

Lessons Learned from Conservation of Malaysia's Parliament House

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Figure 1: Aerial view of the Parliament Complex just after completion in year 1963
(Photo source: Parliament Archives)

The construction of Malaysia's Parliament House started in 1961 and was completed in 1963. The implementation of the building project was carried out by the Public Works Department (PWD) Malaysia. The building was designed by architect William Ivor Shipley, a British national working in PWD at the time. The Parliament complex sits on a 15-hectare site. Initially the Parliament complex consisted of the Main Block, the Tower Block, the Annex Block as well as a Grandstand at the Parade Ground.

The Main Block has four levels including a service basement and houses the *Dewan Rakyat* (House of Representatives), the *Dewan Negara* (House of Senate), the Banquet Hall, the offices of the Speakers, the Deputy Speakers, Committee Rooms, the Royal Room, library, surau and cafeteria. The Main Block is attached to the Tower Block by a link bridge. The Tower Block which was originally used by the Members of Parliament consists of 17 storeys with a service and lift motor room on level 18.

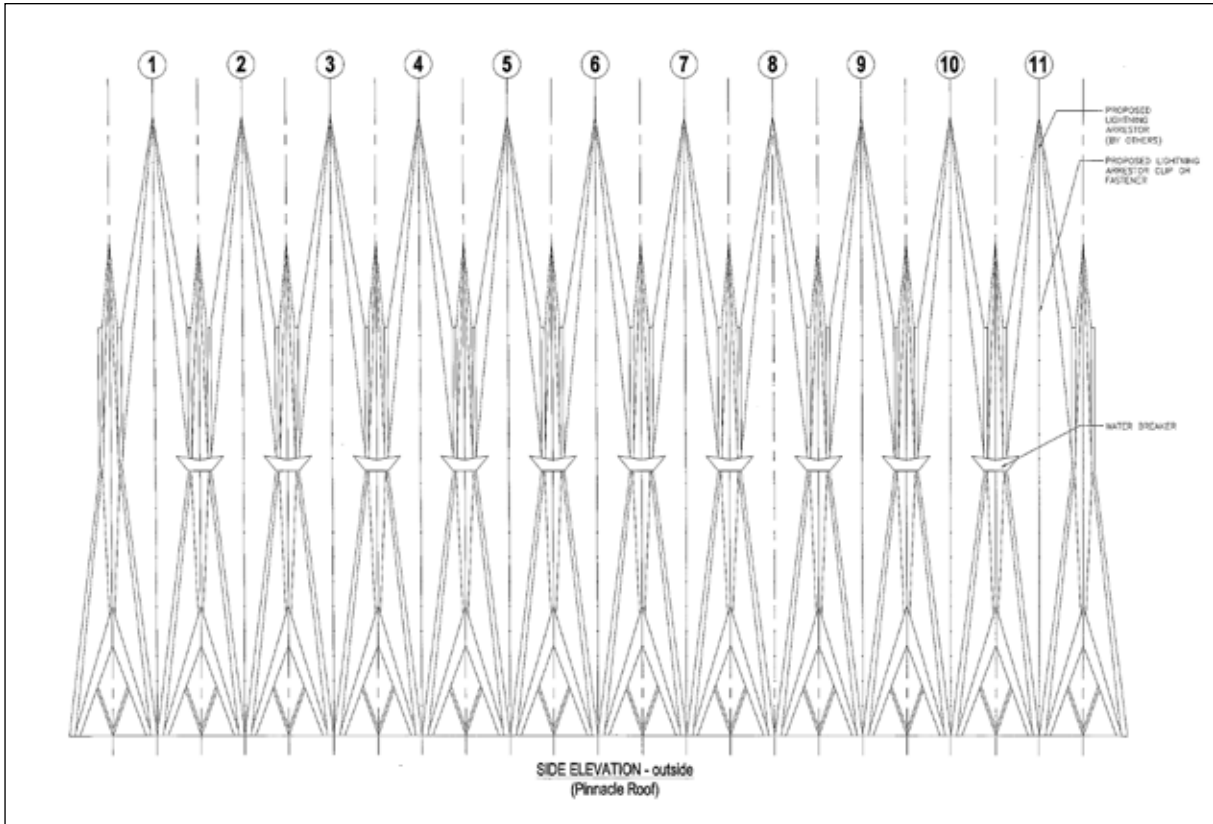


Figure 2: An elevation drawing of the Pinnacle
(Photo source: Public Works Department Malaysia)

PARLIAMENT BUILDING'S SIGNIFICANT FEATURES

Pinnacle Roof

The Pinnacle roof is the main highlight of the entire building. It is uniquely designed with 11 triangular pleated forms that represent the number of the Malaysian Federation's States. These Pinnacles are made of reinforced concrete that has a span of 80 feet in width, 120 feet in length and 60 feet in height. The majestic Pinnacles form the roof structure above the main hall of the *Dewan Rakyat*.

Precast Terrazzo Fins

One of the building's significant architectural features is the decorative precast terrazzo fins which are approximately 11 feet in height and 40 inches in width. Besides being decorative, the fins also act as a sun shading device. The terrazzo fins are installed on the edge of a cantilevered ledge with stainless steel bolts surrounding the



Figure 3: Cantilever ledge



Figure 4: Decorative Terrazzo Fins

perimeter of both the Tower Block and Main Block. This ledge, which is about 1.5 metres wide, also allows ample and easy access for maintenance around the building.

Staircases in the Main Block

In the Main Block, there are a total of 12 staircases of different designs and structure in which a majority of them are decorative types. The designs of the staircases are architecturally unique with some constructed with stainless steel cables supported from the roof beams whilst some are supported by free standing beams.

Roof Pool

Surrounding the pinnacle's base was a water pool system approximately 450mm in depth which also sat along the roof above the *Dewan Rakyat*. The pool system was designed to provide a reflective and cooling effect inside the building and was connected to other pools inside and outside the building. Through the years, frequent leakage from the roof pool resulted in high maintenance repair costs which eventually led to its closure. Findings by forensic engineers later showed that the concrete strength of roof slabs had deteriorated resulting in hairline cracks



Figure 5 : Some of the staircases in the Main Block

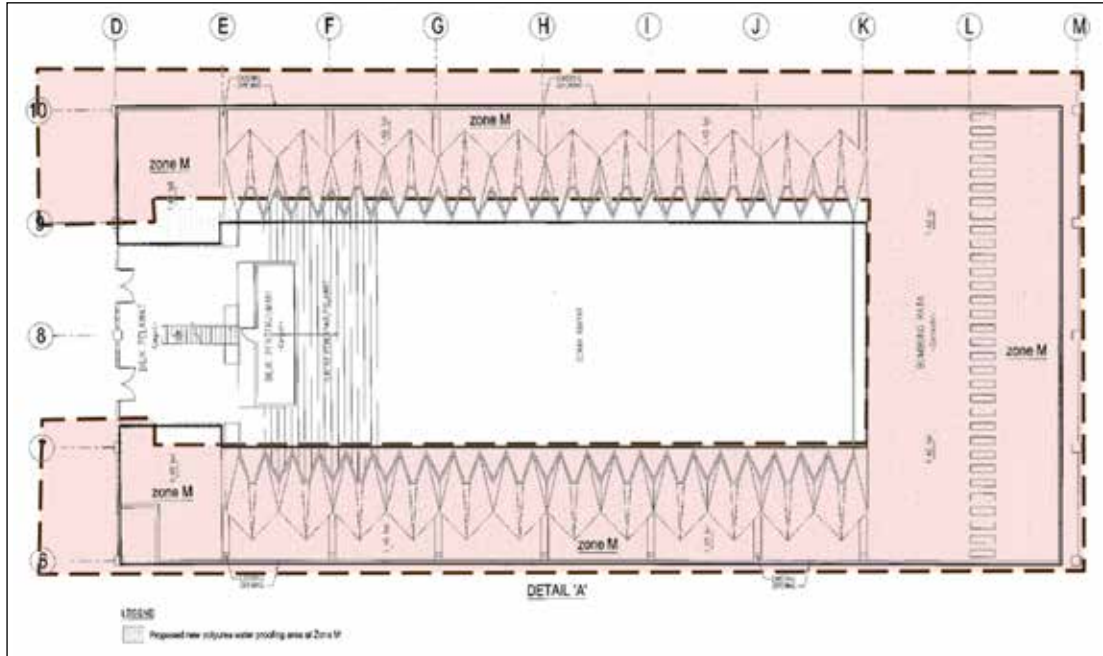


Figure 6: A plan drawing of the pool shaded, surrounding the Pinnacle section
(Photo source: Public Works Department Malaysia)

| Year | Salient Rehabilitation Works |
|--------------------------|--|
| 1963 | Building Completed |
| 1985 | Rehabilitation and renovation works to comply to <i>Bomba</i> requirement. <i>Dewan Rakyat</i> seats were increased from the 160 seats to accommodate 177 Members of Parliament. |
| 1988 | Waterproofing Repair of the Pinnacle and Lower Roof Pool. |
| 2002 | Rehabilitation and renovation and upgrade of facilities including increase of 222 seats (+20 reserve seats) in the <i>Dewan Rakyat</i> , OKU requirement and relocation of Administration Office from Main Block to Tower Block. |
| 2007 | Parliament Complex was declared a heritage site. |
| 2011 (Phase 1) | Temporary relocation Of House of <i>Dewan Rakyat</i> and <i>Dewan Negara</i> to existing Multi-purpose Hall. |
| 2014 -2016 (Phase 2) | Structural repair works to Main Block and Pinnacle and pool area, major ICT upgrade, increase in <i>Dewan Rakyat</i> seats for possible future expansion. |
| 2015 - 2017 (Phase 3) | New Members of Parliament Block with basement car parks, new TNB stations, New Multi-purpose hall and new service tunnels |

Table 1: Salient Rehabilitation Works

which caused the leakages into the building during heavy downpour.

SALIENT REHABILITATION WORKS

Since the Parliament building was completed there have been several major rehabilitation

works carried out due to compliance with newly-introduced regulations and fire safety requirements. Renovation works were also carried out to upgrade the facilities for end users. Most of the rehabilitation and renovation projects at the Parliament Complex were implemented in-house by the PWD. Salient works are listed in Table 1.

NATIONAL HERITAGE ACT 2005

On July 6, 2007, the Parliament Complex was declared a heritage site under Clause 67 of National Heritage Act 2005 (Act 645) and further gazetted on June 6, 2011. With the declaration, any future works on the building or its surroundings must have planning permission from the Commissioner of *Jabatan Warisan Negara* (JWN) under Clause 40 of the Act, in which failure to do so would have committed an offence under Clause 112. The extract of the clauses from the Act are as follows:

Clause 67. Declaration of National Heritage

- (1) *The Minister may, by order published in the Gazette, declare any heritage site, heritage object, underwater cultural heritage listed in the Register or any living person as a National Heritage.*
- (2) *In making a declaration under subsection (1) the Minister may consider—*
 - (a) *the historical importance, association with or relationship to Malaysian history;*
 - (b) *the good design or aesthetic characteristics;*
 - (c) *the scientific or technical innovations or achievements;*
 - (d) *the social or cultural associations;*
 - (e) *the potential to educate, illustrate or provide further scientific investigation in relation to Malaysian cultural heritage;*
 - (f) *the importance in exhibiting a richness, diversity or unusual integration of features;*
 - (g) *the rarity or uniqueness of the natural heritage, tangible or intangible cultural heritage or underwater cultural heritage;*
 - (h) *the representative nature of a site or object as part of a class or type of a site or object; and*
 - (i) *any other matter which is relevant to the determination of cultural heritage significance.*

Clause 40. Application for planning permission for heritage site

- (1) *The Commissioner shall co-ordinate and advise the local planning authority before any planning permission or development order is granted involving a heritage site.*

- (2) *Where the local planning authority refers any application by any person for planning permission or development order to the Commissioner, such application shall contain—*
 - (a) *sufficient particulars to identify the monument to which the application relates, including its layout plan, measured building plan and photographs of its every angle, including the exterior and interior of such monument;*
 - (b) *such other plans and drawings as are necessary to describe the work which is the subject of the application;*
 - (c) *measures that have been taken to secure the safety of the heritage site and the neighbouring land; and*
 - (d) *such other particulars as may be required by the Commissioner.*

Under Part XV Offences of this Act,

Clause 112. Offences in respect of heritage site

- (1) *No person shall, without the approval in writing of the Commissioner—*
 - (a) *dig, construct, excavate, build, plant trees, quarry, irrigate, burn lime or deposit earth or refuse, on or in the heritage site or conservation area;*
 - (b) *demolish, disturb, obstruct, modify, mark, pull down or remove any monument in any heritage site;*
 - (c) *erect any building or structure abutting upon a monument in any heritage site;*
 - (d) *destroy the relationship of a building and its environment that is incompatible with the character of the neighbourhood in any heritage site;*
 - (e) *clear any area or interfere with, destroy or remove any tree, plant undergrowth, weed, grass or vegetation in any heritage site; or*
 - (f) *do any activities or actions that would likely cause damage to the adjacent and surrounding land which have been registered as heritage site.*
- (2) *Any person who, without lawful authority, contravenes subsection (1) shall be guilty of an offence and shall on conviction be liable to imprisonment for a term not exceeding five*

years or to a fine not exceeding fifty thousand ringgit or to both.

Rehabilitation and Renovation Works (BEFORE ACT 645)

Before the year 2005, when the Parliament Complex was not yet declared a heritage site, several major rehabilitation and renovations works were implemented and supervised by the PWD in 1986 and later in 2002. During that time, no submissions or approvals were required from JWN. Among the works were:

New fire escape staircase in the Tower Block

In 1986, major renovations were carried out to the Parliament House to comply with several fire safety requirements and standards as stipulated in the Uniform Building By Laws (UBBL) 1984. This was after the Campbell Complex fire on April 8, 1976 where like most buildings built before the incident had an inadequate fire-fighting system. The 17 storey Tower Block was originally built with only one flight of stairs, which was an open staircase design. To comply with the UBBL 1984 requirements, a second staircase to serve as a fire escape for the entire Tower Block was constructed. The scope of works included redesigning the layout of the Tower Block where 30 toilets had to be repositioned to make way for the new staircase. Demolition work to affected walls and floor slab areas in the Tower Block were done manually with electric hand held tool drills.

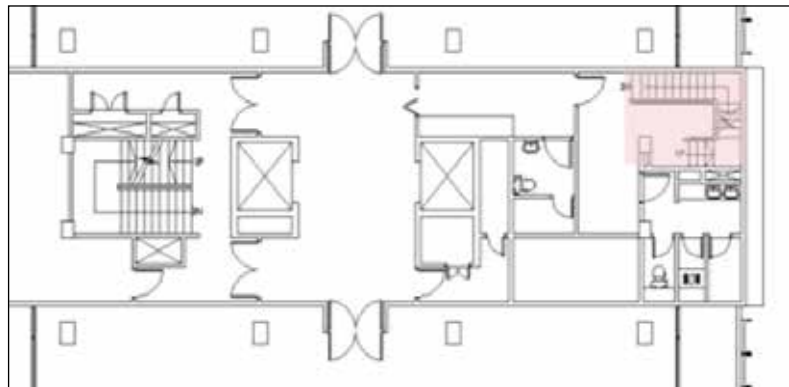


Figure 7: The new fire escape staircase at the Tower Block

Following this, the lift lobbies of the tower block were also compartmentalised and pressurised to comply with fire safety requirements.

New fire-fighting sprinkler systems

Other than the construction of the new fire escape staircase, the entire Main Block and Tower Block of the Parliament House were fitted for the first time with fire-fighting sprinkler systems. The installation involved massive installation of sprinkler pipes throughout the building where all ceiling panels had to be taken down. New fire-fighting water tanks and pumps had to be installed in the basement.



Figure 8: The new mechanical firefighting water tanks

Electrical system in conduits

Major electrical works were also done in compliance with fire safety requirements where all electrical wiring had to be replaced and encased in metal conduits. Other installation works included



Figure 9: The new electrical sub-switch boards

the introduction of new emergency lights and an alarm monitoring system. During this time, the brick walls were hacked up to a depth of 50mm to install the conduits, then replastered and painted. When guidelines issued by JWN had not yet been introduced, it was normal to hack into brick walls and replaster to conceal the conduit for a neat finish. Unlike buildings, which had been gazetted under the Act, wiring could have been installed in exposed conduits.

Other Mechanical and Electrical Systems Upgrade

Other rehabilitation and upgrading of mechanical and electrical works that were carried out included a new main switch board (MSB) and sub switchboards, a lift for the handicapped, a new security system, and new air-conditioning chillers. Building Automation Systems were also introduced, including a new public address system and others generally to comply with fire safety requirements.

Repairs to the Pinnacle Roof

The Pinnacle Roof was constructed of reinforced concrete with cement plaster of varying thickness from 50mm to 300mm. It was finished with mosaic



Figure 10: View of internal section of the Pinnacle

tiles. However, there were frequent leakages from the roof, which was above the *Dewan Rakyat*. Below the Pinnacle Roof, the slab was finished with vermiculite gypsum plaster which provided excellent thermal and acoustic insulation properties. After heavy rain, due to the leakages from the roof, patches of wet plaster could be seen on the underside of the Pinnacle Roof. In a few incidences, these wet patches of lightweight vermiculite gypsum plaster became heavy and disintegrated and dropped down from the ceiling and splashed below. In 1988 major water proofing repairs were carried out where the existing plaster and mosaic tiles were removed and replaced with cementitious waterproofing applied by grouting. The air vent at the top area of the pinnacle also had to be closed as rain brought in by high winds occasionally sprayed into the *Dewan Rakyat*. In addition, there were occurrences when birds entered the vent, perched and nested on the internal ledge, and sometimes chirped so loudly that the sound echoed into the hall.

Repairs to Flat Roofs

The Main Block roof area was about two acres and the whole roof was designed as a two-tier flat roof. However, throughout the years its function deteriorated and became ineffective. Frequent leakages from the flat roof and the failing rainwater downpipes caused damage to the existing finishing materials. Amongst the finishes were carpets, ceiling plaster panels and wooden wall panels. In addition, the leakages had caused the finish to peel off the vinyl floor. The air-conditioning insulation and sound insulation materials in the ceiling were also affected by the leakages. The dampness, which took a long time to dry in the ceiling, resulted in termite attacks. In some cases, some of the rainwater had also affected the electrical wiring. Extensive waterproofing works were done to the flat roof to overcome the constant leaking.

Repairs to existing Rainwater Downpipes

The original rainwater downpipes consisted of 3¼ inch by 2¼ inch rectangular aluminium pipes.



Figure 11: View of the rainwater downpipes



Figure 12: View of pool and grass area at the lower rooftop in 1987

They were generally installed on both sides of all internal columns of the building. After 20 years, the majority of the narrow rainwater downpipes became clogged and ineffective. Rainwater frequently back flowed into the building and caused damage to the existing finishes. Repairs were done and a few of the rainwater downpipes managed to be revived whilst others, which were badly clogged, were sealed and drainage diverted to the perimeter of the roof.

Repair to Roof Pool System

Over the years, frequent leakages seem to occur even after waterproofing works were done on the roof in the water pool areas. There were instances when water leaked in from the roof slab, flooding the *Dewan Rakyat* and corridors of the building. This resulted in a temporarily closure of the pool system and replacing it with earth and grass. Efforts to revive the roof pool system failed again even after re-waterproofing and re-tiling works were carried out.

Facilities for the Disabled

To provide facilities for the disabled, new ramp structures and toilets for the disabled were constructed. In doing so, several walls were hacked and repositioned to create the toilets. At the entrance to the public gallery situated at the rear

of the Main Block, a pneumatic lift for the disabled was constructed by hacking the existing floor slabs to allow the installation of a glass wall lift.

New toilets at the Grandstand

Initially the Grandstand building had no toilets. The nearest toilet from the Grandstand was at the Tower Block where one had to take the lift to the upper floors as there were no toilets on the ground floor. During official events, portable toilets were provided near the parade ground. In the year 2002, new toilets were added at the parade ground on the east side and a few years later on the west side. The construction of the toilets involved massive hacking of the existing Grandstand building's ground slabs and digging across roads to lay and connect new in-coming water supply pipes and out-going sewerage pipes to the nearest manhole.

Renovation and Refurbishment Works

Other than repair works to fix damage mostly caused by leakages and termite attacks, the *Dewan Rakyat* and *Dewan Negara* were renovated and refurbished to cater for the delineation of boundaries. Other areas in the entire Main Block and Tower Block including the lobby, cafeteria, library, Administration Office and Speakers Office were also refurbished.



Figure 13: Renovation and Refurbishment Works

REHABILITATION AND NEW PARLIAMENT BUILDING BLOCKS (AFTER ACT 645)

After the Parliament Complex was declared a heritage site, any rehabilitation and new works that were carried out had to comply to the National Heritage Act 2005 (Act 645). Among the requirements were a submission to the Authorities for approval and the need to appoint the service of

Conservator to ensure that the works are carried out in accordance with JWN requirements.

In 2010, leakage at the Parliament building started to occur again especially at the Pinnacle roof and the surrounding pool roof areas despite the major repairs done in 1988. With the recommendation of the forensic engineers from Kumpulan Ikram Sdn Bhd, the roof areas were redesigned to remove the pools, and redirect

the rainwater runoff on the roof to existing roof drains.

Following thorough investigation and forensic works carried out by Kumpulan Ikram, major structural repairs were required to be done to the entire Main Block and Tower Block.

Concurrently, a new Member of Parliament Block and a new Multi-purpose Hall were designed to cater for the much-needed space and facilities. These buildings were successfully completed on January 15, 2020. All these new developments were subject to submissions and approval by JWN. Several consultations and meetings were held between PWD, the project implementer and JWN during the design stage. Among the JWN requirements were the following:

First Consultation

JWN's approval of the plans was subject to the new buildings being built at the back of the Main

Block. No buildings were allowed to be visibly built in the front and or sides of the Parliament building.

Second Consultation

JWN's comments on January 28, 2013 were:

1. Height of building shall not be higher than the pinnacle of the main block which is 29 metres.
2. Façade of building cannot overshadow the existing main and tower block and shall be in harmony.
3. The new building must not be dominant.

Third Consultation

JWN's requirements in 2014 were:

1. To lower the height of the proposed New Member of Parliament Block to achieve the required floor area.
2. To design a basement car park to meet the requirements.



Figure 14: View of the present lower rooftop after waterproofing repairs and omitting the pool system

3. To design the façade in harmony with the existing building.

CHALLENGES AND LESSONS LEARNED

There were challenges and lessons learned during the implementation of the earlier rehabilitation and renovation works to the Parliament Complex. The PWD later adopted much of the lessons learned. Among them were:

As-Built Drawings

In the absence of as-built drawings in the earlier years, re-measurement of the building had to be done on site and the building plans redrawn before any designs were done for tendering purposes. The design process took a longer time especially during the 1986 renovations when the drawings were done manually. Later these drawings were kept at the PWD Building Branch main office. The restructuring of the department, the change and transfer of officers as well as shifting of

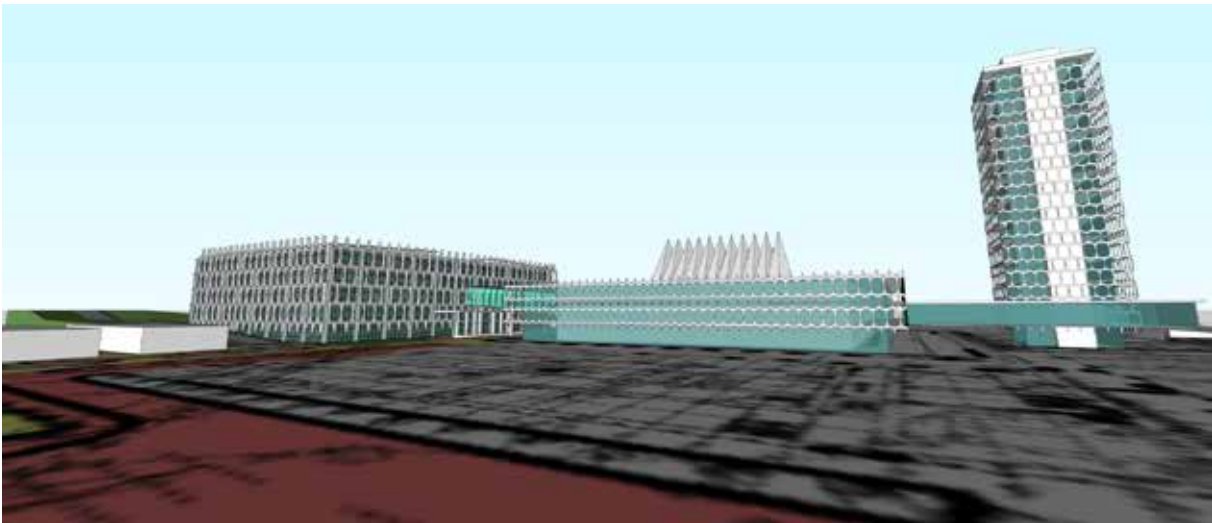


Figure 15: One of the presentation drawings submitted to JWN for approval



Figure 16: New Member of Parliament Block completed on January 15, 2020

| Types of Contract | Reference | As-Built Drawings Submission Timeline |
|--|---------------|--|
| JKR Contract 203A (Revised 1/2010) | Preliminaries | 30 days after the issuance of the Certificate of Practical Completion |
| PAM Contract 2006 | Clause 3.10 | Within time specified... where not specified before the Completion Date |
| CIDB Standard Form of Contract For Building Works 2000 Edition | Clause 4.10 | Not later than three months from the Date of Practical Completion of Works |

Table 2: Comparison of Contracts in Malaysia

office in later years resulted in the loss of some of the drawings. However, in the digital era, with computerisation, drawings can be easily stored and shared. Design can also be done in a short time.

A comparison of contracts widely used in Malaysia indicates different submission timelines for As-Built Drawings. They are shown in Table 2.

In cases where As-Built Drawings are submitted after Practical Completion, it may not be of utmost priority or interest to deliver the As-Built Drawings by the contractor as they may have been under-priced. In cases where they have been under-priced, they may be willing to offset the price of providing the As-Built Drawings. To ensure As-Built drawings are delivered, it is recommended that As-Built Drawings be submitted by the contractor before the date of practical completion.

It is recommended that drawings including As-Built drawings are kept in a systematic manner. For such a significant building, all drawings should be kept centralised and designated to an assigned office especially within a large organisation. Another proposal is to have the drawings microfilmed and sent to the National Archive Department for future record.

Occupants in Building

During the year 1986 when rehabilitation and renovations were carried out, the works were carried out with occupants in the Parliament building. Works had to be scheduled to ensure that no construction works were carried out during Parliamentary sessions. This was not clearly stipulated in the tender documents. During Parliament sessions, the proceedings were held

from Monday to Thursday from 10.00am to 5.00pm. Therefore works could only be carried out after 5pm until the next day. Sometimes the proceedings ended late at night. The days that the contractor could work normally were limited to Friday to Sunday every week. In the earlier renovation contracts, these conditions were not stipulated in the contract and were used as a basis for an Extension of Time. In later contracts, these schedules and situations were clearly spelt out in the contract to ensure the contractor was not entitled for an Extension of Time. However with adequate budget, it is also advisable in major rehabilitation works to relocate the occupants to another building where the contractor can work freely at the site. This was done in the subsequent rehabilitation works.

Clients Brief Confirmation

There were several design presentations by the PWD to Parliament as their client. Their client consisted of not one but several hierarchies of stakeholders and end users, which were duly acknowledged. They included the Parliament Administration Office, the Members of Parliament and both the Speakers. All requests and needs on the clients side were taken into account, analysed over statutory requirements as well as budget allocation before translating them into the design process. As several design changes were requested, proposals were amended several times and presented until finalised and confirmed by the client before tendering. Although the process of amending and proposing the design took time, it was vital to avoid major Variation Orders during the contract implementation and management phases.

Maintenance Consideration

It is important that during the design stage, considerations take into account future maintenance of buildings. In the case of the Parliament House, although there were many good design considerations for maintenance, there were also some design areas that could be improved for future project implementation. Among them were the difficulty to maintain the Pinnacle roof of the *Dewan Rakyat* and the public gallery at the *Dewan Negara* from the inside due to its high ceiling, which did not have easy access. Several times, massive scaffoldings had to be erected over the different levels on the ground level of the Hall to access the ceiling when repairs were required or lighting fixtures needed to be replaced. Another consideration is to avoid a massive pool system directly above the roof level of such a significant hall like the *Dewan Rakyat*. Although the concept and intention of the reflective and cooling pool system were amazing ideas, the expertise for such maintenance complexity is not easily and readily available.

Heritage Building Works

According to the National Heritage Act 2005 (Act 645), any development on the listed heritage buildings and/or sites must refer to JWN for submission and approval. However, if the buildings are not in the JWN heritage list but have significant historical and/or aesthetic value, project implementers or building owners, must enquire about the building status with JWN before any works are done on the building. Some developments may require a Heritage Impact Assessment (HIA) to be submitted to the authorities especially any development that falls under the Georgetown World Heritage Incorporation (GTWHI) and Malacca Historical City Council. Even rail and road projects like the Mass Rapid Transit (MRT) that have impact on the surrounding urban landscape, were also required to do so. In some projects, conservators registered with JWN are required to be appointed to undertake conservation services and works in accordance with JWN guidelines during design and construction stages. These requirements and scopes of work must be clearly stipulated in the tender documents.

PWD has formed a Conservation Unit to ensure Government and public buildings of heritage value are safeguarded and protected and in compliance with the National Heritage Act 2005 (Act 645). For the Parliament projects after the gazette, the services of Conservators to be appointed by the Contractor were clearly spelt out in the tender requirement.

CONCLUSION

All parties, especially those involved in the services, infrastructure and construction industries have their role and responsibilities to safeguard heritage buildings and sites for our future generation. As time goes by, more buildings and urban landscapes depending on their significance and intangible value, may acquire historical and heritage status. However, we may need to strike a balance whether to preserve them in their original state or to further develop for the sustainability of the community, based on current laws and regulations. ■

REFERENCE

- National Heritage Act 2005 (Act 645)
- Jabatan Kerja Raya Malaysia
- Jabatan Warisan Negara,
- JKR Contract 203A (Revised 1/2010)
- PAM Contract 2006
- CIDB Standard Form of Contract For Building Works 2000 Edition
- Garis Panduan Pemuliharaan Bangunan Warisan, Jabatan Warisan Negara
- Draft Guidelines For The Preparation of Heritage Impact Assessment (HIA) Report For World Heritage Cities of Melaka and George Town
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- UNESCO: Operational Guidelines for the Implementation of the World Heritage Convention, World Heritage Centre, WHC.19/01, 10 July 2019
- ICOMOS: Guidance on Heritage Impact Assessments for Cultural World Heritage Properties 2011