display levels for kids to see.

    c. Engine Room:

        i. No vehicles after 1979 – too heavy and would damage floor.

9. Do you have any ideas for rotating exhibits?

    a. N/A

10. What would you like to see in a new exhibit?

    a. N/A

11. What information would you want to go into the museum guide?

    a. Explanation for the watch room

    b. Update information for tower – can't go up

12. What do you see as the purpose or goal of the FSMV?

      a.   Preserve the history of fire services in Victoria

13. Appendix F – Detailed Recommendations for Exhibit Alterations

13.1. Fire Insurance Marks

- Determine with certainty what the theme of the display should be
- Suggestion: the overall importance of fire insurance companies and how they brought about the creation of the MFB
- Create a large informational panel that explains this theme and place it where you would like the display to begin.
- Reduce the number of marks on display to approximately ½ of the current number while keeping on display those that contribute to the determined theme
- Create informational panels for remaining individual insurance marks that display
  - The date the company was founded
  - The location of the company within Victoria
  - The significance or meaning of the picture on the fire mark
  - Noteworthy acts committed by the insurance company

13.2. Fire Extinguishers

- Determine with certainty what the theme of the display should be
  - Suggestion: a progression of fire extinguishers over time
- Organize the extinguishers chronologically
- Remove any duplicates or very similar extinguishers
- Place informational panels throughout the display that can explain the following items
  - The progression of fire extinguishers throughout history, i.e. when each new type of extinguisher was implemented and why etc.
  - The different types of fire extinguishers, i.e. how they work, and the methods of fire extinguishment

13.3. Helmets

- Remove duplicates or nearly identical helmets from display
- Continue to organize helmets by their country of origin
- Organize helmets chronologically within country of origin grouping
- Clearly label the helmets as being from a certain country
- Place informational panels at eye level displaying information on
  - The progression of helmets over time, i.e. leather to brass to plastic
  - Facts about each countries helmet design

151

14.Appendix G – Guidelines for the Creation of Informational Display Panels

- The visitor should be able to understand any item in the museum in 50 words or less

- A supplementary explanation for those more interested in an item can be included

- The full text of a display panel should not use more than 200 words

- The text should explain what the visitor needs to know to comprehend the historical significance of the item

- Labels should be written in the simplest language possible

  - The number of words per sentence and the number of letters per word should be kept to a minimum

- The donor of the item should not be displayed as it is generally of no interest to visitors

- The person most qualified to write an informational panel is not usually the person who know the most about the artifact rather it is the person who understands what the visitor needs to know about it to understand the artifacts significance

15. Appendix H – Newport Vehicle Layout

The following drawings display the current layout of vehicles at the Newport Restoration Facility
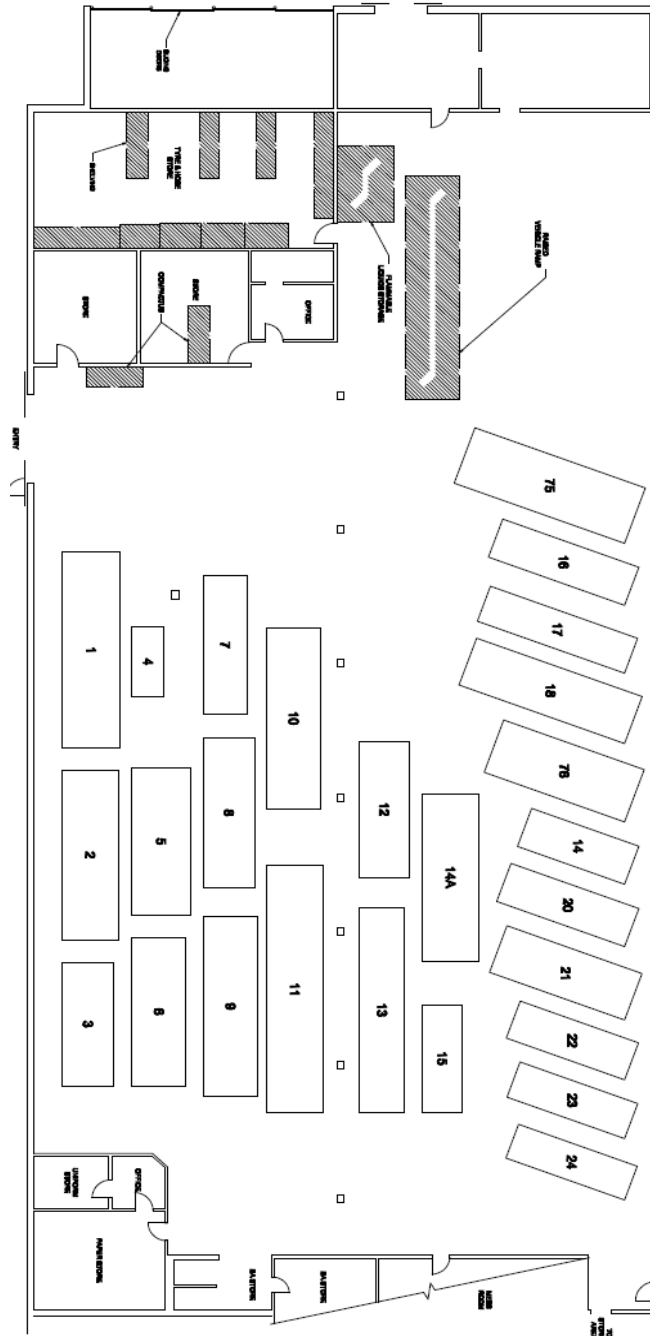
Figure 15.1 – Shed 1 Current Vehicle Layout
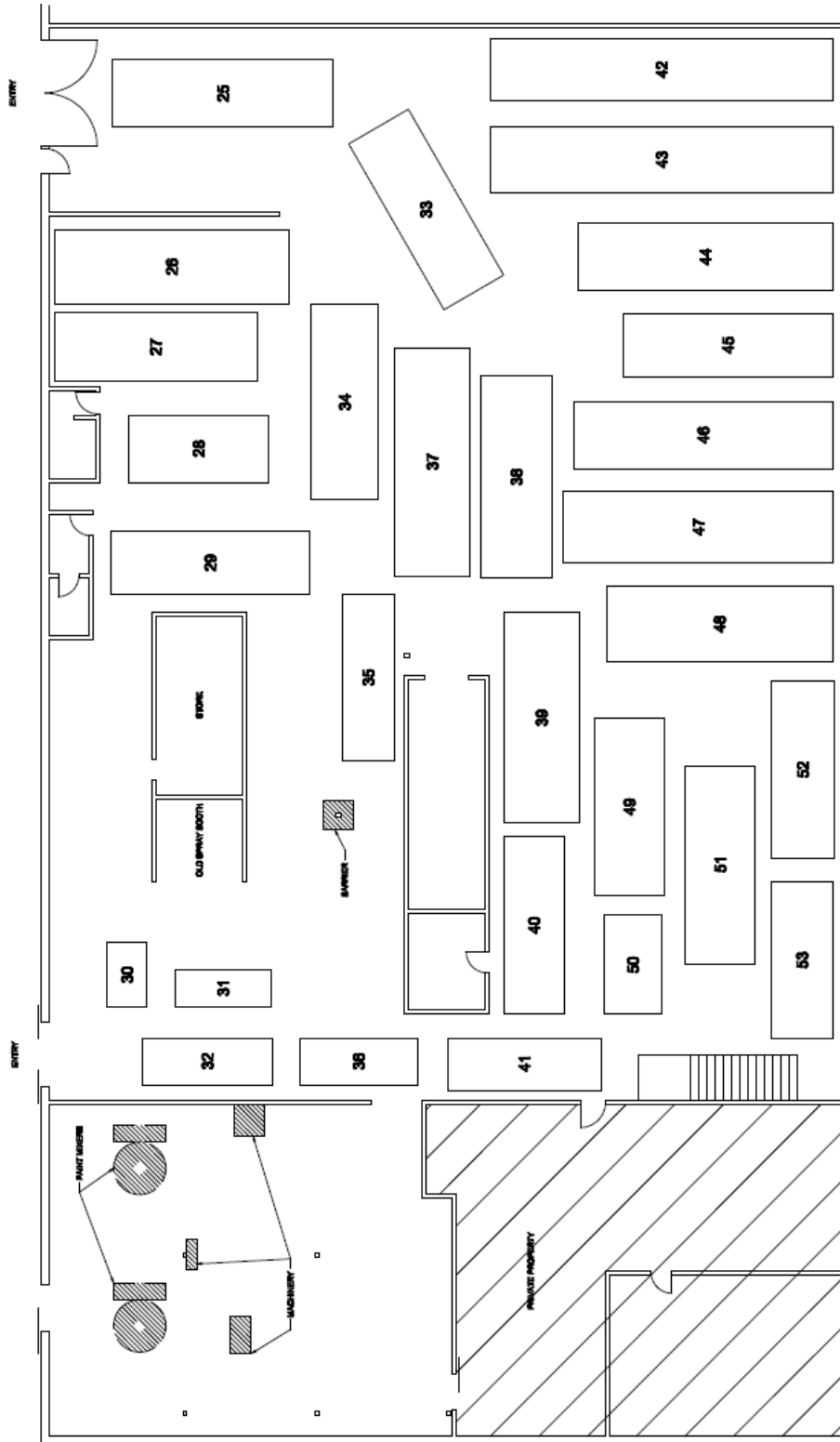
Figure 15.2 – Shed 1A Current Vehicle Layout
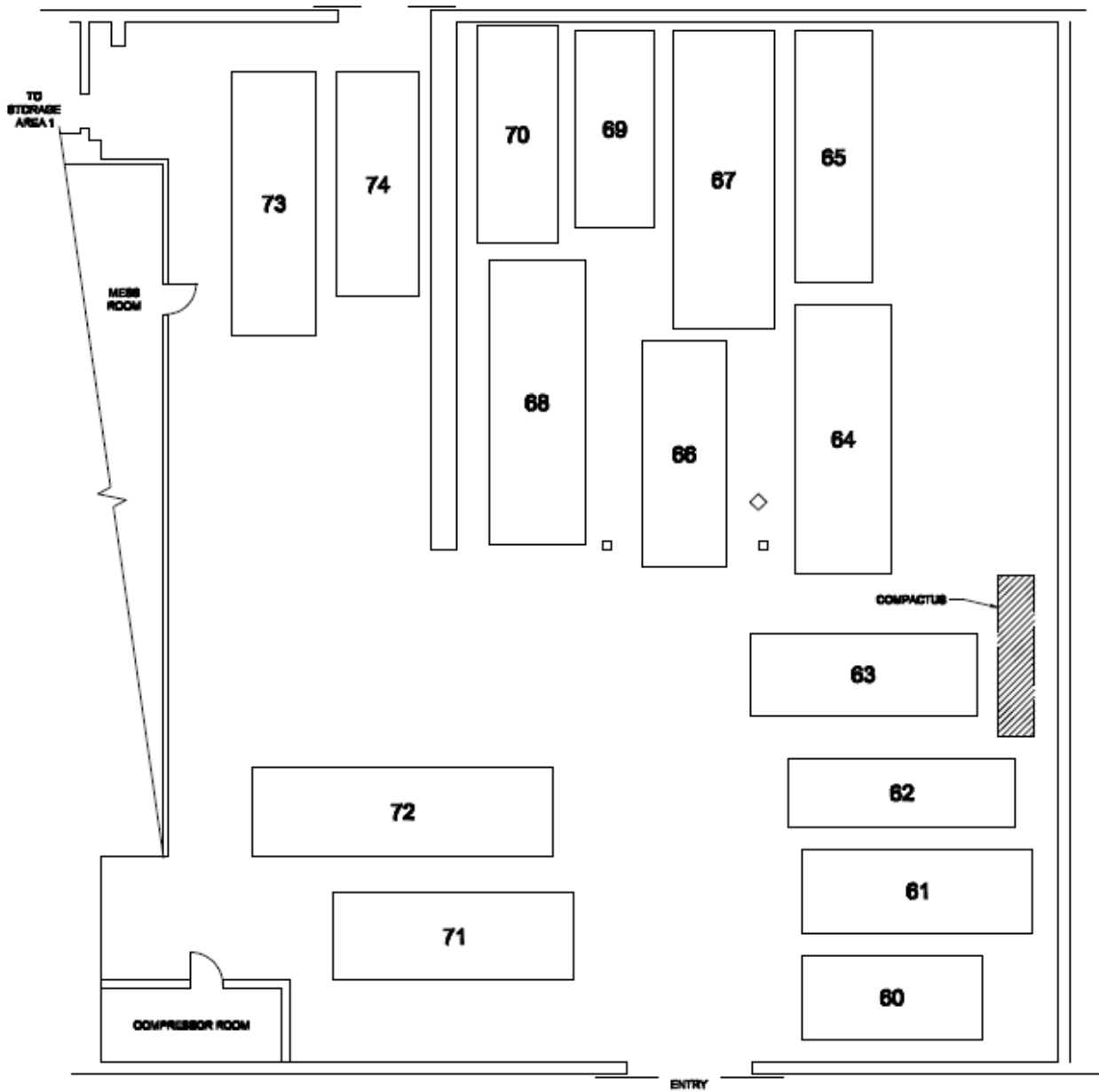
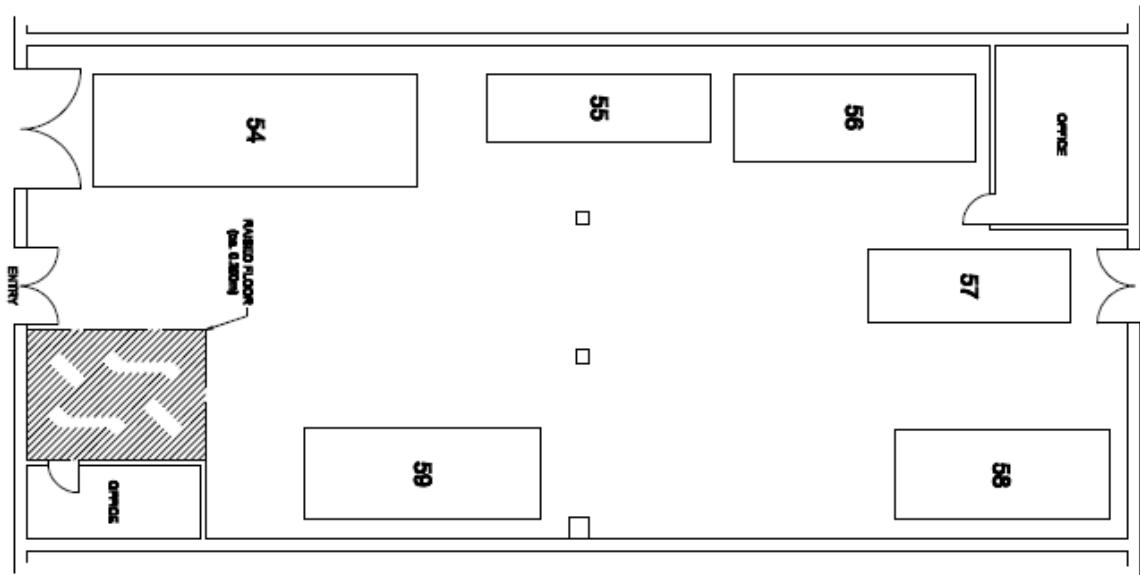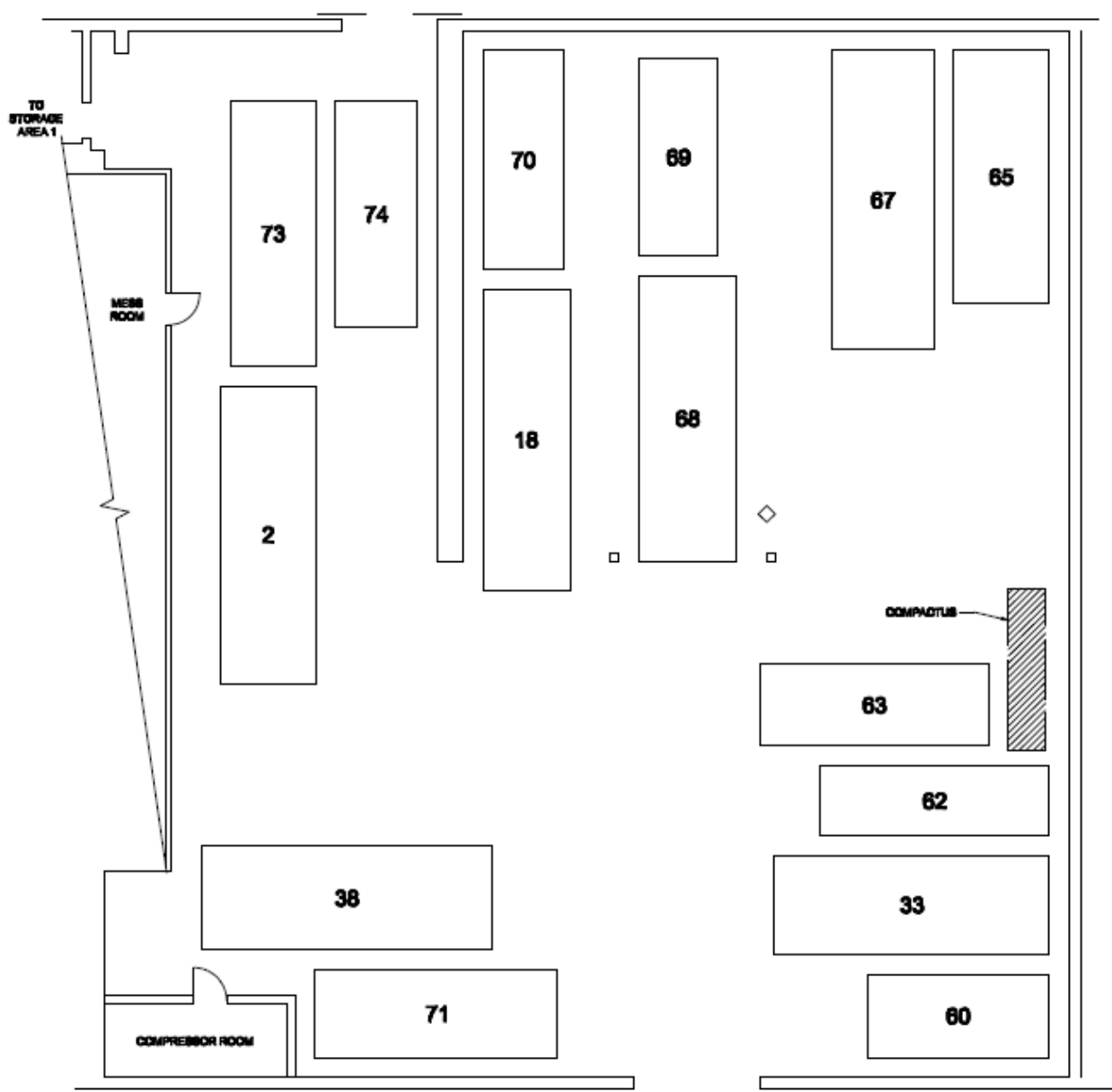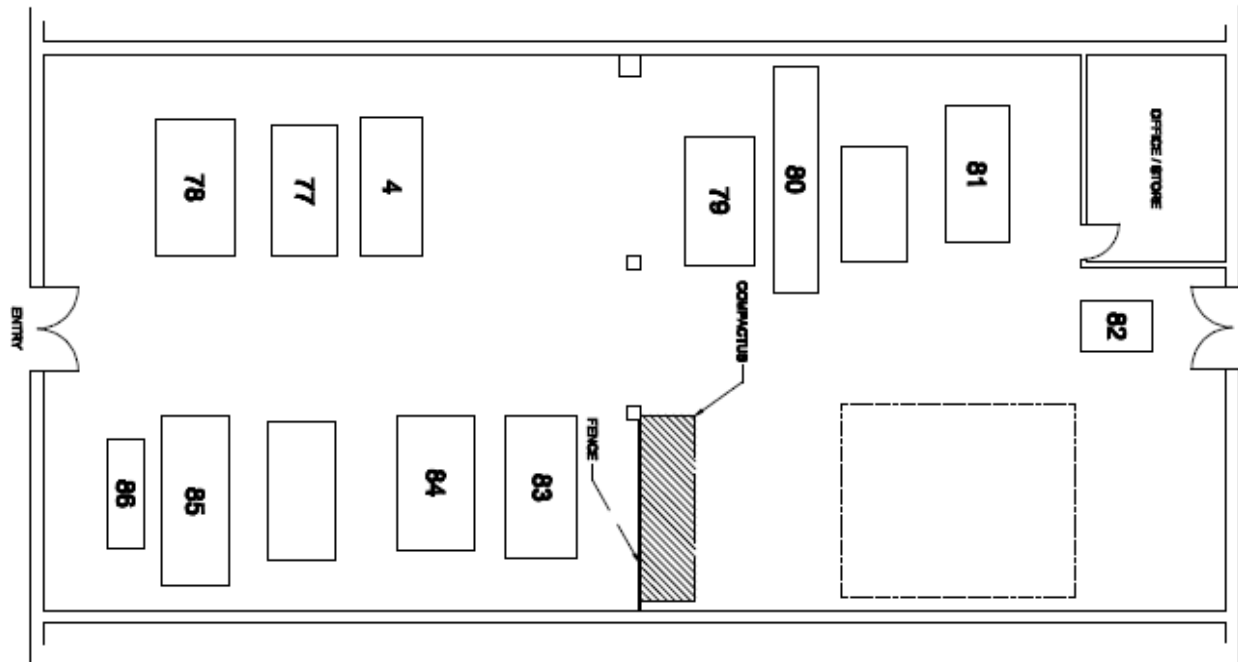Figure 15.3 – Shed 2 Current Vehicle Layout
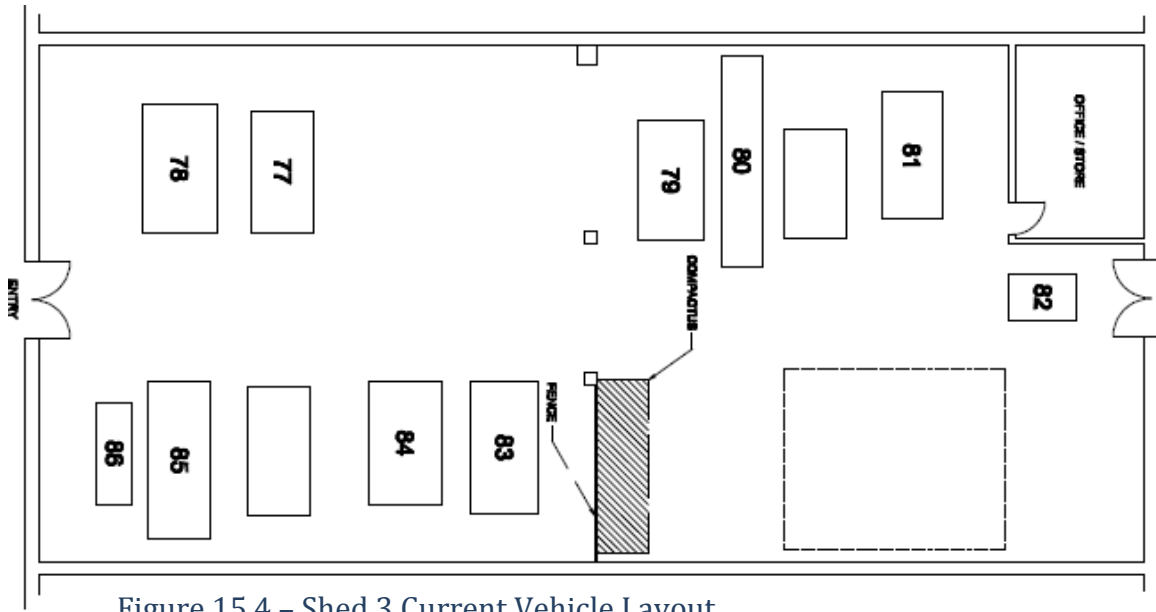
Figure 15.4 – Shed 3 Current Vehicle Layout

Figure 15.5 – Shed 4 Current Vehicle Layout

The following drawings display a recommended layout that is designed to maximize accessibility. Four vehicles were removed from this drawing as they are sold to other owners and will not reside in the Newport Restoration Facility. These vehicles include

1. A 1930's Leyland Beaver salvage vehicle
2. A 1950 Moris Minor
3. A 1668 International C 1600
4. A 1971 International
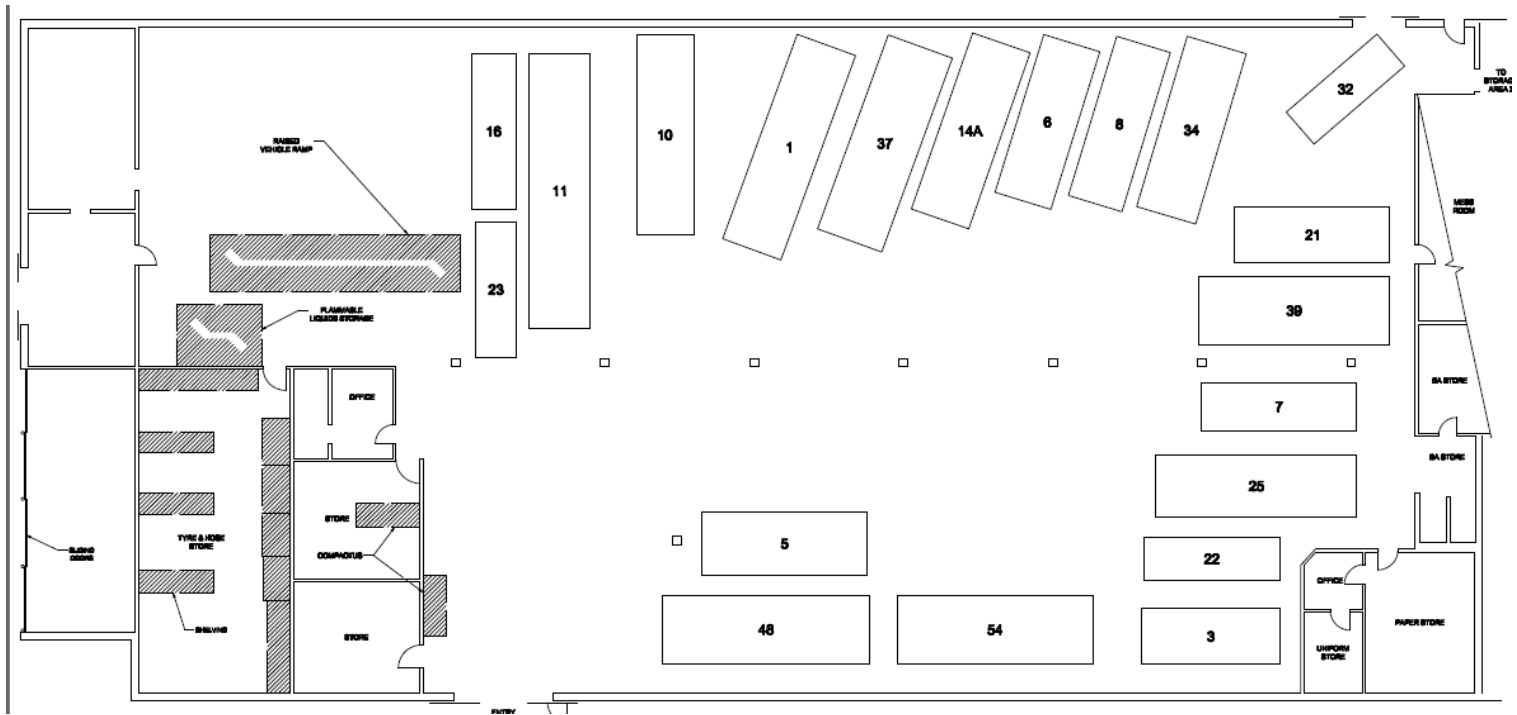
Figure 15.6 – Shed 1 Recommended Vehicle Layout
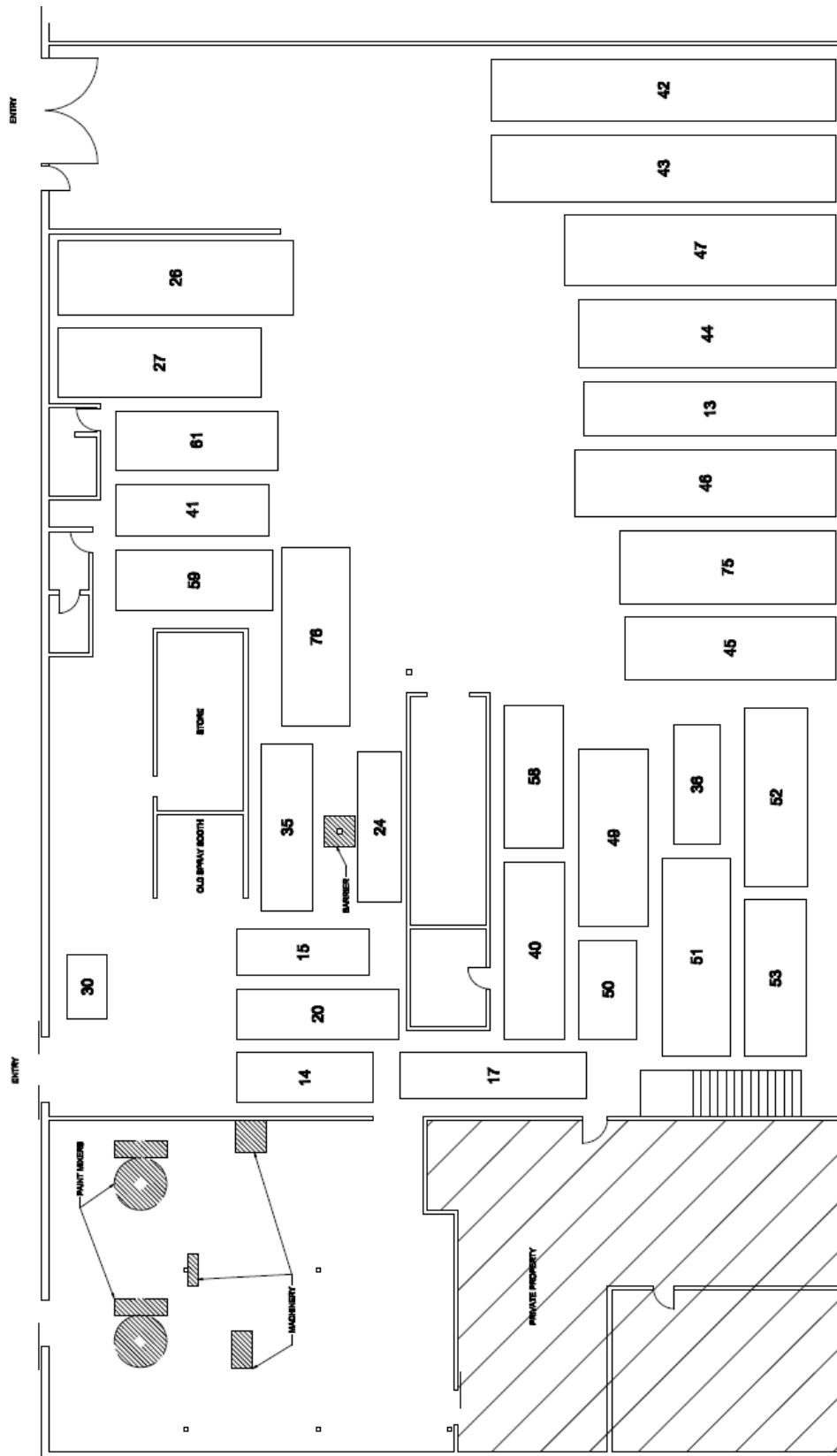
Figure 15.7 – Shed 1A recommended Vehicle Layout

158

Figure 15.8 – Shed 2 Recommended Vehicle Layout
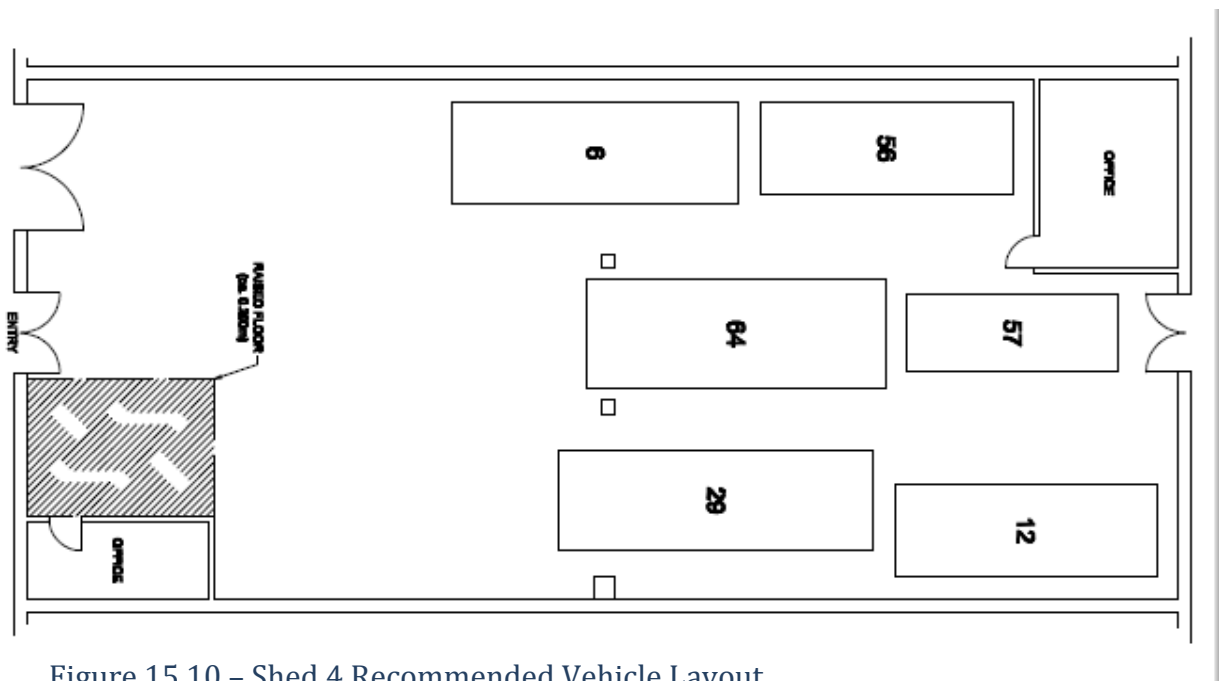
Figure 15.9 – Shed 3 Recommended Vehicle Layout

Figure 15.10 – Shed 4 Recommended Vehicle Layout

The following drawings display a recommended layout that is designed to maximize accessibility. Eight vehicles were removed from this drawing as they are sold to other owners or are in poor condition and have little chance of being restored. These vehicles include

1. A 1930's Leyland Beaver salvage vehicle
2. A 1950 Moris Minor
3. A 1668 International C 1600
4. A 1971 International
5. A 1947 Austin
6. A 1942 American-La France
7. A Ford 600
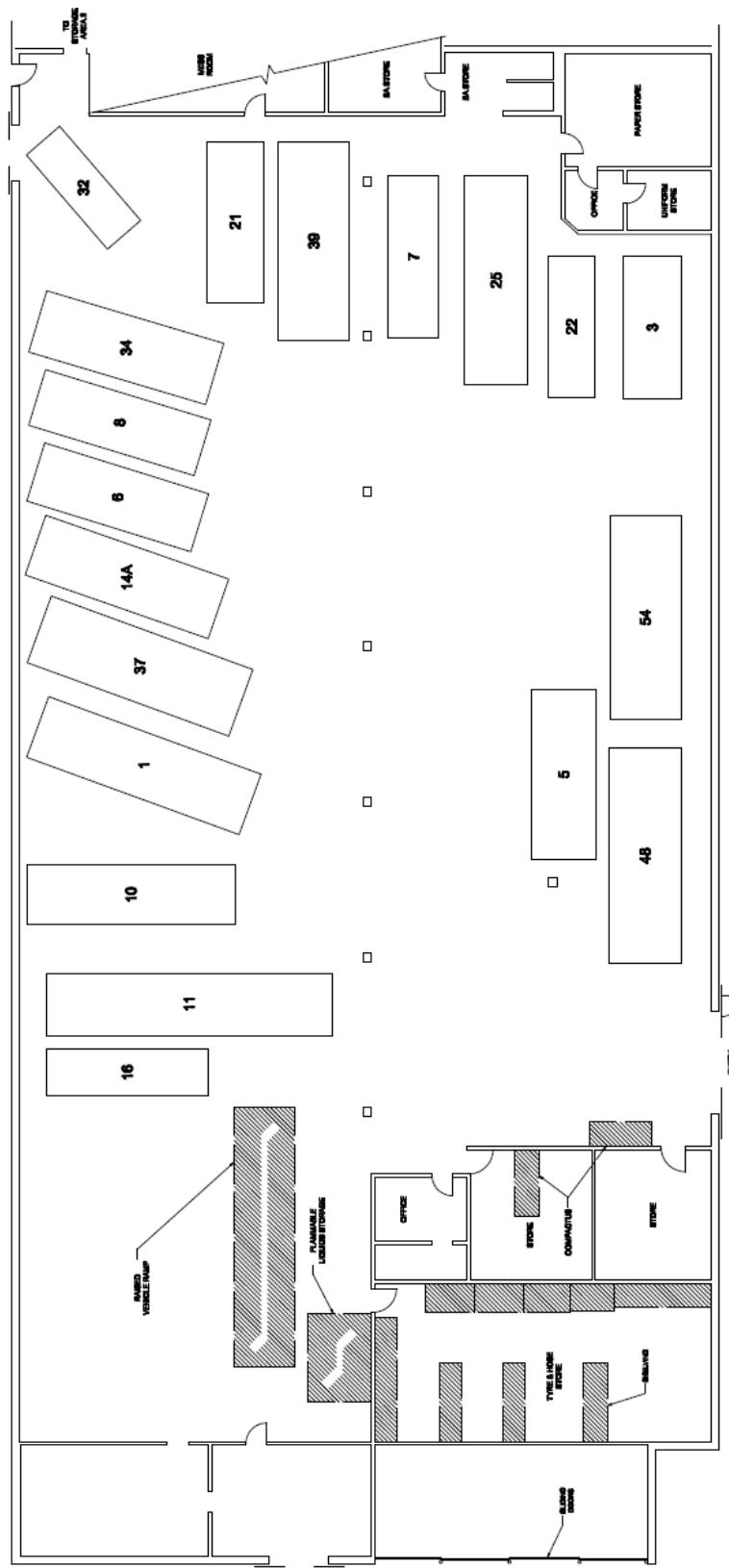8. A 1974 Ford Trader

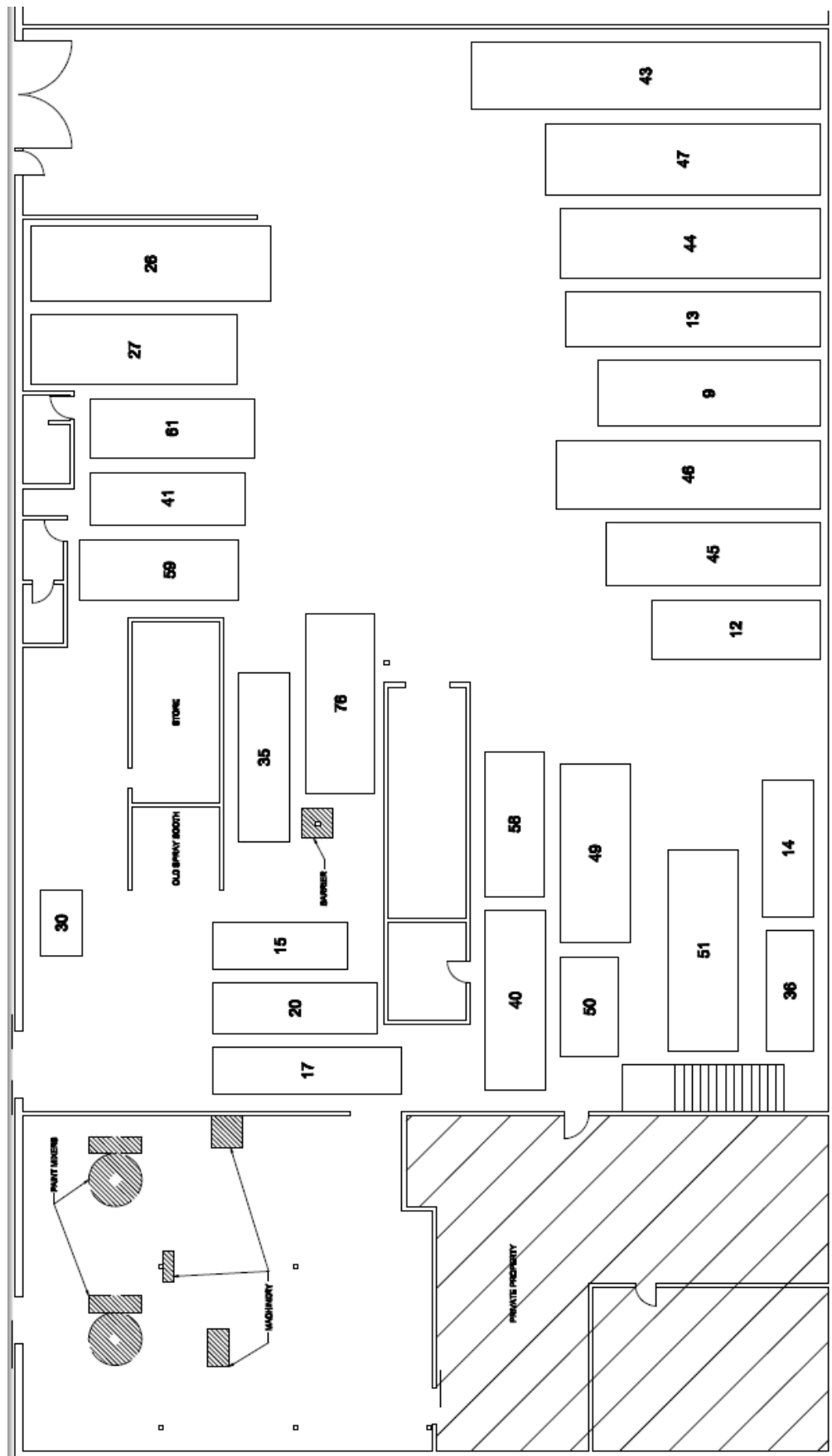Figure 15.11 – Shed 1 Optimized Vehicle Layout

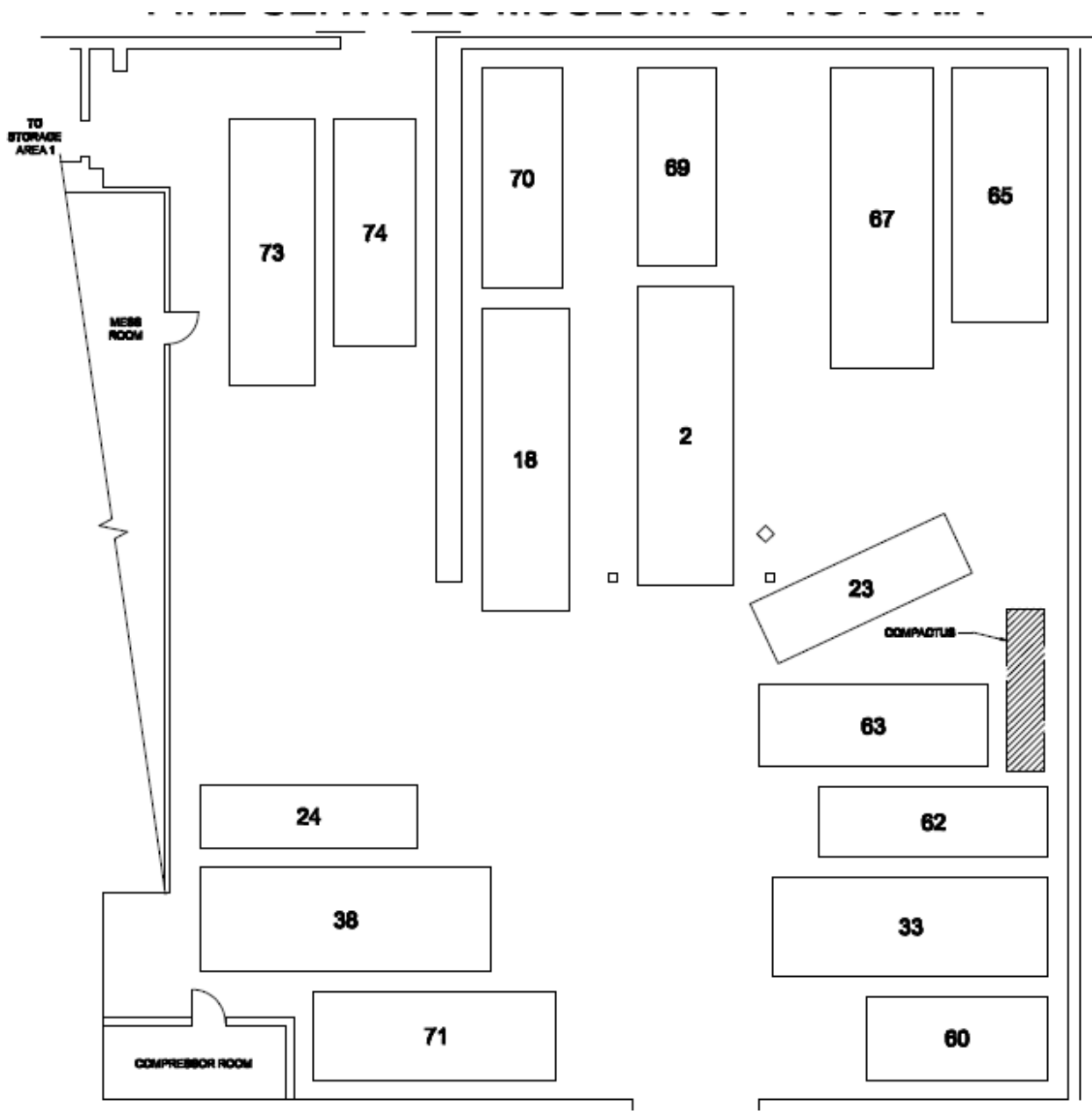Figure 15.12 – Shed 1A Optimized Vehicle Layout

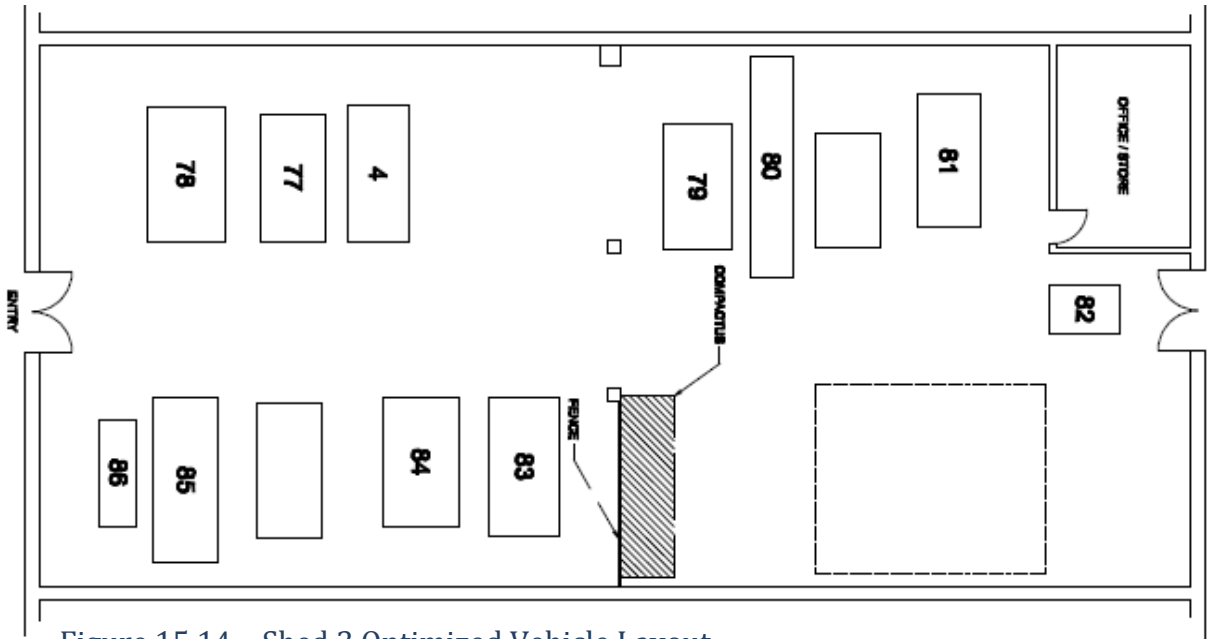Figure 15.13 – Shed 2 Optimized Vehicle Layout
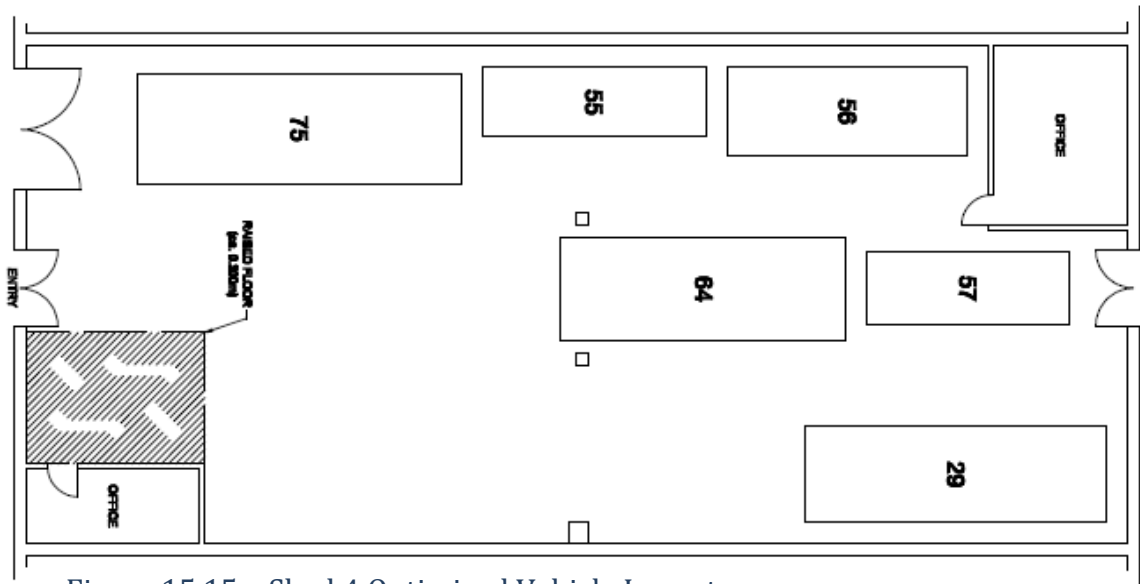
Figure 15.14 – Shed 3 Optimized Vehicle Layout

Figure 15.15 – Shed 4 Optimized Vehicle Layout

All Numbers in vehicle layouts refer to the assigned numbers in this table

Table 15.1 – FSMV Fire Fighting Vehicle Inventory 2010			
Assigned Number	Make	Model	Year
1	Atkinson	9-pump	1960's
2	International	Heavy Rescue	1990's
3	Dodge		1967
4	Shand Mason		1880's
5	International	1810C	1980's
6	International	1710B	1979
7	Fargo	"3 Pump"	1942
8	International	1610A	1983
9	International	2250D	1990
10	Leyland	Ladder	1938
11	International	S2600	1990's
12	Rolls-Royce	Dennis	1958
13	International	C1600 (Combo Ladder)	1970's
14	Willis	Tanker	1958
14a	International	C1500 (Front Pump)	1972
15	Garford NSW		1919
16	Dodge	(Pumper)	1938
17	International	K4	1947
18	Dennis	Quenos	1974
19	Dodge in museum		
20	Dennis	Ace	1935
21	Austin	Series 2 (Front Pump)	1952
22	Dennis	NSW	1930
23	Dennis	NSW	1928
24	Graham Bros. - Dodge		1927
25	Hino	(4WD Tanker)	1985
26	International	1710B	1980's
27	Dennis		1970's
28	Leyland	Beaver (Salvage Truck)	1930's
29	Ford	Trader (Tanker)	1967
30	McCormick-Deering	Tractor	1935
31	Morris	Minor	1950
32	Dodge	Ambulence	1923
33	International	1810C	1981

34	International	1810C ("Tupperware")	1981
35	Morris	Commercial	1938
36	Land Rover	Duralux (4WD)	1975
37	International	1810C	1982
38	Mercedez-Benz	911 (4WD Tanker)	1983
39	International	1950D Mark 3	1987
40	International	AB160	
41	International	AB 130	
42	American-La France	JO/JOX	1942
43	American-La France	JO/JOX	1942
44	Magirus-Deutz	(44m - Turntable Ladder)	1967
45	International	C1900 (Tanker)	1970's
46	Magirus	(Low-Profile Ladder)	1980's
47	International	1950C	1990's
48	Scania	93M (Combo Ladder)	1990's
49	International	AB160	
50		(Foam Tank and Pump)	
51	Thawny-Croft		1950's
52	Ford	600	
53	Ford	Trader	1975
54	International	2350 G	1996
55	Hotchkis		1919
56	International	1410 D (4WD Tanker)	1970's
57	Fargo	(Utility)	1948
58	Austin	(Tanker)	1947
59	International	AS 130	1950's
60	Ford	Blitz	1940's
61	Morris	(Commercial)	
62	Dodge	Cinclaire	1935
63	Austin	Series 3	1961
64	International		1971
65	Dennis	No. 4 Pump	1964
66	Ford	Blitz (Tanker)	1940's
67	Magirus-Deutz		1969
68	Dennis	F12	1955
69	Austin		1947
70	International	K5	1945
71	Bedford	(Tanker)	1968
72	International	C 1600 (Tanker)	1968
73	American-La France	(Pumper)	

74	International	K4	1948
75	Leyland	Flatbed Truck	
76	International	C 1600	1976
77		(Steamer)	1880's
78		Monitor	
79		(Trailer Pump)	
80		(Curricle Ladder)	
81	Furphy's Water Cart		
82		(Foam generator)	
83	Merryweather Pumper		
84		(Trailer Pump)	
85	Rudolstadt	Pumper	1880's
86		(Hand Pumper)	1833

16. Appendix I – Information Included in the New Brochure

The free exhibit guide includes

- A floor plan of the museum
- A brief description of each room
- A list of museum services and contact information
- A comment that the FSMV needs more volunteers

The museum guide includes

- An overview of the Museum
- An overview of the history of the Eastern Hill Fire Station which includes an explanation of
  - Each room in the Museum
  - The Watch Tower
  - The "Story of Fire" Mural
- An explanation of the Museum's collection
  - A list of the fire fighting appliances on display at the Museum with photographs
  - In the Board Room
    - The Centenary Painting
    - The Furniture
  - In the Chief's Office
    - The Chief's Desk
    - The Portraits of the past Fire Chief's
    - The Chief's medals and helmets
  - In the Engine Room
    - Helmets
    - Breathing Apparatus
    - Fire Extinguishers
    - Fire Marks
    - Foam Generating Equipment
    - Street Fire Alarm
    - The MFB Band
    - The "Great Fire of Melbourne" Display
    - Horses in the Fire Services Display
  - In the Watchroom
    - An explanation of the history and function of the Watchroom
    - The Alarm Receiving Panels
      - Their function and coverage
      - The Robert Prenzel Wood Carving

- - - The "Senior Board"
    - The "Junior Board"
    - The Key Cabinet
    - The Radio Desk
  - In the International room
    - The "Saved" Painting
    - The 9/11 Flag
    - Overseas uniforms
  - In the Memorial Room
    - The Valour Medals
    - The Family Medals
    - Military service
  - The CFA Room
  - The Shop
    - Behind the scenes
    - Historical archives
    - Photograph collection
    - Print shop
    - Book collection
- An explanation of the Newport Restoration Facility
  - An explanation of the appliances too large to display at Eastern Hill
  - The restoration of the fire fighting vehicles
  - The collection of breathing apparatus, fire extinguishers, and trailer equipment
- An explanation of the FSMV's other activities
  - Appliance Hire
  - Photography group
  - Research
    - Brigade histories
    - Family histories
    - Significant people
  - Badges and Patches
  - Uniforms
  - Community participation
    - Good Friday Appeal
    - Christmas parade
    - Variety of Children's party
    - Fire service funerals
    - Fire service events
- Contact information and hours of operation

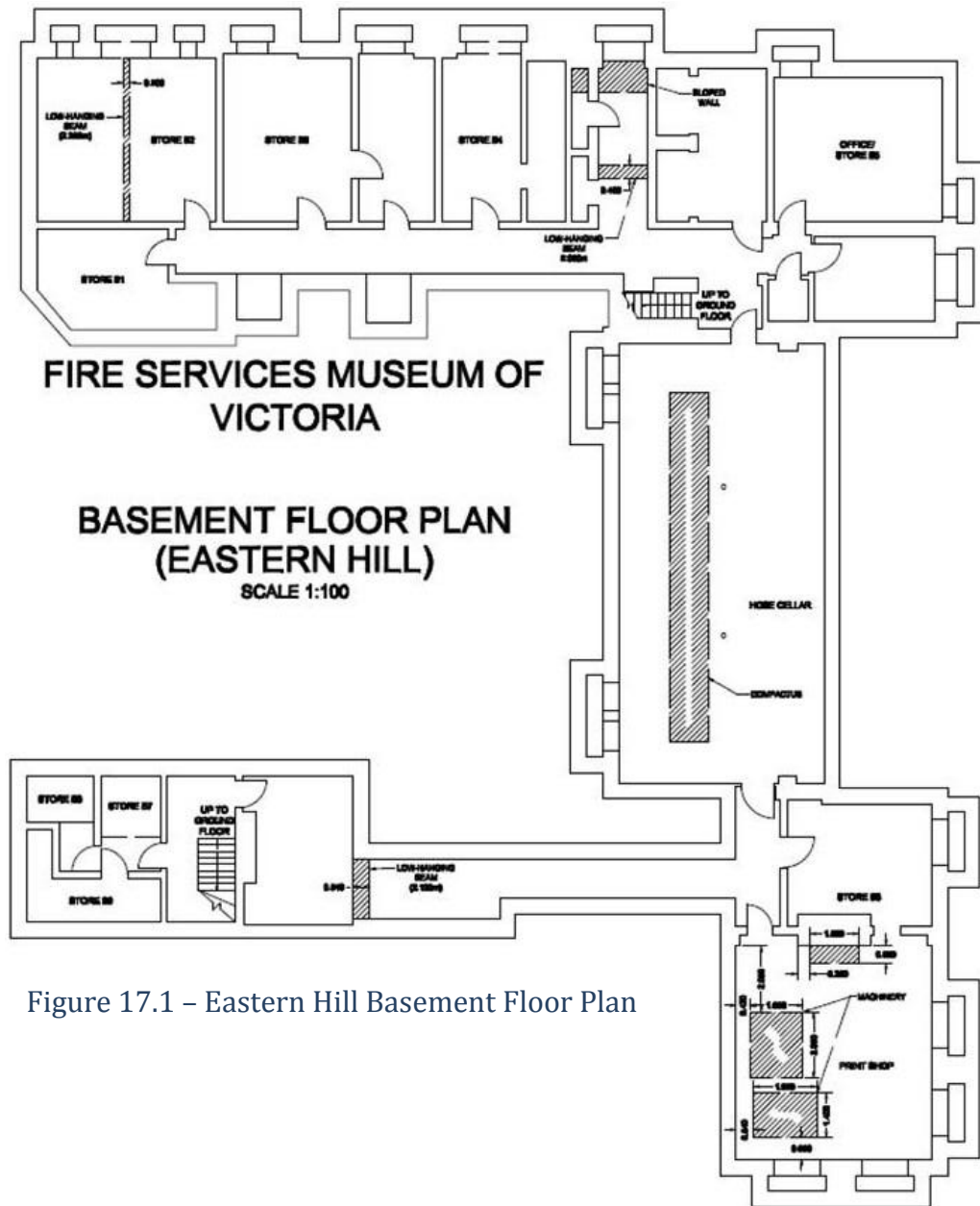## 17. Appendix J – Floor Plans for Eastern Hill and Newport

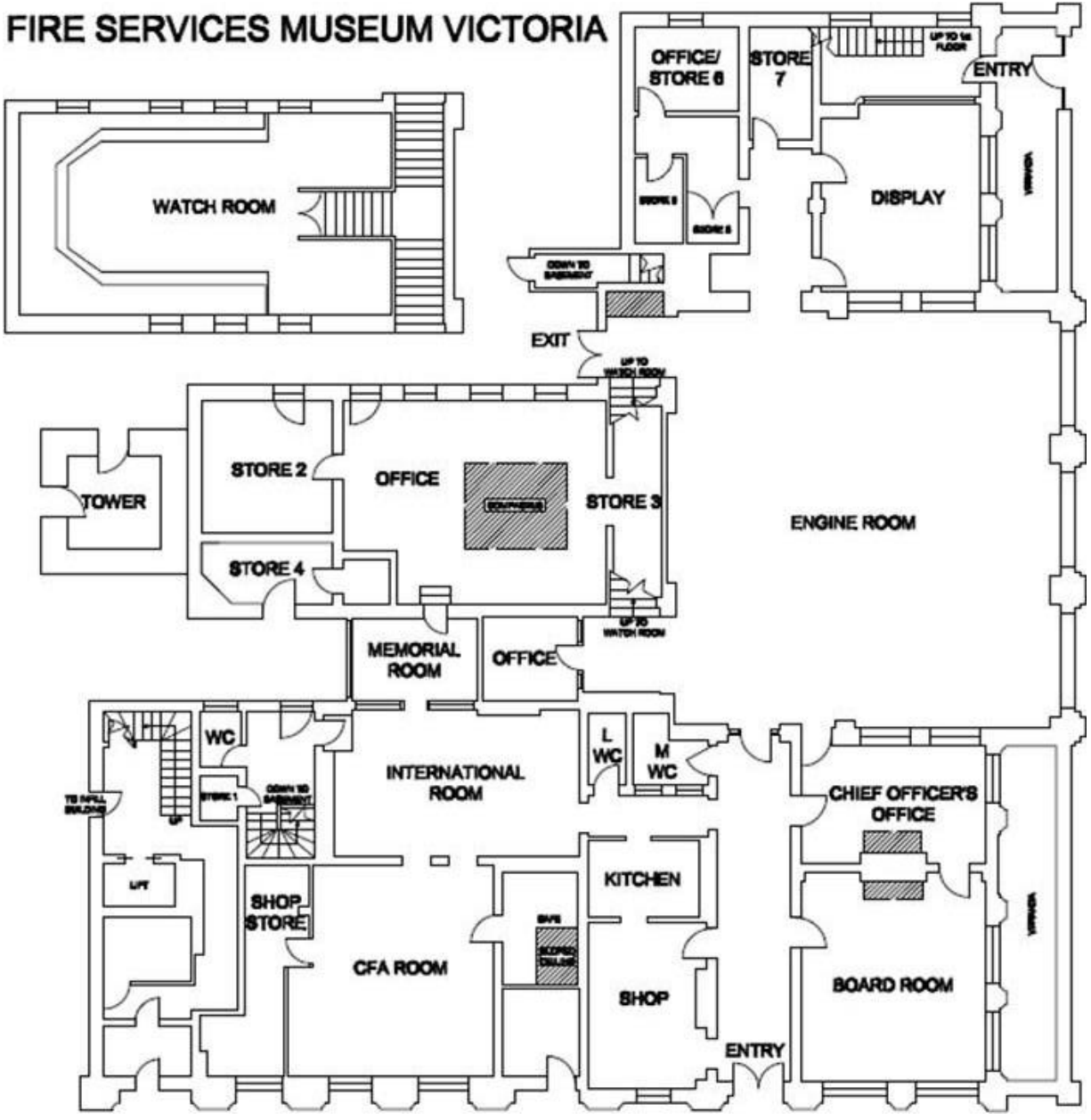Figure 17.1 – Eastern Hill Basement Floor Plan

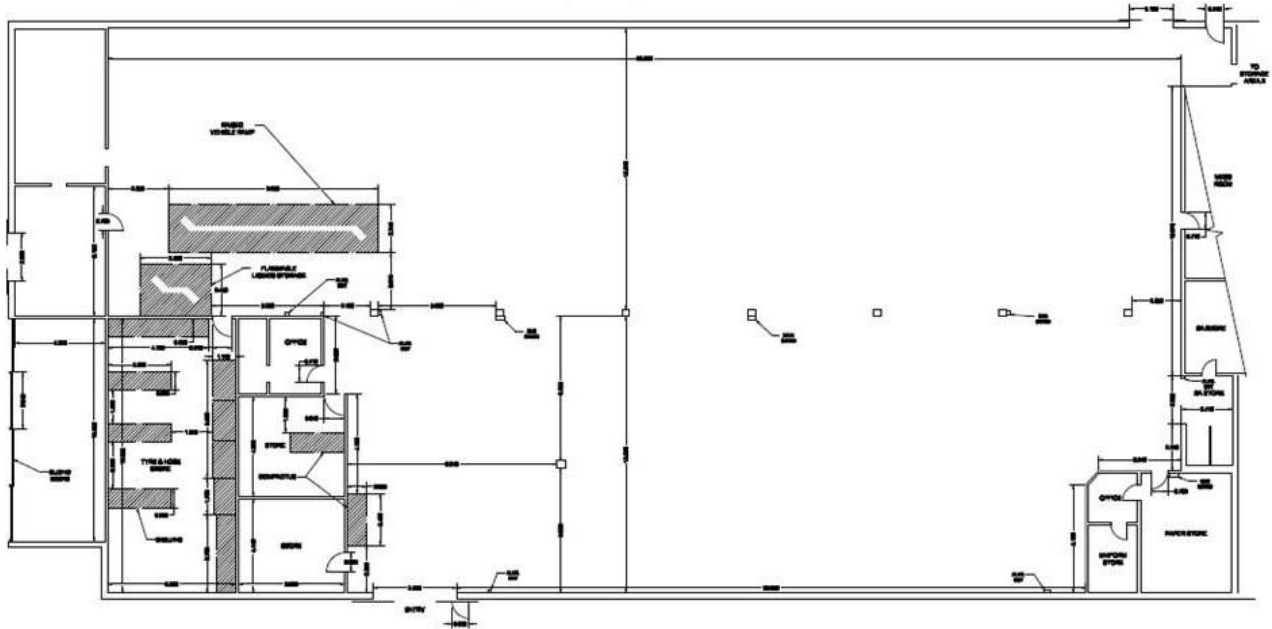Figure 17.2 – Eastern Hill Ground Level Floor Plan

Figure 17.3 – Newport Shed 1
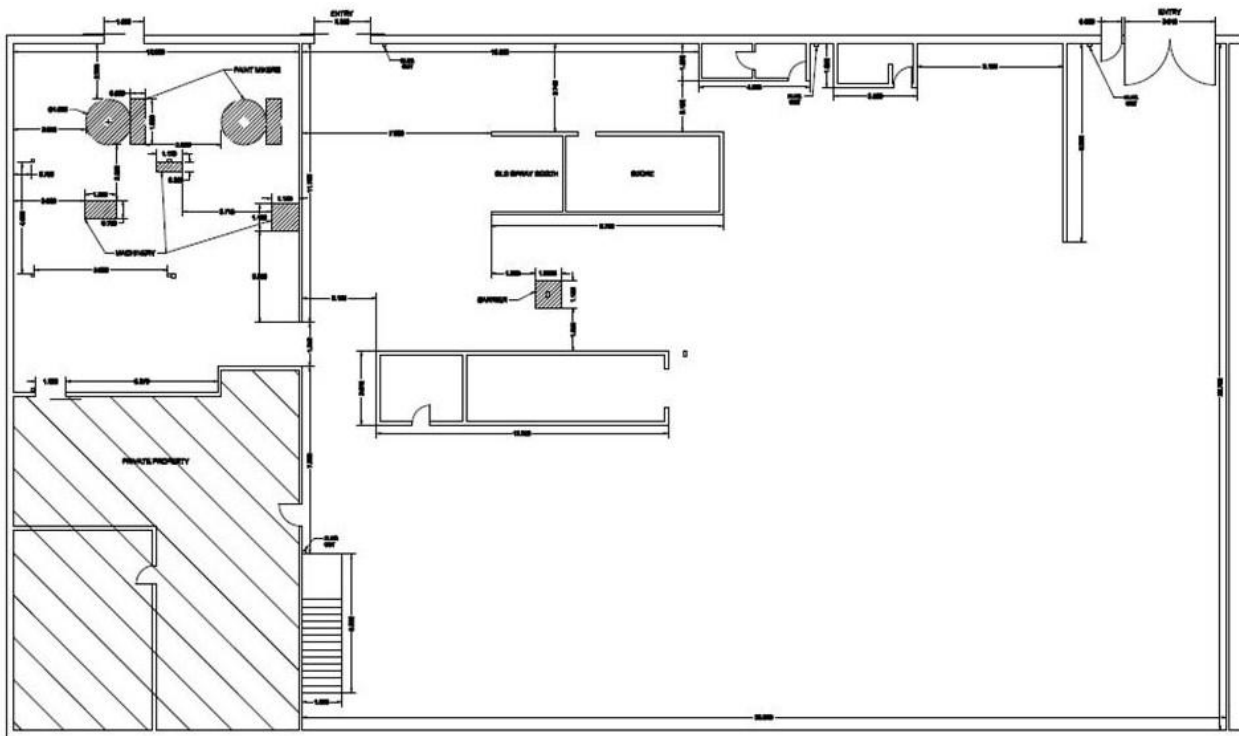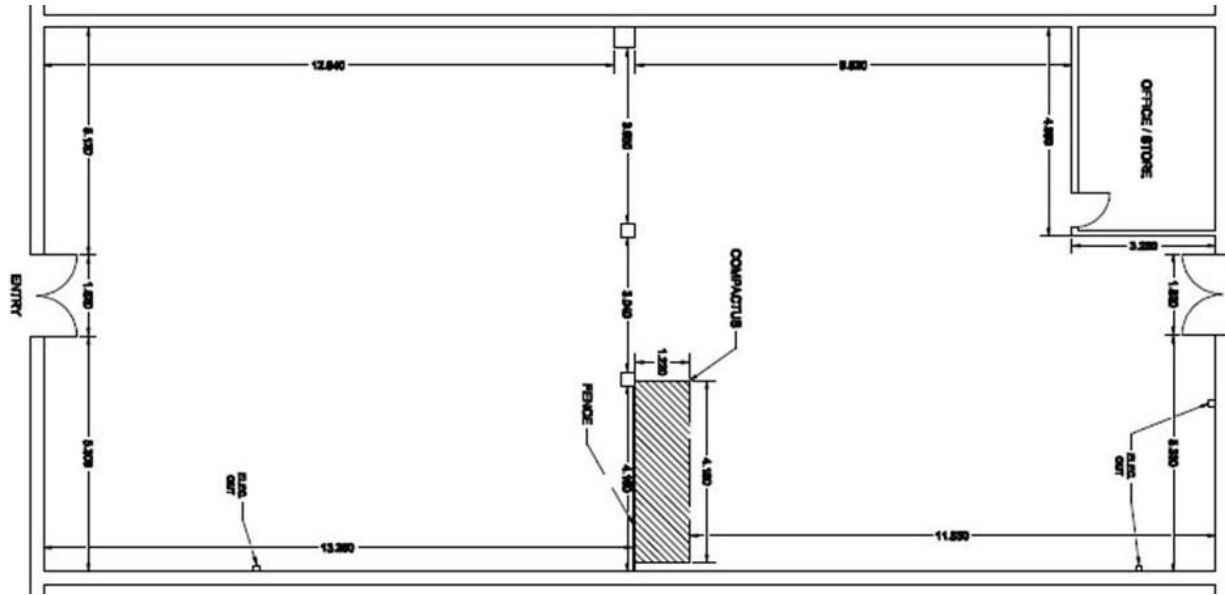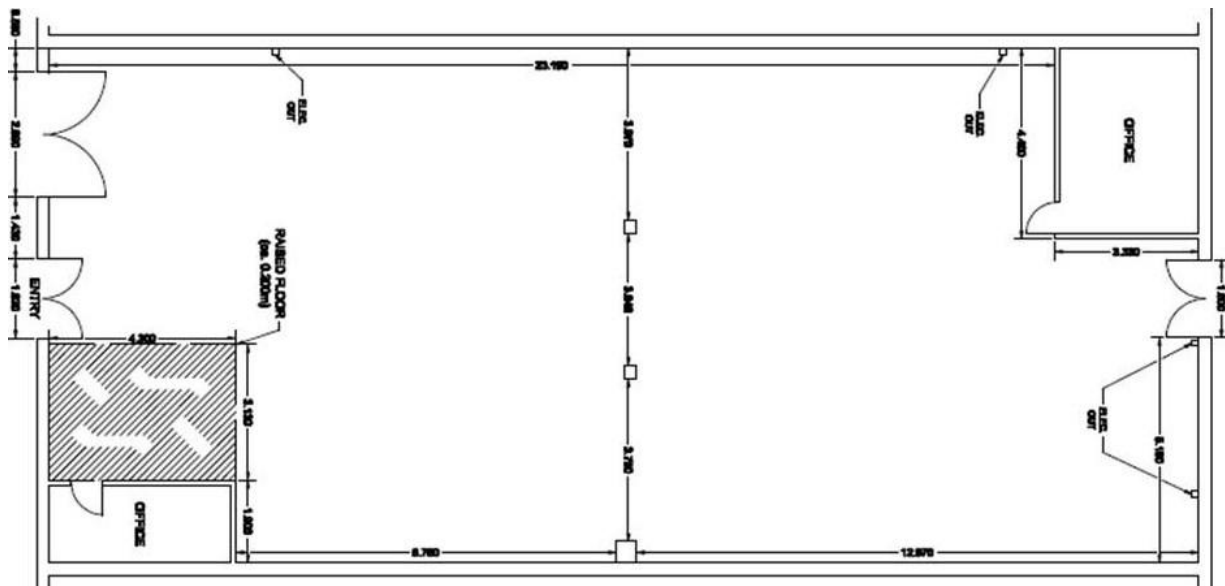

Figure 17.4 – Newport Shed 1A

Figure 17.5 – Newport Shed 2

Figure 17.6 – Newport Shed 3

Figure 17.7 – Newport Shed 4