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Investigation on Adaptive Re-use of Heritage Building in George Town, Penang

Adaptive re-use of heritage buildings in George Town has gained attention from their owners. Their owners either private owners or government, want to adapt their respective buildings to new usage for instance to become a gallery, museum, restaurant, boutique hotel and many more. Every heritage building that is being adapted to paper main objective is to identify the changes made in terms of structure, space and material when adapting the heritage buildings to a new usage specifically into a gallery. Two heritage buildings are chosen as case studies for this paper which are Rumah Teh Bunga and Fort Cornwallis; both buildings located in Penang, Malaysia. The changes made to these two buildings were analyzed using the guidelines provided which are Guideline for Conservation areas and Heritage Buildings and National Heritage Acts 2005. Both buildings will be analyzed using National Heritage Acts, while only Fort Cornwallis will be analyzed using Guideline for Conservation areas and Heritage Buildings. Adaptation of these two heritage buildings requires changes in structure, space and material. The changes in Rumah Teh Bunga focuses more on materials and space while changes in Fort Cornwallis emphasize more to space and addition of other structures. Analysis on the changes are made by using the guideline provided, most of the changes made to both of these heritage buildings comply the rules and regulations stated in the guideline. It was found from the data that some of the reasons on why the owner change Rumah Teh Bunga to gallery are because of its complicated procedure that involves in privatization of this building to other owner and the need to promote the heritage significance of this building to the public. As for Fort Cornwallis, the adaptation is more on strengthening its value as a fort and becoming a tourist attraction.

Keywords: adaptive re-use, heritage, Penang, gallery, conservation building, adaption, George Town

1. Introduction

Heritage buildings in George Town are steep in history and high of architectural significance. In Penang, George Town World Heritage Incorporated, GTWHI is a non-government body that is established to manage, monitor and promote the heritage of George Town and the city's World Heritage Site. Their main objective is to make everyone whether they foreigner or local to understand the importance of World Heritage Site. They work in much collaboration with planners, conservation specialist, state and city authorities for better planning, conserving and management of the physical site. They also work with historians and arts practitioners on a program of educational and cultural activities [1]. The owner of heritage building also can consult GTWHI if they ever want to make a change to their respected building. The owner of the heritage building must follow the guideline provided if they ever want to make a change internally and externally in the building. Other organizations that can be consulting by the owner regarding their heritage buildings are Penang Municipal Council (MPPP), Penang Heritage Trust (PHT) and Badan Warisan Negara.

Adaptation means modifying a place to suit the existing use or proposed use. Adapting these old and historical buildings when the original function is no longer relevant or desired with new uses is called as adaptive re-use. One way to prevent the loss of historical value is re-use existing historical patterns [1]. Re-use means historical will be enlivened, history will be discovered and the characteristics of the structure will be maintained.

Therefore, re-use defines the function of the spaces by adapting them to the requirement. Adaptive reuse is also a process that changes a disused or ineffective item into a new item that can be used for a different purpose. Sometimes, adaptive re-use would be the only choice to make the old and historical building become alive again. Where a building can no longer function with its original use, a new use through adaptation may be the only way to preserve its heritage significance [2]. Two approaches of adaptive re-use; compatible re-use and most appropriate re-use [1].

The adaptive re-use of heritage building causes redundancy of buildings. For example, the adaptive re-use of heritage building to commercial building are usually redundant with the modern commercial building. The re-use of a redundant building, to accommodate new activities while maintaining its character, represents an appropriate and long-term sustainable approach to preservation. The whole notion of what constitutes re-use and importance attached to our built heritage appears to be more definitive than ever. Re-use can mean something special, unique, and often expensive and adaptation describes rehabilitation, renovation or restoration works that do not necessarily involve changes of use. Rehabilitation is the recycling of buildings involving restoration and new construction [3]. The difference is that restoration returns a building to the condition it was when originally constructed, whereas renovation modifies a building so that it meets current standard and codes.

2. Adaptive Re-Use: Stories Of Success



Figure 1. Bangunan Sultan Abdul Samad

In Malaysia, there are stories of success concerning on re-use of heritage buildings. In Kuala Lumpur, one of the famous adaptive re-use of historical buildings is Bangunan Sultan Abdul Samad as been shown in Figure 1. This historical building was adapted to become court which consists of Apex Court of Malaysia, the Supreme Court which subsequently renamed as the Federal Court. The Court of Appeal was also housed in this historic building.



Figure 2. Central Market in Kuala Lumpur

Another good example of adaptive re-use in Kuala Lumpur is Central Market as in Figure 2. It is originally served as wet market but now it became a stall concept store that consists of several types of store like souvenir shop and even provides food court at the first floor. While in George Town, Penang, there are also

stories of success in re-use of heritage building and it is Cheong Fatt Tze Mansion shown in Figure 3. This mansion is very popular among tourist as their tourist destination. This building is successfully adapted to become boutique hotel. Boutique hotel is a hotel to tourist to stay but the heritage characteristic of the building is still being preserved. Besides boutique hotel, this mansion also used for newly married couple to take a picture here. This is one of the reasons Cheong Fatt Tze Mansion is popular among tourist as well as locals. It gradually became one of the main attractions in Penang.



Figure 3. Cheong Fatt Tze Mansion

Adaptive re-use not only related to heritage buildings, it also related with other kind of building such as commercial. One of the famous example adaptive re-use of commercial buildings to gallery is the Gallery of Modern Arts for the Tate museum in London, United Kingdom. The museum (Figure 4) was once a power station. It was constructed in 1947. The power plant shutdown in 1981 and this was transformed in 2001. It is situated on the south bank of the river Thames.



Figure 4. Tate Modern Gallery

3. Benefits of Adaptive Re-Use

Buildings are just similar to other things, even though the physical life of the building is still in a good shape, they can still become obsolete through time. Therefore, the adaptive re-use is introduced to overcome the problem regarding the historical building where the original function of the building is no longer can be continued and adapting it to other innovative usage. It can be said that rehabilitation of historical buildings and suggesting them to new usage does bring some benefits as the following:

i. Economic benefits

Rehabilitated space can be created more quickly than new space, unless extensive structural reconstruction is required. Besides, there are several financial savings and returns to be made from adaptive reuse of historic buildings. Embodied energy savings from not demolishing a building will only increase with the predicted rise of energy costs in the future [2]. While there is no definitive research on the market appeal of reused heritage buildings, they have anecdotally been popular because of their originality and historic authenticity [2].

ii. Environmental benefits

Adaptive re-use of heritage buildings does spread benefits to the environment, because environmental benefits from rehabilitation arise through the recycling of materials, reuse of structural elements and the reduction in generated landfill waste [4]. Besides, adaptive re-use also can play a major role in sustainable development. One of the main environmental benefits of reusing buildings is the retention of the original building's embodied energy. Embodied energy as the energy consumed by all of the processes associated with the production of a building, from the acquisition of natural resources to product delivery, including mining, manufacturing of materials and equipment, transport and administrative functions.

iii. Social benefits

Adaptive re-use of historical buildings is done mostly to benefits the social. The heritage significance value stored in the buildings can be appreciated by the communities around it. They have significance and they are the memories of the society [4]. Taking George Town as an example, the heritage building lies at the very heart of the town. Therefore, the historical buildings are often in advantageous locations in the city centers, where a lot of people focus on that area. In the context of local government planning, heritage has merged with more general environmental and quality-of-life concerns in recent years. Communities increasingly recognize that future generations will benefit from the protection of certain places and areas, including heritage places. Our lifestyle is enhanced not just from the retention of heritage buildings, but from their adaptation into accessible and useable places [5].

4. Data collection and analysis

This chapter will discuss on the changes made to the case studies of Rumah Teh Bunga [6] and Fort Cornwallis in terms of structure, material, and space.

4.1 Case Study Findings: Rumah Teh Bunga

Based on the case study findings, there are several changes identified after conservation work done on this mansion. The changes made to this mansion will focus on changes made in terms of structure, space and material and it is divided into three subtopic; structure, space and material.

4.1.1 Structure

Rumah Teh Bunga has a unique structure of house. Adapting buildings to meet new uses and modern standards involves making physical changes to the existing building [5]. Based on the research done, structurally, this mansion did not undergo major changes in structures. The only structure that has been removed in order to do a conservation work on this mansion is the partition walls. The partition walls are used by previous owners to separate the bedrooms for his children. The partition walls used are made from plywood. It is also found that although the homeowner's changes, but the whole fabric of the house and characters still remain unaffected. The changes in terms of structure can also be seen from this mansion in turning it to become gallery. It is the addition of partition wall at the ground floor at the two bedrooms that are adapted to become exhibition area (See Figure 5).



Figure 5. Addition of partition wall at the ground floor

Based on the interview done, the partition wall is made from timber structure and it is covered with a material called "Papan Lapis Cantik" (Glossy Plywood). This addition of partition walls is used as part of the requirement of becoming a gallery. The partition wall build is permanent. This partition wall also

can be found on the next bedroom that facing each other. Both of these rooms are adapted to become exhibition area for the gallery. This partition wall also do not carry load for the structure of both rooms.

Apart from partition wall, another addition of structure found in this mansion is also the timber structure covered with Papan Lapis Cantik material at the lobby. This structure is used for decoration purposes in the lobby. The structure used for this lobby is same type used in the exhibition area. This structure also does not carry any load for this mansion (see Figure 6).



Figure 6. Timber structure covered with "Papan Lapis Cantik" material



Figure 7. Sun Shelters at the external area

Besides that, there is also an addition of sun shelters at the external area of this mansion. Previously, this sun shelter does not exist and it is built after this mansion is properly conserved. The structure like beam and column of the sun shelter is made from steel. The function of this sun shelter to provide a shelter from the sun for the people and the visitors that came to this gallery. This sun

shelter is also connected to the VIP toilet. Based on the interview done, this shelter also acts as a parking for VIP. See Figure 7 for sun shelters at the external area. On the first floor of this mansion, it is also provided with the same type of sun shelters. It is used to cover the open space at the porch. See Figure 8 for the sun shelters at the first floor area.



Figure 8. Sun shelters at the first floor area

Besides sun shelters, they have also build a suspended ceiling at the toilet (See Figure 9). The toilet previously functioned as a horse-drawn carriage room. Then, they decided to build a toilet as a current requirement for the future usage of this mansion which is a gallery. They build two toilets for this gallery, a toilet for visitor while another toilet for the VIPs. Currently, these toilets are only used by the person in charge that takes care of this building which is, the guard man. Figure 9 shows the suspended ceiling builds in the toilet. Previously, the ceiling does not exist.



Figure 9. Suspended ceiling in the toilet

4.1.2 Space

According to Mucahit Yildirim, and Gizem Turan, the adaptive re-use of a traditional structure such as cultural centers, spaces for management, handicraft courses, meeting rooms and exhibition halls are needed. Government intervention is essential in this type of community purpose re-use to ensure the attractiveness of historical site. This statement is also applied in adapting Rumah Teh Bunga to become a gallery. The space for management, meeting rooms, and toilet is surely needed for the future used. This mansion is adapted to become Penang Malay Gallery and each of the space will be used for other purposes. Some of the space will remain to original usage intended for exhibition purposes such as kitchen area and the first floor area, the two bedrooms; master bedroom and bedroom 3.

Generally, the ground floor of this mansion is for exhibition area. Based on observation, the rear side of this mansion is mostly used for the management of this gallery at ground floor area and first floor area. Meanwhile, the front side of this house is used for exhibition area. In the kitchen area, master bedroom and bedroom 3 are used as an exhibition area but it exhibits the original usage of this space which as a bedroom and kitchen area remains a kitchen exhibition area.

The summary of changes in every space can be shown in the spaces layout (See Figures 10, 11, 12 dan 13)

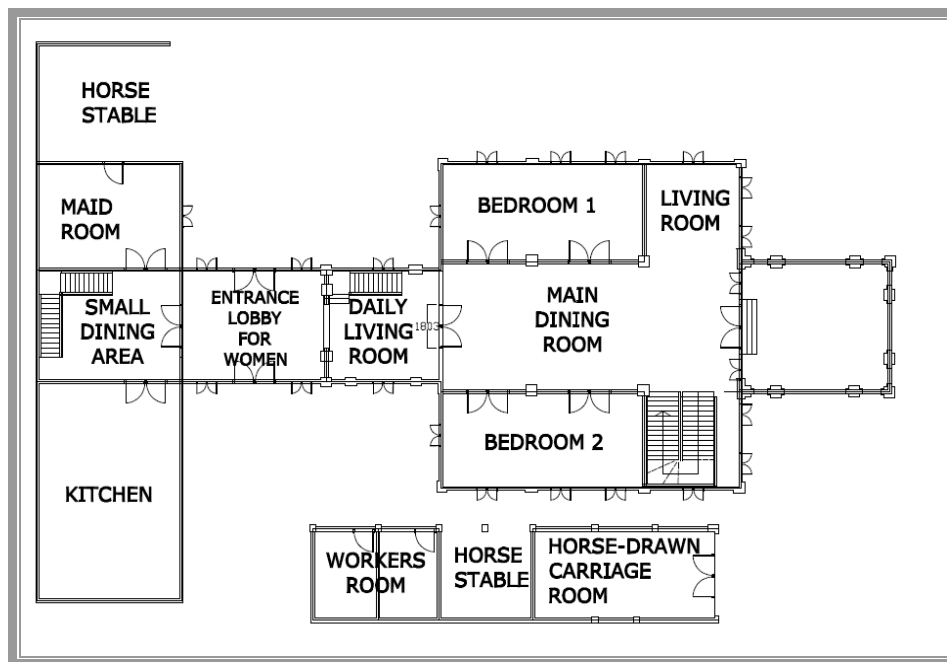


Figure 10. Ground Floor Plan before re-use

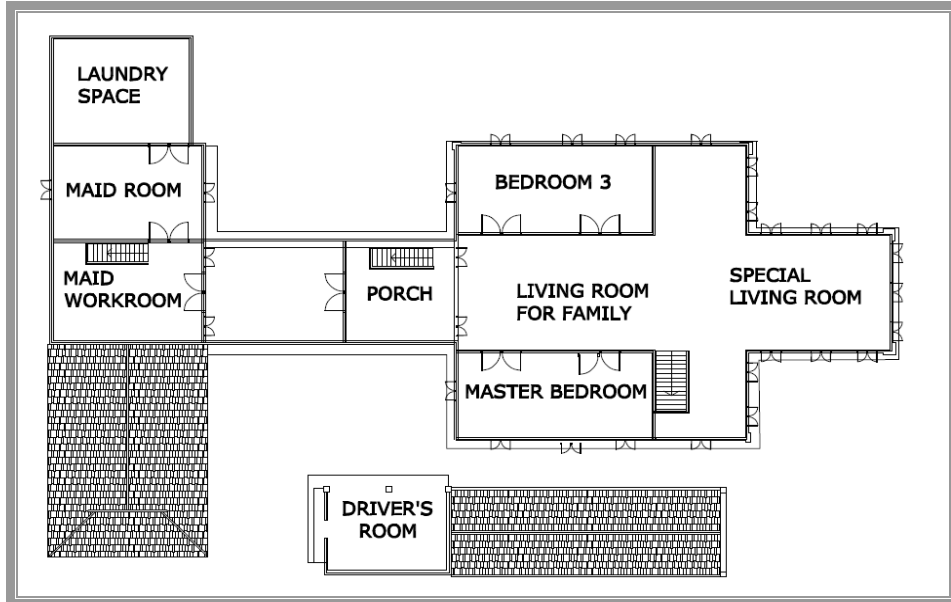


Figure 11. First Floor Plan before re-use

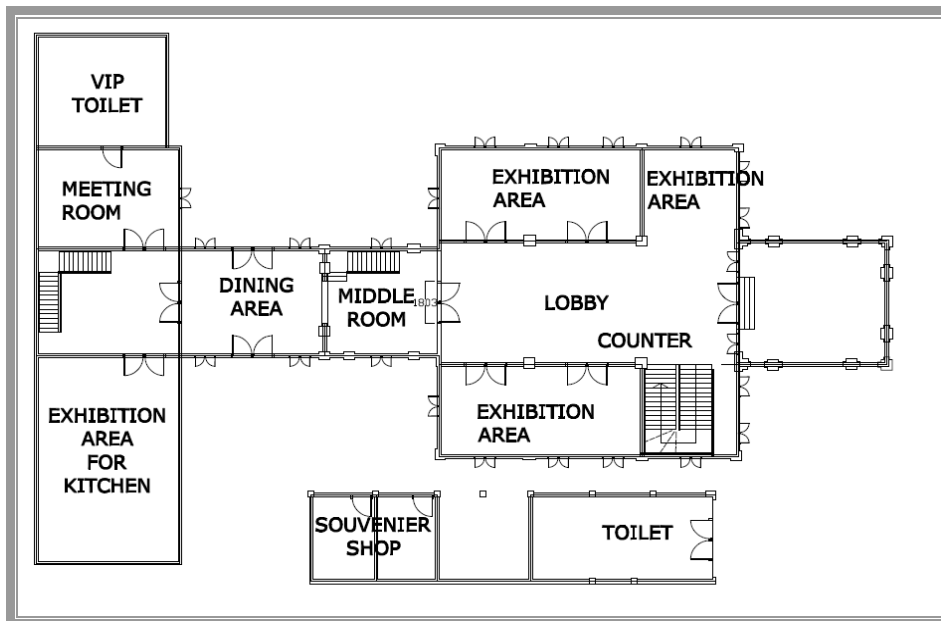


Figure 12. Ground Floor Plan after re-use

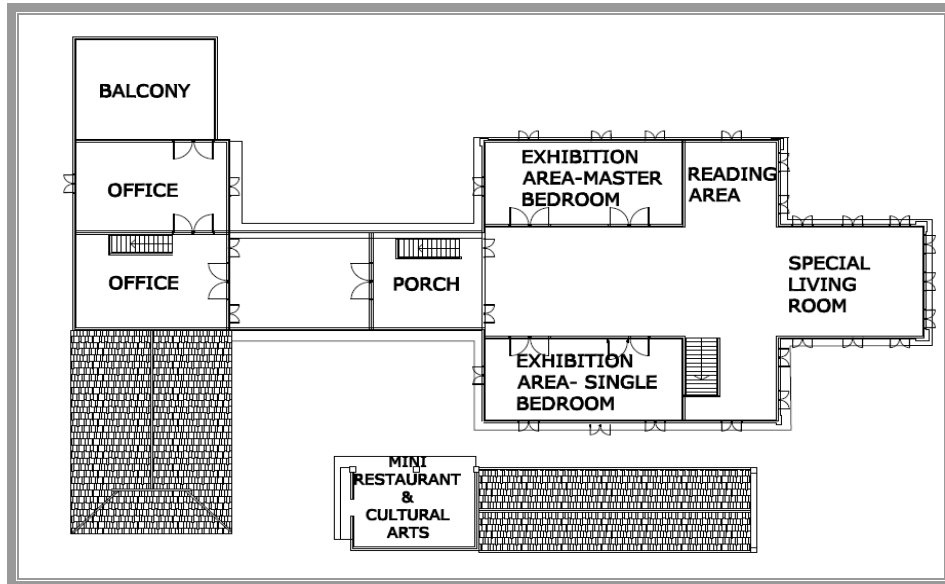


Figure 13. First Floor Plan after re-use

4.1.3 Material

This mansion had undergone major changes in terms material. The changes are divided into major changed and partially changed. For major changed, they changed the material completely while for partially changed, they changed the broken parts only. In this mansion, during the conservation phase, there are two materials that have undergone major changed which are timber for flooring and plaster for wall.



Figure 14. Meranti Merah used for timber flooring

Timber is a common material that is used in heritage buildings. During the conservation phase, they decided to change the timber flooring completely. The reason behind this decision is the old timber flooring is too brittle and was not safe to be used. Firstly, they found the type of timber flooring this mansion used. However, if they do not found any type of woods that is similar, they would have to find the type of wood which have the same grade or quality as previous or original one. Therefore, the type of timber used during the conservation phase is "kayu meranti merah" (See Figure 14).

Old buildings usually use lime for plastering their wall. They do not use cement plaster like modern buildings do. The guideline has stated that minimum intervention is needed while conserving this building. It has stated also that only original material is allowed to use on the building, therefore this building was plastered again using lime plastering. They removed the entire old lime plastering and replaced it with a new one. Following that, several new mixture of plaster test which follows the original plaster mixture is conducted and then best mixture was chosen for plastering work in order to replace original plaster.



Figure 15. The interior wall paint for Rumah Teh Bunga

After finished replacing the new plaster, the wall needs to be painted. The paint used to paint this wall is a special paint. The special paint is usually used only for heritage buildings is "Cat Air" and the brand that usually used is Lota Paint. This special paint is the only paint that is suitable with the plastering material, which is lime. Besides that, this special paint is used because it can last longer on the heritage buildings. They also paint the wall according to the original color of the wall which is blue. Figure 15 shows the interior wall paint for Rumah Teh Bunga while Figure 16 shows the exterior wall paint for Rumah Teh Bunga.



Figure 16. The exterior wall paint for Rumah Teh Bunga

They also paint the wall with the original colour of the house. External wall was painted with the chrysanthemum flower colour. Meanwhile the internal paint is a paint that is in a blue shade colour. They identified that, the blue colour was the original colour for the interior wall. Regarding to the colour of the paint for external wall, they did some research near the surrounding neighbouring area about the colour of the mansion.

Based on their research, the colour of this mansion resembles the chrysanthemum flower that is popular as a floral tea. In partially changed material, they just replaced the material that is broken only. They do not change the material as a whole. It is because some of the material is still in a good condition and do not need any replacement. An example of material they changed partially is V tiles for roof covering and terracotta tiles.

Apart from terracotta tiles, V tiles for roof covering had also undergone partially changes. Some of the good condition of V tiles is still used in this mansion. The original V tiles are placed at the rear side of this mansion. While the new replaced V tiles are used at the front sides of this mansion. This is to show the respect for this heritage building. Figure 17 shows the original V tiles used for roof covering and Figure 18 illustrate the new replaced V tiles.

The component of door and window that are made from wood component are then being replaced with the same design and material of wood. They managed to find craftsmen that can produce the same design of door and window. See Figures 19 for door and window component.

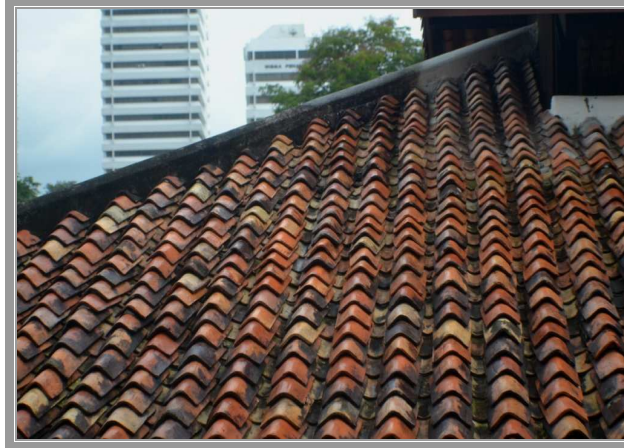


Figure 17. Original V tiles for roof covering



Figure 18. Replaced V tiles for roof covering

Now, we will be looking the type of material used for the window glasses. The windows used before have intricate design on them. However, new window glasses are replaced without any design on it. The decoration materials used for the gallery for example panel graphic and information board which often require attaching or affixing it on the wall. However, in this case, they would like to minimize the intervention made to the wall. One of the conservation guidelines that need to be followed is that there is no renovation work that will cover the wall to the maximum. It is because the wall of this mansion encounters high rate of salt problem. As a precaution step, the technique of exhibition focuses more on to a suspended approach so that it will not have a contact with the wall. See Figures 20 for the suspended approaches of panel graphic used in this gallery.



Figure 19. Window and door component respectively



Figure 20. Suspended approaches for panel graphic

4.2 Case Study Findings: Fort Cornwallis

Based on the case study findings, there are several changes identified after being re-used to become a gallery and tourist attractions. The changes made to this fort will also focus on changes made in terms of structure, space and material and it is divided into three subtopic; Structure, Space and Material.

4.2.1 Structure

Fort Cornwallis is a historical site. This fort is not like other common buildings that have roof structure, column, beam and many more. This fort is build using special arrangement of clay bricks. The structure for this fort is just clay bricks wall that surrounds an open space. It is a structure that consist another structures in it. The restoration of this fort is done by the teams of consultant and experts to bring back the shine and to its former glory. After the restoration of project is done, this fort is now converted to become a tourist attraction.

In adapting it to become a tourist attraction, they also build other structures like amphitheater and a structure special for toilet, souvenir shop and management office. This fort also previously consists of other structures that were originally built in it. The original structures found in this fort are church or chapel, cell room, gunpowder magazine, harbor light and flagstaff, and store. The actual interesting feature in this fort is the cannon itself. The cannon found on this site were the historical evidence on how this building acts as administrative building in previous years. In this structure, we can observe that there are many columns built as showed in Figure 21 that functions as a support to the structure.



Figure 21. The columns that react as support structure

There are more or less 30 columns found in this structure. This structure was built to fulfill the current requirement for this fort that to become a tourist attraction. For example, the toilet built is to provide a facility to the visitor that came here. Besides that, adaptive re-use this fort, another addition of structure found in this fort is a small cottage that is made from timber frame. Based on the observation, one small cottage is found and its function is to connect another entrance of this fort. Without this small cottage, it is impossible to cross the gap

between the entrances. However, this entrance is closed and not used for the visitor. See Figure 22 for the small cottage image.



Figure 22. The small cottage found in Fort Cornwallis

4.2.2 Space

Fort Cornwallis is a very spacious area and it is an open space. Fort Cornwallis is regarded as a site rather than a building. Plus, part of the open space is regarded as archeology site. Even though the construction of amphitheater took some of the space at this fort, the space left is still considered as large. In terms of space of existing structure, the only empty space in the cell room was adapted to become a gallery. There are nine cell rooms that were used as a gallery. See Figure 23 showing the cell rooms.



Figure 23. The cell rooms

The panel graphic used in every space of the cell room provides information and explained in a very informative manner. Each space used in the cell rooms demonstrates different information and themes regarding this fort. However,

based on the observation, the space of this cell room mostly is not in a pleasant and satisfying situation. Most of the cell room experiences serious dampness problem. If any visitors that comes in, they will not feel comfortable with the poor condition of the cell room.



Figure 24. Dampness problem occurred in one of the cell rooms

Through observation also, this space is not a popular space among visitors that came to this fort. Based on the interview done, the condition of this cell room is purposely left like that, because it is accordance with the age of this structure. See Figure 24 shows the one example of serious dampness problems that occurs in one of the cell rooms.

4.2.3 Materials

In terms of material, as mentioned earlier, the material used to build this fort is clay bricks and the only material that can be identified. Based on the literature review done on the restoration project on Fort Cornwallis, it requires the use of thousands of new bricks, particularly in reconstructing the demolished walls on the west zone, replacing broken brickworks and restructuring the leaning and cracked walls.

Meanwhile, the decoration material used to change the cell rooms as to a gallery is the standing panel graphic. These standing panel graphic used were placed in every cell room. Meaning that, no intervention was made to the wall because it used standing panel graphic. All cell rooms used the same type of panel graphic. As usual, there are also artifacts showed in this gallery. The artifacts displayed in this fort are the artifacts found during the restoration work.

Other than artifacts display, during the inspection, a painting also found on the wall of the cell rooms. The paintings seem new and quite fresh. The function of the painting is unknown; however, it seems to enliven this dull and boring cell room. Some of the paintings done on the wall were related to past years of time in

Malaysia and some are just general painting. It is found that the paintings are done on the wall at most of the cell rooms. See Figure 25 shows the painting done. Other decorations that can be found in the fort are like sitting area, Francis Light statue, and a photo shooting board.



Figure 25. The painting done on the wall of the cell room

5. Analysis on The Changes Made To The Case Studies Based on The Guidelines Provided

After determining the changes made to these two case studies, the changes made were the subsequently analysed using the guideline provided. Only two guidelines used to analyses the changes made, these are; Guideline for Conservation areas and Heritage Buildings (MPPP Guideline) and National Heritage Acts 2005. Both buildings are applicable using the National Heritage Acts 2005 while the MPPP guidelines are only applicable to Fort Cornwallis only.

5.1 National Heritage Acts 2005

The meaning provide in this acts can be used to analyses the changes made to these case studies. The meaning of restoration in the Part I at Preliminary Section stated that "Restoration means the process of accurately recovering the forms and details of a structure or part of a structure and its setting, as it appeared at some period in time, by removing the latter work and replacing the missing original work, and includes the following elements:

- a. full restoration which involves both exterior and interior;
- b. partial restoration which involves the exterior, interior, or any partial combination and is adopted when only parts of a structure are important in illustrating cultural values at its level of historic significance, or contribute to the values for which the area was designated;

- c. adaptive restoration which involves all or a portion of the exterior restoration with the interior adapted to a modern functional use;”

By using this meaning of restoration that is clearly mentioned above, the restoration work done on these two case studies follows this law.

For Rumah Teh Bunga, restoration can be observed from the changes made to the material. The changes in material involves wood component for timber flooring, door and window, terracotta tiles, V tiles for roof covering and wall plastering. For example the use of new terracotta tiles, they only replaced the broken and damaged only. The terracotta tiles that are still in a good condition and shape will be reused. In terms of size and arrangement, this mansion also follows the original size of the tiles and arrangement. This can be referred to Figure 5.13. This figure shows the combination of new and replaced terracotta tiles.

In terms of V tiles for roof covering, even though they do not combine the old and the new V tiles, but the original V tiles were used at the rear side of this mansion. Again as mentioned earlier, this is to show the respect to this mansion as a heritage building. Below is the overall analysis according to the full restoration and partial restoration on the mansion;

- a. The full restoration which involve interior are the wall plaster and wood component for timber flooring
- b. The partial restoration which involves both exterior and interior are the restoration of component for window and door (wood and glass), terracotta tiles and V tiles for roof covering

According to Part (c) in the meaning of restoration, these mansion and fort were allowed to adapt to modern functional use such as to become a gallery and tourist attraction, where it involves the adaptation of space interiorly and exteriorly.

Followed by the painting found on the wall of cell room in the Fort Cornwallis, it could be considered as offence to heritage building. Under section 112 in matter (1) (b) stated that “no person shall, without the approval in writing of the Commissioner demolish, disturb, obstruct, modify, mark, pull down or remove any monument in heritage site”.

Since no information whether the painting is done with or without approval of Commissioner, the status of the offences is still unknown. Based on the interview conducted with MPPP officer, the painting done is not considered as an offence as long as there are no structural changes to the building. On the other hand, Prof A. Ghafar, said if the painting is new which means that previously the painting is not exist, then it can be regarded as an offence because it can damage the values of the heritage buildings.

5.2 Guideline For Conservation Areas And Heritage Buildings (MPPP Guideline)

In this guideline, only Fort Cornwallis is applicable as it is located at the world heritage site and it falls under category I. Besides that, this fort was declared as an

ancient and gazette formerly under the Antiquities act 1976 now under the National Heritage Site and it is automatic fall under Category I building. Category I buildings and sites are important in that they reflect the authenticity of the cultural landscape and therefore the Outstanding Universal Value of the Site.

Under 4.1 Permitted Use for Category I stated that the use should remain as originally intended, when possible. Any adaptation to the use must have minimal impact on the cultural significance of the place and requires the preparation of a Cultural Impact Assessment" (CIA). Based on analysis on the statement above, the adaptation to this fort has minimal effect on the cultural significance where no other spaces were adapted to other usage except for cell room while the other original structures is well preserved and maintained at the site. Therefore, all the structure in the fort as well as the brick wall is still maintained as its original structure to protect its cultural significance.

6. Conclusion

As a conclusion, the adaptive re-use of heritage buildings to other usage is quite long and complicated process, because building preservations range from restoration until adaptive re-use. The function of adaptive re-use of these two building is to adapt the heritage buildings with the modern functional use. Modern functional use of these heritage buildings is needed whilst preserving its historical and cultural significance. The study has shown that when the perfects time has come, many parties can gain benefit for the restoration and re-used of the heritages buildings especially in George Town area. However, issues in adaptive re-use of heritage buildings to other usage will always be there because the selected usage may questionable and debatable at times.

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