TAYLOR'S UNIVERSITY

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BACHELOR OF SCIENCE (HONS) IN ARCHITECTURE

ARC 1215 METHODS OF DOCUMENTATION AND MEASURED DRAWING

ISTANA BANDAR

BANTING

JANUARY 2015

ISTANA BANDAR

Declaration

This report is completed to obtain 5 credits for Practicum 1 prior to the subject METHODS OF DOCUMENTATION & MEASURED DRAWING (ARC 1215) by the School of Architecture, Building and Design of Taylor's University.

Name of Building Assigned: Istana Bandar, Jugra

Address : Kampung Sungai Langat,

42700 Banting,

Selangor, Malaysia.

This project is accomplished by a joined effort of 2 groups (Group A & Group B) consisting of 40 students combined. Throughout the project, there are 2 lectures assisting and supervising both groups in completing each given task.

Students: Taylor's University Lakeside Campus

Bachelor of Science (Architecture) (Honours)

August 2013 & March 2014 Intake

Group Photo 1

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Group Photo of Group A

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PENG YEP SIANG 0315259

PRISCA KWAN MAY YAN 0318530

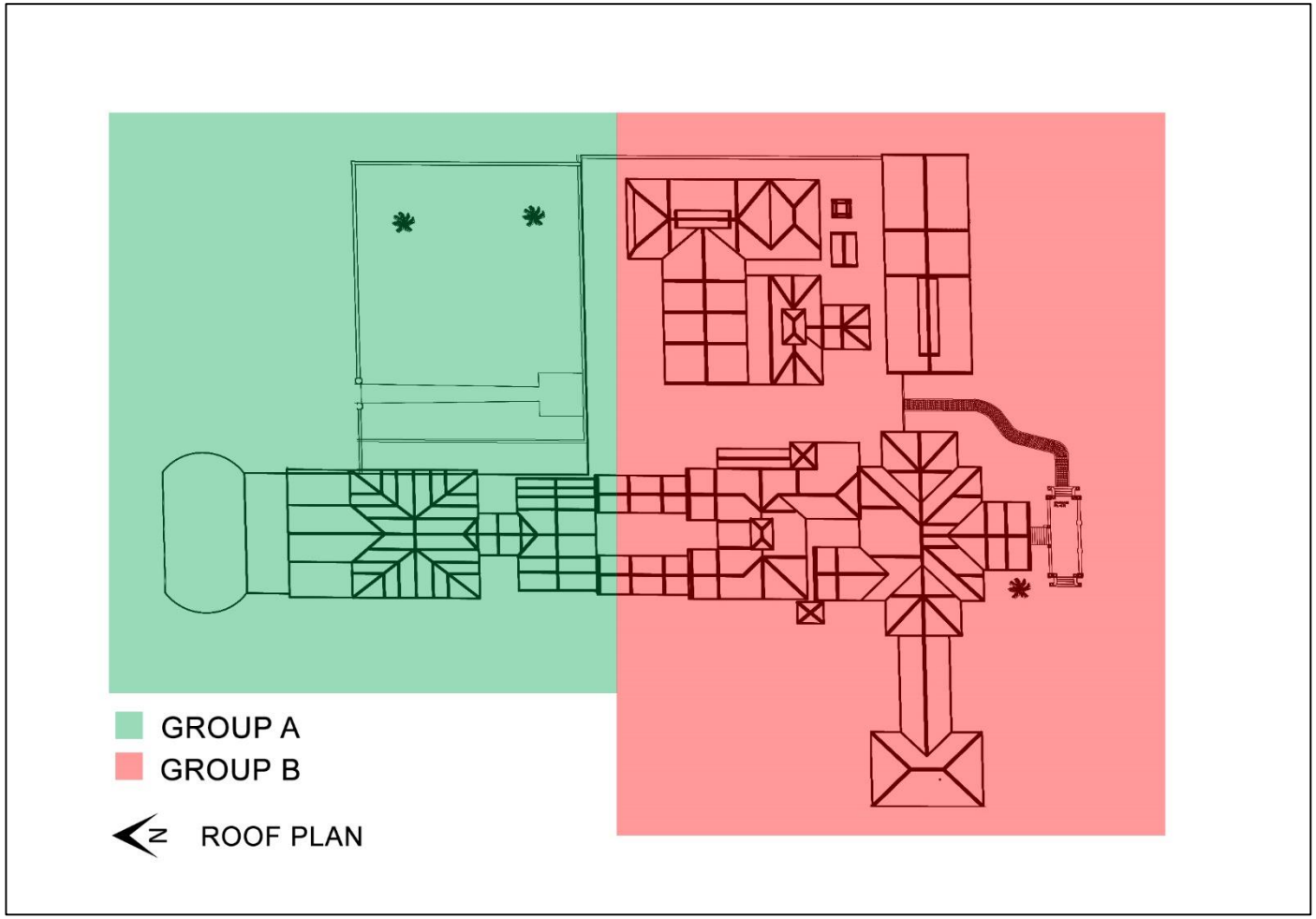
TING PENG HANG 0313515

WANG PUI YEE 0316283

WEE BOON BING 0313569

Group Photo of Group B

Group Measurement Coverage



Highlighted roof plan indicating measurement coverage

Acknowledgement

Throughout this assignment, we also gain essential skills that we will not be able to obtain from other subjects we will or went through, therefore it is a very great opportunity provided by Taylors's University to offer this Method of Documentation and Measured Drawings subject. This subject provides practical skills that are very crucial and important that is required in the real working world that we could not experience in a usual in-class lecture or tutorial. We would like to express our utmost gratitude to the lecturers, Pn Nor Hayati Hussain, Pn Mariatul Liza Meor and Ms Alina Choong for being so committed to educate and guide the young generations although some of them are just part-time staff.

We would again our appreciation to establish profesionals and elder personal who were involved in other means to make this assignment plausible. Interviewee include Mr. Haji Abdul Rahman bin Haji Abdullah (Chairman of JKKKP of Kampung Bandar), Mohd Aidy Khairunizam (chairman of the south district museum which based in Kuala Langat in Klang), Raja Sulong bin Raja Salleh (the Royal Cemetery Caretaker), Pak Cik Anuar bin Ishak (Senior Resident of Kampung Bandar) who were kind enough to offer their humble knowledge and understanding of Istana Bandar to us without any hesitation. Another highly regarded personal include Architect Steven who came himself to offer his knowledge and equipment for our measurement drawing task.

This report is also made possible with the undying support, dedication and cooperation from every single member of the Istana Bandar Team and also from the encouragements from the student from other groups in this short semester.

Group Photo 2

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1.0 Introduction

1.1 Introduction of Research

Methods of Documentation and Measured Drawings (ARC1215) (ARC60305) is a short semester course conducted in Taylor's University that aims to develop an understanding of the principles of building preservation and the method of recording it in three documentation methods; measured drawings, written documentation and photographic documentation. The ideas of application and management of architectural historic documentation will be presented as part of the overall knowledge of building preservation. For measured drawings, students are to document historically and architecturally significant buildings in the form of as-built drawings. The task requires 10 to 20 students per group that involve field works consisting measuring technique such as photographing, sketches, use of theodolite and measuring tape. The outcomes of the subject are collections of plans, sections, elevations, details and axonometric views / models; complemented with a report that explains about the background, history, culture architectural style, construction and ornamentation of the given building.

Plate 1.1: Site Visit to *Istana Bandar* on the 19th to 23rd of Jan 2015.

1.2 Aims and Objectives of Research

The aims objectives of the module are to introduce several methods of documenting historic structures in the three documentation methods of measured drawings, written documentation and photographic documentation to preserve an accurate record of historic properties that can be used in research and other preservation activities as well to introduce basic preparation of measured drawings of an approved building or structure to prescribed standard.

Upon successful completion of the module, we will be able to identify and classify architectural historic structure as well as method to document them in the appropriate means to ensure it can be used as a reference in the future. Through the report writing, we would also able to explain the application of architectural historic documentation, as-built building constructions, architectural details, elements and the list goes on. In the future, we would also be able to recall and recognize the techniques of measured drawing and documentation when having a site visit, especially the heritage buildings that needed much documentation for preservation and conservation purposes. On the other hand, we would be able to execute fieldwork and hands-on measurements before translating the data into scale drawings.

Plate 1.2: Measuring Process on Site.

Plate 1.3 CAD-ing Process on Site.

1.3 Research Outcome and Significance of Research

The significance of this research is for us to document and understand the architectural, historical and cultural values of *Istana Bandar*. This also allows us to have all necessary measurements and data stored in the national historical building archive or passed to legitimate owner, organization or caretaker of the building for conservative or restoration purposes and even reconstruction due to unexpected disaster.

Through this research, it enabled us, the younger generation to appreciate historical architecture in our local context, as well to ignite the sense of patriotism by understanding our country's history and culture in an architectural perspective.

Plate 1.4: Briefing upon Arrival.

1.4 Research and Measurement Methodology

1.4.1 Job Distribution

The 40 members are led by the two leaders, Lim Jian Jun (J.j.) and Robert Kong Ren Heng each supervised by our lecturers, Ms Liza and Ms Alina respectively. Everyone is given at least two roles to be in charged throughout the whole project where that are in charge of measuring and CAD-ing of plan, elevation, details, section, site plan, interview, media and report writing. A Facebook group is made to ease the communication between the two major teams as well as to share significant information.

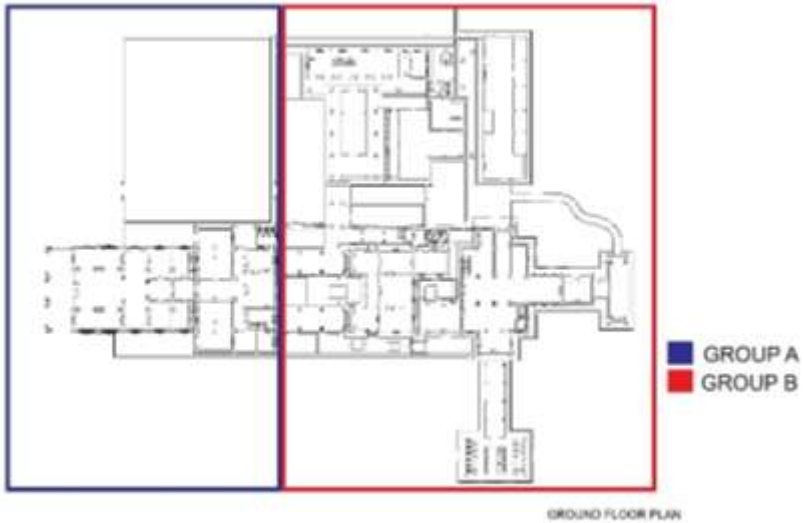


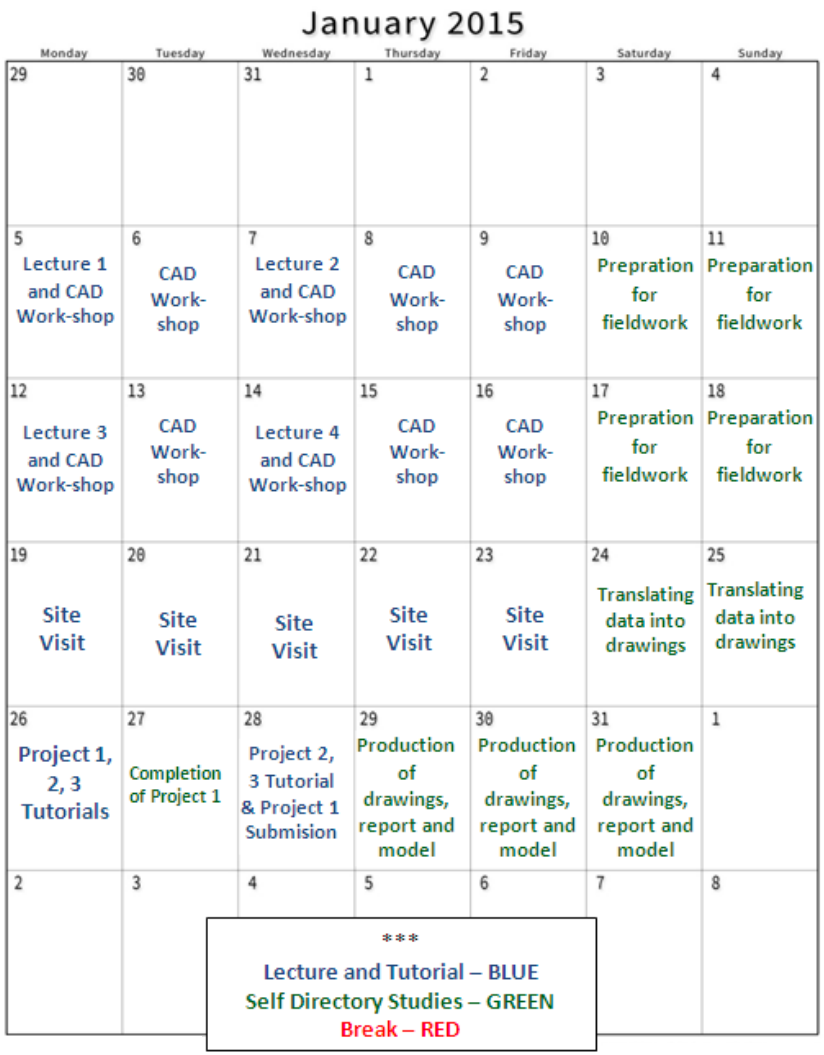
Plate 1.5: Diagram of Distribution of Site for Measuring Activity.

	Name	Other	On site	Off site
1	LIM JIAN JUN 0316867 (J.J.)	Leader	Datum line, Section and Building measuring	Drawings (floor plan, section) and
2	CHUAH SAY YIN 0315301	Sub group leader	Building, details measuring and interview	Drawings (details) and 3D model
3	ALEXANDER CHUNG SIANG YEE 1003A78541	Sub group leader	Building and elevation measuring	Drawings (Elevation)
4	ADRIAN SEOW CHEN WAH 0314331	Sub group leader	Site, elevation and building measuring	Drawings (site, details)
5	TEH XUE KAI 0317021	Sub group leader	Plan and Building measuring	Drawings (plan) and 3D model
6	MUHAMMAD FARIDZUL FIKRI BIN JEFFRY 0311836	Sub group leader	Building and details measuring, video	Video
7	VICKY LEE WEI KEE 0313317		Building and section measuring, photo and video	Report, model
8	PHANG JUNE EE 0311954 (PETER)		Building measuring	Drawings (details)
9	YONG CHANG THENG 0310925		Building and plan measuring	Drawings (plan)
10	HON YI HANG 0318473 (RACHEL)		Building and site measuring	Drawings (site) and report
11	HOOI WEI XING 0318523		Building and elevation measuring	Interview and report
12	ZHUANG ZHI JIE 0314224 (CLAIRE)		Building and elevation measuring	Drawings (Elevation), report and 3D model
13	AIMI RUZANNA BINTI D ADZMAN 0306177		Plan measuring, interview	Report
4	HELSA JOSEPHINE 0305813		Site and building measuring	Drawings (site)
15	ALVIN MUNGUR 0316886		Building measuring	
16	LIM MING CHEK 0317743		Building and details measuring	Report, drawings (details)
17	LIM WAI MING 0317068 (JOJO)		Building measuring and video	Drawing and video
18	YEW JIE EN 0319285		Building and details measuring	Drawings (details) and report
19	JOANNE BERNICE CHUA YUNN TZE 0315905		Section and building measuring	Drawings (section)
20	KRISTINE YONG XI WEI 0311297		Building, plan measuring	Drawings (plan) and model

	Name	Other	On site	Off site
1	KONG REN HENG 0316416 (ROBERT)	Leader	Datum line and Building measuring	Drawings (floor plan, elevation, section) and 3D model
2	JEREMY TAY EUJIN 0312228	Sub group leader	Building and roof measuring	Drawings (floor plan) and 3D model
3	PEH KER NENG 0314619	Sub group leader	Datum line, Building and roof measuring, Interview and photos/videos	Video
4	WANG PUI YEE 0316283 (FELICIA)	Sub group leader	Building measuring	Drawings (floor plan, elevations) and model
5	CHRISTINE YEAP ZHE XING 0316294	Sub group leader	Site and Building measuring	Drawings (site, section) and 3D model
6	IMANN BINTI AZZUDDIN 0310102	Sub group leader	Datum line, Building measuring and interview	Report and video
7	ANG JIA PIN 0315506	Sub group leader	Building and details measuring	Drawings (Details)
8	TING PENG HANG 0313515	Sub group leader	Building measuring	Drawings (floor plan, elevations)
9	EE XIN HUA 0314089		Building measuring	Report, model
10	EVON LOW SIEW CHENG 0318156		Building measuring	Report, model
11	HO TZE HOOI 0314179 (COLBY)		Building measuring	Drawings (floor plan, elevation) and model
12	PENG YEP SIANG 0315259 (EUGENE)		Building measuring	Drawings (floor plan, section)
13	NASEEM NAAJID 0311649		Building measuring	Drawings (Details), Report, model
14	MOHD SHAHRUL IZZAT BIN ABDULLAH 0317185		Roof measuring, interview and photos/videos	Report, 3D model
15	MUHAMMAD MUZHAMMIL BIN AZHAM 0311446		Roof measuring, interview and photos/videos	Video
16	KENNETH CHANG WEI JIAN 0318252		Site, building and roof measuring	Model
17	LEONG HUIYI 0319280		Building measuring	Drawings (floor plan, elevation)
18	PRISCA KWAN MAY YAN 0318530		Building and details measuring	Report, drawings (details)
19	WEE BOON BING 0313569		Building measuring	Model
20	E JY HUEY 0313332 (JOEY)		Building measuring	Drawings (Elevation, details) and model

Table 1.1: Group members and their task given on-site and off-site.

1.4.2 Monthly Schedule



January 2015

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
29	30	31	1	2	3	4
5 Lecture 1 and CAD Work-shop	6 CAD Work-shop	7 Lecture 2 and CAD Work-shop	8 CAD Work-shop	9 CAD Work-shop	10 Prepration for fieldwork	11 Preparation for fieldwork
12 Lecture 3 and CAD Work-shop	13 CAD Work-shop	14 Lecture 4 and CAD Work-shop	15 CAD Work-shop	16 CAD Work-shop	17 Prepration for fieldwork	18 Preparation for fieldwork
19 Site Visit	20 Site Visit	21 Site Visit	22 Site Visit	23 Site Visit	24 Translating data into drawings	25 Translating data into drawings
26 Project 1, 2, 3 Tutorials	27 Completion of Project 1	28 Project 2, 3 Tutorial & Project 1 Submision	29 Production of drawings, report and model	30 Production of drawings, report and model	31 Production of drawings, report and model	1
2	3	4	5	6	7	8

***
Lecture and Tutorial – BLUE
Self Directory Studies – GREEN
Break – RED

February 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Production of drawings, report and model	2 Project 3 Presentation	3 Production of drawings, report and model	4 Project 2 Tutorial	5 Production of drawings, report and model	6 Production of drawings, report and model	7 Production of drawings, report and model
8 Production of drawings, report and model	9 Project 2 Interim Crit	10 Production of drawings, report and model	11 Project 2 Tutorial	12 Production of drawings, report and model	13 Production of drawings, report and model	14 Production of drawings, report and model
15	16	17	18	19	20	21
22 Production of drawings, report and model	23 Project 2 Final Tutorial	24 Production of drawings, report and model	25 Project2: Production of Final drawings, report & model	26 Production of drawings, report and model	27 Production of drawings, report and model	28 Production of drawings, report and model
1 Completion of Project 2, Portfolio & Preparation of presntation	2 Project2 & Portfolio Submision & Presntation	3	4	5	6	7
8	9	10	11	12	13	14

CNY BREAK

***
Lecture and Tutorial – BLUE
Self Directory Studies – GREEN
Break – RED

1.4.3 Measurement Process

Measurements of the building were carried out from the 19th of January to the 23rd of January which is the whole 5 weekdays in our 3rd week into the course. We are required to fulfill our fieldwork through data collection, on-site investigation and measurement. Students are required to gather at the commercial block bus stop every morning 8:30am and be back to campus by 7pm. Deducting travel and lunch time, we were left with 6 hours per day to carry out our work. The 40 members is split into 2 teams lead by Lim Jian Jun (J.j.) and Robert Kong Ren Heng, each responsible of first half and second half of the whole palace. The team is then divided into smaller group in charge of elevations, floor plan, sections, details, site plan.

Plate 1.6: Commotion upon Arrival.

Plate 1.7: Guidance and Supervision of Ar. Steven and Pn. Liza.

Plate 1.8: Measuring and Recording Process.

1.4.4 Research Process

Data and information obtained for this report are from interviews, local library, local authorities, heritage societies, archive, and museums. All the arrangement for the studies are planned and made prior to the site visit. Research letter were given as proof to our identity and being a Taylor's University student doing this coursework.

Examples of government authority, department and services we visited to collect facts, information, site map, interviews include the *Shah Alam Muzium, Badan Warisan, Jabatan Ukur dan Pemetaan Malaysia,* Jugra Museum, National Library and *the* National Archieve and *Perpustakaan Raja Tun Uda Shah Alam*.

On the other hand, we also visited surrounding landmark that was related to the *Istana Bandar* which include Jugra Lighthouse, *Masjid* Alaeddin, *Makam Sultan Abdul Samad, Istana Jugra* and the Tahfiz School.

Plate 1.9: Visit to Shah Alam Muzium to collect informations for report.

Plate 1.10: Visit to Raja Uda Library Shah Alam for research purpose.

Personal we interviewed include:

- Mr. Haji Abdul Rahman bin Haji Abdullah, Chairman of JKKKP of *Kampung Bandar*
- Mohd Aidy Khairunizam, the chairman of the south district museum of PADAT based in *Kuala Langat* and *Klang*
- Raja Sulong bin Raja Salleh, who is the Royal Cemetery Caretaker
- *Pak Cik* Anuar bin Ishak Senior Resident of *Kampung Bandar*

Plate 1.11: Interview with Mr. Haji Abdul Rahman bin Haji Abdullah.

Plate 1.12: Interview with Pak Cik Anuar.

Plate 1.13: Interview with Pak Cik Raja Sulong bin Raja Salleh.

Plate 1.14: Interview with Mr. Mohd Aidy Khairunizam.

1.5 Measuring Instrument and Technique

1.5.1 Datum Line

The concept of datum line is introduced by Architect Steven. It was used to measure the vertical state of the building. A datum is drawn and measurement above and below of it are recorded to trace settlement of the base of the building.

In order to measure elevation heights to add to the drawing, a datum line must be established across the face of the building. The datum is created using a dumpy level from a point is drawn directly on the building with a pencil. This datum line would normally be set at a height that runs through the middle of the windows and doors so that tops and bottoms of the features can be measured easily and noted in a clear way as well as the imperfect placement of the windows and doors are also be calculated.

Plate 1.15: Demonstration by Ar. Steven.

Plate 1.16: Datum Line Plotting in Process.

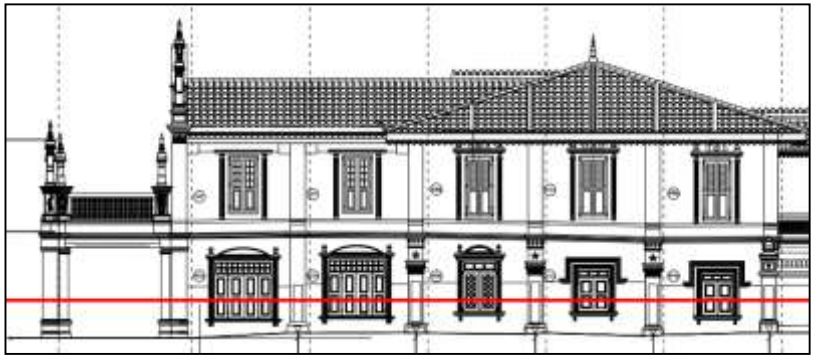


Plate 1.17: Datum Line and Left Elevation of Private Area of *Istana Bandar.*

1.5.2 Equipment

- Dumpy level

Together with a tripod is introduced by Architect Steven that was used to acquire the datum line to measure the vertical state of the building. A datum is drawn and measurement above and below is recorded to trace settlement of the base of the building.

Plate 1.18: Operation of the Dumpy Level.

- Normal Leveler

If the datum line is only needed to be transferred to a near stretch, a normal leveler can be used.

Plate 1.19: Drawing of Datum Line Using Leveler.

- E-meter staff or a DIY measuring-bamboo-staff

It is be put align to the camera frame to be recorded and later measured digitally. It is generally used to trace ornamentations that couldn't be measured easily.

Plate 1.20: E-meter Staff to Digitally Measures Ornaments using Photography.

- Transparent Pipe

The dumpy level is able to transfer to only the two side of the building, which is the back and left elevation. To transfer it to the front and right elevation, the water pipe with circular marking at both ends is used. It is placed in a “U” position with one end on the existing datum point. Mark the second point when the water levels are equal at both circular marking and proceed to draw a straight line.

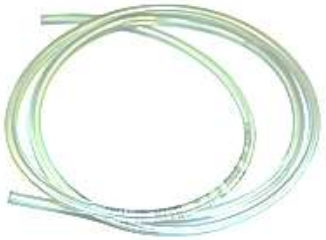


Plate 1.21: Clear Pipe.

Plate 1.22: Water Level and Pointer on the Clear Pipe.

- Measuring Tape

To measure length, distance or height of any elements or component of the building, many variation of measuring tape was being used.

- Bosh GLM 250 VF Professional

To measure height or distance that is not easily reached like height of ceiling or length of roof trust, a Bosh GLM 250 VF Professional was used. It is also used to extreme length easily with less effort compared to a normal measuring tape.

Plate 1.23: Bosh GLM 250 VF Professional.

- Mobile crane

It was only used on the third day of the site visit week to reach to areas that couldn't reach by the normal ladders. Roof ornamentations, second floor external façade and details were able to be measured without jeopardizing the safety of students.

Plate 1.24: Mobile Crane at *Istana Bandar*.

Plate 1.25: Measuring of Fascia of the Roof.

Plate 1.26: Measuring of Ornaments.

1.6 Limitation of Measurement and Research

1.6.1 Time Limitation

The most dependent limitation is the time given for the measurement activity and the overall assignment itself. Five days are unable to complete the entire palace thoroughly with every single details, individual repeated ornamentations or cracks recorded knowing that the aim of the project is to record the current state of the building for recording and documentation purposes. Time constraint also limit the quality of the research and information collected as some places or interviews that wasn't able to be visited or made, causing end result to be slightly one side from the overall factors.

1.6.2 Errors in Measurements

Inaccuracy and errors in measurements as the team consists of 40 members and each of us has different measuring techniques and 2 teams measuring the entire building without any standard rules or skills which will lead to systematic errors which include instrumental errors, environmental errors, observation errors and theoretical errors, where some can or can't be avoided. Repetition of architectural elements might also affect the accuracy of the

Plate 1.27: On-site CAD-ing Commotion.

Plate 1.28: Using of E-meter to capture On-scale Photograph.

documentation effort as assumption that all repetitions are the same knowing that handcrafted items like ornamentations are prone to inconsistency, defects and human errors. By using the photo measuring technique we also face the challenge of not getting the eye level of subject as well as correct placement of E-meter staff.

1.6.3 Access to Certain Parts of Building

For example, the roof structure was also not able to be measured accurately due to the fact that certain parts are covered with ceilings and the danger of being on top of 3rd story without safety equipment such as harness, safety line and helmet. Certain rooms are also locked by the caretaker, making the measurement documentation incomplete.

Plate 1.29: Measuring of Building's Details.

Plate 1.30: Measuring of Roof Details.

1.6.4 Unverified Interview Answers

Gathering information using interview is also risky as different individual have different opinion and knowledge of the building that may cause clash of information on certain details or facts. Certain contradicting points were made making report effort more complicated. There is also limited to no documents or evidence that can be used to verify the statement taken from the interview as information may be twisted or altered throughout the many years or mouths of the party.

Plate 1.31: Interview with *Pak Cik* Anuar.

1.6.5 Limited Scholarly Resources

Research is not as easy as it seems as information of the 101 year old building is scarce and online information is majority unscholarly and unreliable due the reason that not much information had been documented throughout the years especially the 42 years of abandonment. Information found was very general and evidently duplicated from a single source, leaving out important details or information that is crucial for the deeper understanding of this heritage building.

Plate 1.32: Books Found in National Library.

2.0 Background Information of the Site

2.1 Selangor

2.1.1 Introduction to Selangor

Selangor (Plate 2.1) is one of the states in Malaysia. *Selangor* is situated on the west coast of peninsular Malaysia and covering 8,000 square kilometers, *Selangor* is surrounded by *Perak* on the north side, by *Pahang* and *Negeri Sembilan* on the east side and by the Straits of Malacca on the west (Sawadee, 2004). *Selangor* is consist of nine districts; namely *Sabak Bernam, Hulu Selangor, Kuala Selangor, Gombak, Klang, Petaling, Hulu Langat, Kuala Langat* and *Sepang* (State of Selangor Government Official Portal, 2014). *Selangor* has two capital cities which are *Shah Alam* as the state capital and *Klang* as the royal capital (Tourism Selangor, 2014).

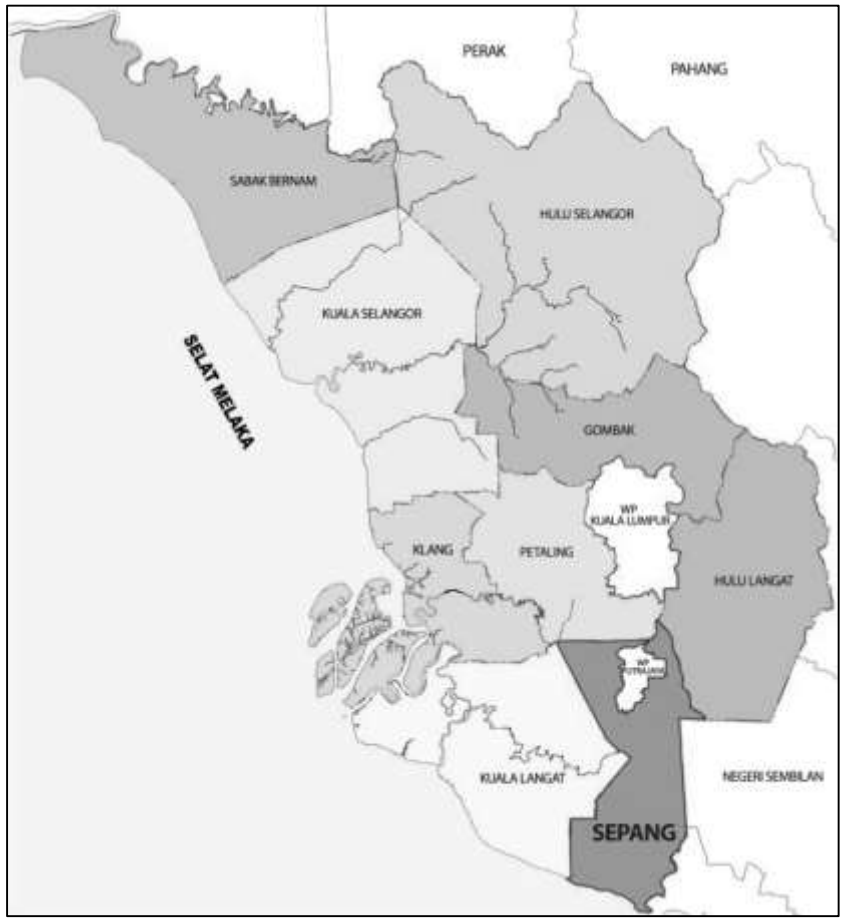


Plate 2.1: Map of Selangor showing the nine districts in Selangor. (Nasnuri. 2015).

2.1.2 History of Selangor

Selangor was under the ruling of the Malacca Sultanate in the late 15th-century but eventually in 1511 Malacca fall under the Portuguese ruling. Then the Dutch overpower and chase away the Portuguese thus took over both Malacca and *Selangor* (All Malaysia, 2015). In 1680 *Selangor* received mass immigration by Bugis, a Malay people from Macassar (now *Ujung Padang*) in Celebes (*Sulawesi*) (Sawadee, 2004).

By the 18th century the Bugis dominated the state of *Selangor* both politically and economically and established the present Sultanate of Selangor in 1740 (All Malaysia, 2015). In 1766, Raja Lumu, who was one of the descendent has established *Kuala Selangor* as the first capital of *Selangor* and he became the first sultan of Selangor (Plate 2.2) (Tourism Selangor, 2014).

The city of *Kuala Lumpur* act as both the national capital of Malaysia and the state capital of *Selango*r. In 1974, *Selangor* hand over *Kuala Lum*pur to the federal and the state capital was moved to *Shah Alam* after the concession (Tourism Selangor, 2014).

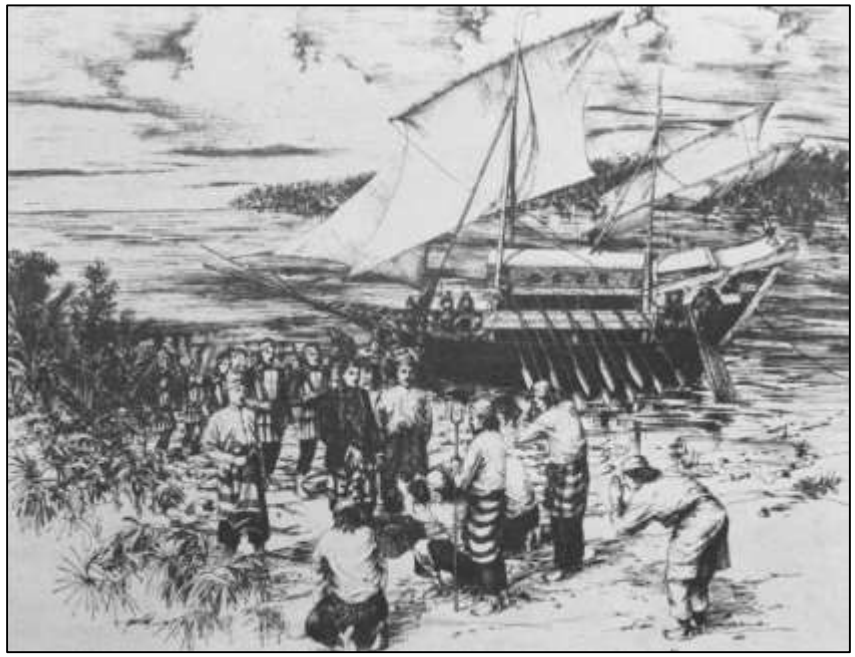


Plate 2.2: Raja Lumu, the first Sultan of Selangor pays his first visit to *Klang* in about 1756. He is wlecomed by the Chief of Klang, To' Engku' Raja Lumu's followers wearing Bugis armour. (Klang 20 Centuries Eventful Existence. 1986)

2.1.3 List of Sultan of Selangor

Duli Yang Maha Mulia Sultan Selangor or Sultan of Selangor is the title given for the constitutional ruler of Selangor. Sultan is in charge of the religion of Islam in the state and the "fountain of honours and dignities" in the state. Sultan's position is hereditary and it can only be held by Selangor's royal family.

No.	Sultan's Name	Year Throne Ascended
1.	Almarhum Sultan Salehuddin Ibni Almarhum Yamtuan Muda Daeng Chelak (Raja Lumu)	1766-1782
2.	Almarhum Sultan Ibrahim Ibni Almarhum Sultan Salehuddin	1782-1826
3.	Almarhum Sultan Muhammad Ibni Almarhum Sultan Ibrahim	1826-1857
4.	**Almarhum Sultan Abdul Samad Ibni Almarhum Raja Abdullah**	**1857-1898**
5.	**Almarhum Sultan Sir Alaeddin Suleiman Shah Ibni Almarhum Raja Muda Musa**	**1898-1938**
6.	Almarhum Sultan Sir Hisamuddin Alam Shah Alhaj Ibni Almarhum Sultan Sir Alaeddin Suleiman Shah	1938-19942, 1945-1960
7.	Almarhum Sultan Musa Ghiatuddin Riayat Shah Ibni Almarhum Sultan Sir Alaeddin Suleiman Shah	1942-1945 (During Japanese occupation only)
8.	Almarhum Sultan Salahuddin Abdul Aziz Shah Alhaj Ibni Almarhum Sultan Sir Hisamuddin Alam Shah Alhaj	1960-2001
9.	Sultan Sharafuddin Idris Shah Ibni Almarhum Sultan Salahuddin Abdul Aziz Shah Alhaj	2001-Now

Table 2.1: Table showing lists of Sultan of Selangor (State of Selangor Government Official Portal, 2014).

2.1.4 Sultan Abdul Samad (1857-1898)

Sultan Abdul Samad (Plate 2.6) is the fourth Sultan of *Selangor*. He is the son of Raja Abdullah ibni Ibrahim Shah who is the younger brother of the third Sultan of Selangor, Sultan Muhammad Shah. He was born at *Bukit Melawati* in *Selangor* (Editorial Advisory Brard, 2011).

Before he became Sultan, he held the title *Tengku Panglima Raja* and held the authority over *Langat*. The third Sultan of Selangor, Sultan Muhammad Shah died without appointing the next Sultan. There was a dispute in choosing the next Sultan. His son, Raja Mahmud was supposed to be the heir but he was too young thus making Sultan Abdul Samad as the next Sultan. He was not formally installed by Sultan of Perak as the previous Sultans (Malaysia Factbook, 2014).

In 1857 Sultan Abdul Samad relocated the royal capital from *Kuala Selangor* to *Langat*. This move was taken as a security measure to prevent a potential backlash following the dispute over his accession to the throne.

Plate 2.3: Sultan Abdul Samad.
(profile.V.2011).

In 1866, Sultan Abdul Samad gave the power and authority over *Klang* to Raja Abdullah bin Raja Jaafar, one of his son-in-laws. This starts a feud between Raja Abdullah and Raja Mahadi, the previous administrator of *Klang*, leading to the Klang War.

In 1868 Sultan Abdul samad appointed his son-in-law, Tengku Kudin as Vice *Yamtuan* to assist him to manage the entire state of *Selangor* and to settle the Klang war. Tengku Kudin in turn engaged the help of *Pahang*, mercenaries and Sir Andrew Clarke of the British Empire which marked the first British involvement in the politics of *Selangor* (Malaysia Factbook, 2014).

Tengku Kudin won the war and was given the authority over *Klang*. Sir Andrew Clarke assigned Frank Swettenham as a live-in advisor to Sultan Abdul Samad after the war in August 1874. Sultan Abdul Samad sent a letter to Sir Andrew Clarke, requesting for *Selangor* to be placed under the British protectorate thus incorporated into the Federated Malay States, together with *Perak, Negeri Sembilan*, and *Pahan*g in October 1875.

In 1875 Sultan Abdul Samad moved the royal capital of *Selangor* from *Langat* to *Jugra* and built the Jugra Palace.

In February 6 1898 in the age of 93, Sultan Abdul Samad died and was laid to rest in his own mausoleum (Plate 2.7: *Makam* Sultan Abdul Samad) in *Jugra.* His son, Raja Muda Musa was supposed to be the next heir but he died believed to be because of black magic/*santau* in 1884 making Sultan Sulaiman Shah, the eldest son of Raja Muda Musa, the fifth Sultan of Selangor (A. Ishak, personal communication, January 20, 2015).

Plate 2.4: *Makam* Sultan Abdul Samad in Jugra. (Makam Sultan Abdul Samad. 2011)

2.1.5 Sultan Alaeddin Sulaiman Shah (1898-1938)

Sultan Sulaiman (Plate 2.8) was born on 11 September 1863 in *Kuala Selangor*. Upon the death of his father Raja Muda Musa, he became the fifth Sultan of Selangor after his grandfather. Sultan Sulaiman was raised and educated as a Sultan since he was a child. He spent 10 years in assisting his grandfather in the affairs of state (Malaysia Factbook, 2014).

Proclaimed to be Sultan Alaeddin Sulaiman Shah on 17 February 1898 at *Istana Jugra*, he was formally installed and crowned on 22 October 1903 at *Astana Mahkota Puri* in *Klang*.

The name Alaeddin was given to Sultan Sulaiman by Sultan himself as a nickname believed to confused people with bad intention to go against Sultan using black magic. He started the nickname and followed by next Sultans (A. Ishak, personal communication, January 20, 2015).

In 1890, Sultan Sulaiman established a Royal School, the school for children of Selangor chiefs and royalty. He also establish an all-girls school in *Kampung Bandar* near his palace, *Istana Bandar* which he built in 1898. The girls were sent to and from school in covered bullock cart that limited their exposure to the opposite sex (Editorial Advisory Brard, 2011).

Plate 2.5: Sultan Alaeddin Sulaiman Shah. (Klang 20 Centuries Eventful Existence. 1986)

Sultan Sulaiman is also known as a devout Muslim. He wrote and published religious book for use in schools. Sultan Sulaiman was also an avid carpenter. Some of his work can still be seen at *Istana Bandar* in *Kuala Langat* (Plate 2.9). A mosque in *Kuala Langat* was named after Sultan Sulaiman as Alaeddin Mosque (Plate 2.10). It is one of the evidence of Sultan Suleiman's credibility as a religious leader. The mosque was built according to his revelation. Sultan Sulaiman also regularly gave sermons for Friday prayers at the mosque (Editorial Advisory Brard, 2011).

In 1912 by the age of 49, Sultan Alaeddin Sulaiman Shah was knighted the Order of St Michael and St George (GCMG) by the United Kingdom, with the title Sir (Malaysia Fact Book, 2014).

Sultan Alaeddin Sulaiman Shah died on 31 March 1938 by the age of 75 and was interred at the Royal Mausoleum in Klang. He was succeeded by his third son, Raja Muda Alam Shah.

Plate 2.6: *Istana Bandar* in *Kuala Langat.*

Plate 2.7: *Masjid* Alaeddin in Kuala Langat.
(Mazlan Mohammad Jali. 2015)

2.2 Kuala Langat

2.2.1 Introduction to Kuala Langat

Kuala Langat (Plate 2.11) is one of the nine districts in *Selangor*. It is located in the southwestern part of *Selangor*. It covers an area of 885 square kilometers. *Kuala Langat* is bounded by *Klang* district on the north side, *Sepang* district on the east and by the Straits of Malacca on the west (Port Klang Integrated Coastal Management Project. n.d). Some of the major town in *Kuala Langat* are *Banting, Bandar Jugra, Teluk Datok* and *Morib*. *Morib* is famous for its beach among the locals. There are seven sub-districts in *Kuala Langat. Tanjung Dua Belas, Telok Panglima Garang, Jugra, Bandar, Kelanang, Morib* and *Batu.*

Plate 2.8: Map showing sub-districts in *Kuala Langat*.

2.2.2 History of Kuala Langat

Kuala Langat used to be known as *Langat* and it was located where *Bandar Tema*sya and *Jugra* are situated. It is believed that *Langat* have been founded by the Bugis who came from *Johor* to trade with *Melaka* in the 18th century. *Jugra* was already well known during the *Melaka* Sultanate. In fact, *Jugra* was already existed before the Sultanate exist, as proven by the discovery of archaeological remains believed to be 2,000 years old in *Kampung Sungai Langat* in 1964 (Port Klang Integrated Coastal Management Project. n.d).

The government center was moved to *Bandar Temasya* during the Klang War (1868), during the ruling of Sultan Abdul Samad Ibni Almarhum Raja Abdullah (1857-1898) (Plate 2.6). Then, *Bandar Temasya* became a Royal Town and played an important role in the political, social and economic development of *Selangor*. This was generally because of its location on the coast, which made it suitable for a riverine and marine-based governance system.

Due to its location near the riverbank of *Sungai Langat* and natural protection provided by the nearby Carey Island, the river course was made safe. It attracted people from the nearby areas as well as traders from *Sumatera* and Bugis. The decline of *Bandar Temasya* and *Jugra* began early in his ruling and finally due to the power struggles within the palace, the government center was moved back to *Klang* in 1903 (Port Klang Integrated Coastal Management Project. n.d).

2.3 Banting

2.3.1 Introduction to Banting

Banting is part of *Kuala Langat* district and it is the administration, commerce and industrial centre of the *Kuala Langat* district. It is situated in the banks of *Sungai Langat* and known as rest town to a historic city, *Jugra. Banting* has developed due to the impact of development from the opening of Government Administrative Centre in *Putrajaya* and KLIA Airport.

Banting is an agricultural town. The main agricultural resources include oil palm plantations, poultry farms, betel leaves and it has a number of industrial areas. *Banting* has a lot of historical places such as *Istana Bandar, Masjid Alauddin, Rumah Api Jugra, Makam Sultan Abdul Samad., Pantai Morib* and *Pantai Kelanang.*

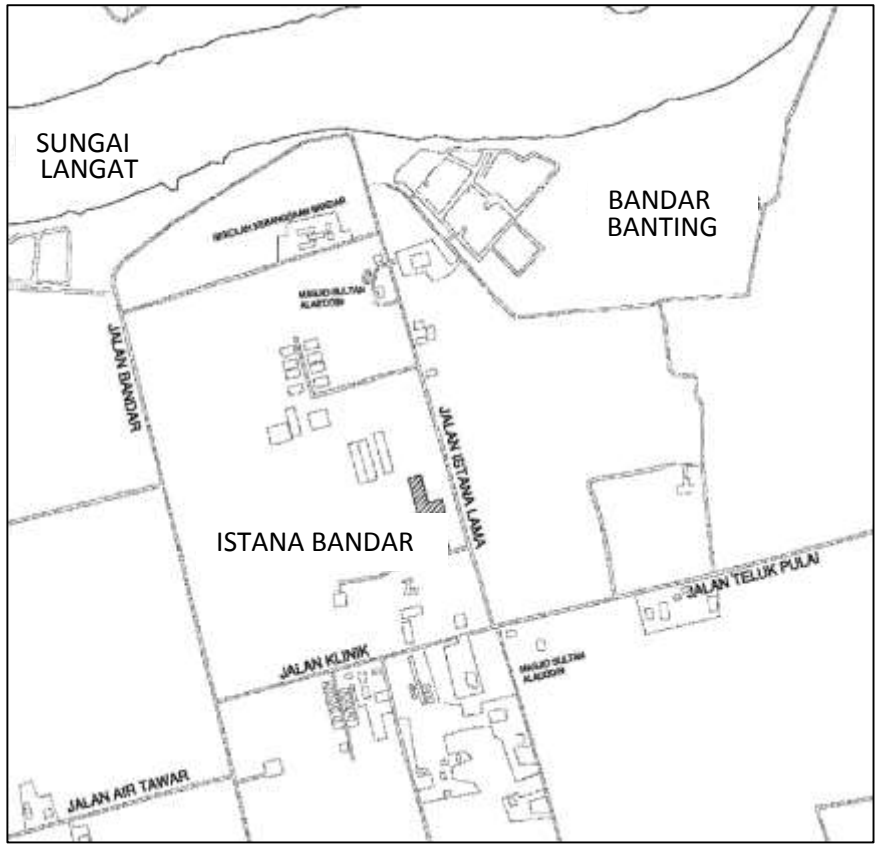


Plate 2.9: Location of *Istana Bandar* and *Banting*.

3.0 Historical Background of the Palace

3.1 Kampung Bandar

3.1.1 Introduction to Bandar Temasya and Jugra

Kampung Bandar (Plate 3.1) is one of the town located under the *Kuala Langat* district. Bandar or also known as *Bandar Temasya* back then was a developing small village. The name *Bandar Temasya* was given because back then there were a lot of activities conducted. *Bandar Temasya* is now known as *Kampung Bandar* located near *Jugra*. *Jugra* was once very popular since the early sultanate of *Selangor* not only during the government of Sultan Abdul Samad as well as during the intervention of Frank Swetthenham (Abdul Aziz. A, 1997).

Bandar Temasya was developed by Sultan Abdul Samad in 1867, whereas *Jugra* was developed in 1876, the year when his Royal Highness built the *Istana Jugra*. In one of the historical research of the Sultanate of Selangor, both *Bandar Temasya* and *Jugra* shared a mutual interest. Although both *Bandar Temasya* and *Jugra* are located at the isolated areas of *Kuala Langat*, they had attract many visitors to visit them every year (Dkampungbandar.blogspot.com, 2013).

Plate 3.1: Location of *Kampung Bandar*.

3.1.2 Early History of Kampung Bandar

Kampung Bandar was officially open by Sultan Alaeddin in 1898, the same year he ascended the throne. *Kampung Bandar* was developed by Al-Marhum, D.Y.M.M. Sultan Alauddin Sulaiman Shah ibni Al-Marhum Raja Muda Musa, the fifth Sultan of Selangor in 1898, now covering 2000 acres. It was also known as *Kampung Tanah Raja* (Abdul Aziz. A, 1997).

Sultan Alauddin was known for his generosity and gave his people a few pieces of land for living and agricultural purposes whereas tax will be collected from the people. There are six villages altogether and all the villages are given a name each and each had their head of the village. The six villages are *Kampung Bandar, Kampung Teluk Pulai, Kampung Kurau, Kampung Sungai Ingat & Chodoi, Kampung Sungai Tawar and Kampung Sawah* (Dkampungbandar.blogspot.com, 2013)

According to the local, Javanese people are among the first who settle in *Kampung Bandar*. Some of the Javanese were said to migrate to *Kampung Bandar* with their own will to improve their standard of living while some were kidnapped (A. Ishak, personal communication, January 20, 2015).

The transportation at that time was only using bicycle for people who are rich and *sampan*. Roads at that time were only small narrow lanes. However, *Kampung Bandar* is now more developed as compared to the rest of the villages in *Mukim Bandar* and Jugra. During the reign of Sultan Abdul Samad, there are a few conflicts going on between his descendants and the state dignitaries. This has caused the insecure of Sultan Abdul Samad and thus he resided at *Bukit Melawati*, *Kuala Selangor*. Soon, the Sultan and his followers retreated and moved to *Kuala Langat* (Dkampungbandar.blogspot.com, 2013).

Bandar Temasya was once more popular than *Jugra* back then. During the government of Sultan Abdul Samad, His royal highness has withdrew from his enemy forces and moved to *Bandar Temasya* when a war known as *Perang Kelang* outburst in *Kelang* in 1867. Since then, *Bandar Temasya* was also known as *Bandar Diraja* and some political conflicts and issues related to the state happened there (Abdul Aziz, A, 1997).

When the British came to interfere in the politics of *Selangor, Jugra* (Plate 3.3) then became more popular than *Bandar Temasya*. However Sultan Abdul Samad was more attracted to *Bandar Temasya* as it is located nearby a river named *Sungai Langat* in *Rantau Panjang* and the road that connects *Bandar Temasya* and *Kelang*. Ever since the government of the British, the two major changes made to the politics of *Selangor* were: the displacement of the central administration of *Selangor* from *Bandar Temasya* to *Jugra*, and secondly both *Bandar Temasya* and *Jugra* are left abandon (Abdul Aziz. A, 1997).

Plate 3.2: The view of *Jugra* from *Bukit Jugra*.

3.1.3 Kampung Bandar Social, Economy and Culture Context

After the changes of administration place where the royal family leave *Kampung Bandar, Kampung* Bandar was left abandoned. Despite being abandoned, *Kampung Bandar* has so many historical memories from the early years of *Selangor*. According to data done by *JKKK Kampung Bandar* in 2010, the town has only habited by two race-Malay and Chinese. Most of the chinese live in a small town called *Pekan Chodoi* (Dkampungbandar.blogspot.com, 2013).

Because of the type of ground in *Kampung Bandar* which is clay, it is suitable for plantation. Back then there were a lot of coffee tree, cocoa tree and coconut tree but nowadays most of the land is oil crop. There was also a few paddy field back then in *Kampung Bandar*. Now, since *Kampung Bandar* is located near the industrial area such as *Teluk Panglima Garang, Klang, Shah Alam* and Port Klang, most of the people chose to work there in private section, industrial department. Other than that some chose to work alone, some work as farmers, breeders and fisherman (Dkampungbandar.blogspot.com, 2013).

There used to be a traditional game called *Gayau* but it is no longer played by the people of *Kampung Bandar* today however the traditional game *gasing*, kite and *Dabus* dance (Plate 3.4) are still practiced until today. *Dabus* dance include some martial art action and it was performed in *Istana Bandar* back then (A. Ishak, personal communication, January 20, 2015)

Plate 3.3: Dabus dance. (Dabus dance. 2012)

3.2 Ownership: Sultan Alauddin Sulaiman Shahlbni Almarhum Raja Muda Musa (Sutan Selangor V)

Sultan Alauddin (Plate 3.6) was the fifth Sultan of Selangor from 1898 until 1938. He was previously known as Raja Sulaiman before crowned Sultan. He have completed higher education in administration and management at Singapore after being advised by the British hoping he can manage the state himself one day. He had eleven wives. The well-known ones include Tengku Ampuan Maharum, Tengku Ampuan Zabedah (Daughter of Sultan Perak), Tengku Ampuan Fatimah (from *Perak*), Raja Meriam (from *Jeram*), Che Hasnah binti Pilong, Che Johari, Che Anjung, Che Chik, who four of them are royalties while the remaining seven weren't (R. Sulong, personal communication, January 23, 2015). In 1914 his grandfather was Sultan Abdul Samad and his father was Raja Abdullah. Sultan Sulaiman's father, Raja Muda Musa ibni Sultan Abdul Samad, who was supposed to be the king after Sultan Abdul Samad, died when he was young, that's why the throne was passed on to Sultan Sulaiman.

Plate 3.4: Sultan Alauddin Sulaiman Shahlbni Almarhum Raja Muda Musa. (profile.V.2011)

3.3 History of Istana Bandar

3.3.1 Early History of Istana Bandar

Istana Alaeddin, *Istana Temasya*, Istana 40 *Bilik* these were some of the alternative names for one of the most historical Palace in Malaysia, *Istana Bandar* (Plate 3.6). It was owned by our fifth sultan, Almarhum Sultan Sir Alaeddin Sulaiman Shah ibni Almarhum Raja Muda Musa, or Sultan Sir Alaeddin Sulaiman Shah in short. The palace was built amidst of a family conflict as a second home to cater Sultan Alaeddin's second wife, Cik Aminah binti Pelong while his first wife, Tengku Ampuan Mahrum remain reside in the official royal palace of *Mahkota Puri* (Plate 3.7). Construction starts on the 1899 and completed 4 years later in 1903. The Sultan himself designed, funded and involved in the construction of the palace, especially the carvings of the ornaments. Being a highly educated individual and a crafter, he appreciate international art in the form of architecture therefore vibrant influence of Classical, Indian, Chinese, Malay, Mogul, Moorish and Indonesian architecture can be seen. (A. Khairunizam, personal communication, February 11, 2015)

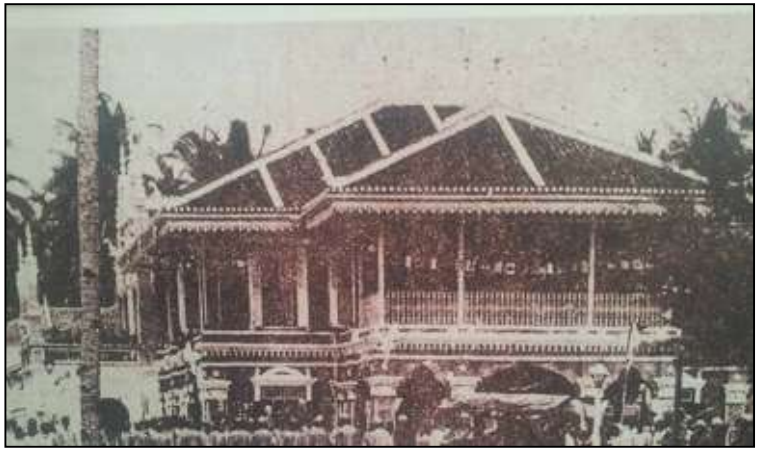


Plate 3.5: *Istana Bandar* in 1910. (Istana Sultan Alaeddin Kampung Bandar. 2015)

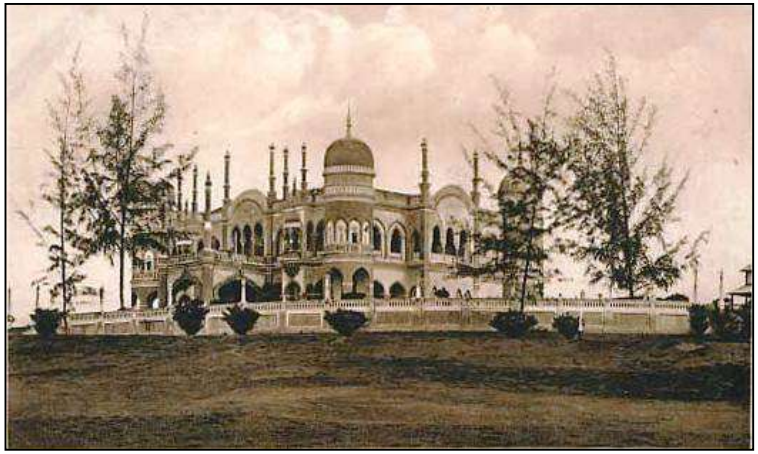


Plate 3.6*: Istana Mahkota Puri, Kelang* 1899. (Istana Mahkota Puri. 2013)

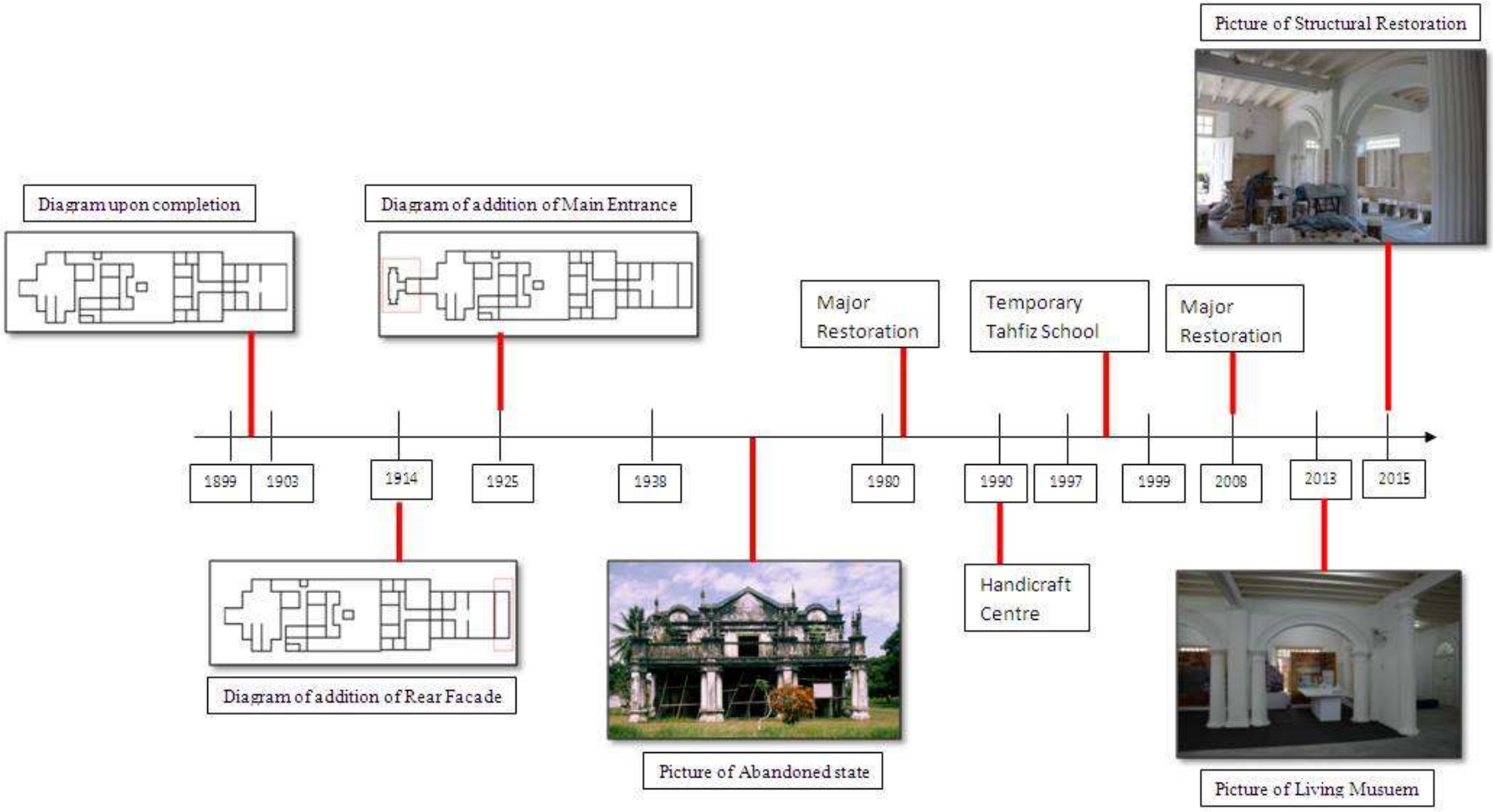


Plate 3.7: The timeline of Istana Bandar from 1899-2015.

3.3.2 Renovation during Sultan Alaeddin Administration

Although minor renovation did took place during 1914 and 1925 (Plate 3.10), which is 11 years consecutively after its completion on the rear façade and main entrance, the main structure and whole palace retain its original state in majority of the slight components. In 1914, the rear façade (Plate 3.9) is added with ornaments and details such as crenellations and pinnacles that according to the Moorish architecture symbolize power, strength and also protection of the Sultan identity. A fence was also added, shaping a beautiful garden with original year of completion and *Jawi* Quran engravings. (A. Khairunizam, personal communication, February 11, 2015

Plate 3.8: Renovated Rear Façade, 1914.

Plate 3.9: Renovated Front Entrance, 1925.

3.3.3 Abandonment Period

35 years after being used, Sultan Alaeddin passed away and since it was abandoned in 1938 (Plate 3.11 & Plate 3.12). It was being confirmed that the palace was being used as a Japanese base during the Japanese Occupation. This due to the fact that Japanese soldiers prefer to occupy concrete solid structures compared to Malay traditional timber structures as it provide a better defense to them. Even after the Japanese Occupation, Istana Bandar remained unoccupied and unmaintained, leaving it to deteriorate.

Plate 3.10: Rear façade during Abandonment Period. (Istana Bandar. 1905)

Plate 3.11: Left Veranda during Abandonment Period. (Istana Bandar.1905)

3.3.4 Major Restoration after Abandonment

It was out of the limelight for 42 years and finally being restored in year 1980. The major restoration works include tiles, addition of flat roof, doors and windows replacement as well as to ensure it is well-built to be used. It was in such bad condition that restoration process took 10 years and completed in 1990 and turned into a Local Handicraft Centre. (A. Khairunizam, personal communication, February 11, 2015)

Plate 3.12: Colour Scheme in 1992. (Istana Bandar, 1992)

3.3.5 Art and Craft Centre and Tahfiz School

The support for the art and craft was weak that it was forced to be closed down shortly. It was then used temporarily as a Tahfiz School in 1997 by the Islamic Religious Office with the wall painted yellow while the ornaments painted white. It was being left vacant again in 1999 after the Tahfiz School was constructed with its colour reversed, white walls and yellow ornamentations (Plate 3.13 & Plate 3.14).

Plate 3.13: Colour Scheme in 1999. (Istana Bandar, 1999)

3.3.6 Second Restoration after Abandonment

A more dedicate restoration and conservation was carried out on 2008 after it was registered as a national heritage under the Selangor's Board of Museum by *Jabatan Warisan Negara* (Plate 3.15) with pale yellow colour for the walls and white colour for the ornaments (Plate 3.16). The new colour was decided by Sultan Sharafuddin Idris Shah himself although the original yellow colour was suggested as the sultan thought that It might be mistook it as a temple, he then asked for cream and white colour similar to the *Galeri Diraja* in *Klang.* Other preservation works include repaired electrical wiring, balustrades, pillars, windows, floors as similar as possible to the original state. (A. Ishak, personal communication, January 20, 2015)

Plate 3.14: Recognition by *Jabatan Warisan Negara*.

Plate 3.15: Colour Scheme in 2008.

3.3.7 Exhibition and Living Museum

Upon completion, it was handed over to Malay Customs and National Heritage Corporations of Selangor (PADAT). An event organized by PADAT called *Jalinan Adat* where an exhibition will be conducted in an historical landmark every month in Selangor and *Istana Bandar* was chosen to host in June 2012 (Plate 3.17). It was divided into 3 areas to showcase 3 interesting elements such as background history of *Jugra* and *Istana Bandar* in the *Balai Mengadap Baru*, equipment and furniture used in the *Ruang Keluarga Diraja* dan *Dapur Masak* and lastly exhibition of handicrafts from the Selangor states in the *Ruang Beradu* (Plate 3.18). A living museum is created even after the exhibition as all the props are not removed to educate visitors. (A. Khairunizam, personal communication, February 11, 2015)

Plate 3.16: Models and Information Boards during Exhibition.

Plate 3.17: Equipment and Furniture Showcase During Exhibition.

3.3.8 Conservation Works in 2015

In the beginning of January 2015 where being visited, the building (Plate 3.19) is going through a structural conservation. All plastered brick walls and columns are being striped to carry out to treat salt attack and rising damp that causes the walls to deteriorate (Plate 3.20). Cocoon treatment and Chemical Damp-proof Injection Course were being used and it would take up to months before the walls can be replastered (Plate 3.21).

Plate 3.18*: Istana Bandar* in 2015.

Plate 3.19: Stripped off Columns.

Plate 3.20: Stripped off Walls.

3.3.9 Future of Istana Bandar

After the interview with Mr. Mohd Aidy Khairunizam, the PADAT chairman of the South District Museum who based in *Kuala Langat* in *Klang*, a living museum is still the best plan to preserve and educate the future generation of this magnificient national heritage but it all still depends on the fund allocate by the state government. (A. Khairunizam, personal communication, February 11, 2015)

3.4 Related Landmarks in Surrounding Area

3.4.1 Royal Jetty

This jetty was a private jetty along the river that connects *Klang* and *Banting* (Plate 3.22). It is owned by the royalties as early as the Sultan Abdul Samad regime. It act as a means of transportation for Sultan Alaeddin to travel back and forth between *Istana Mahkota* and *Istana Bandar* way before land automobile was widely used. Not far away are the public jetty*, Pangkalan Batu Hampar* and *Pangkalan Perahu* that was used by commoners to transport minerals, forest products as well as residents.

Plate 3.21: Royal Jetty along the river that connects *Klang* and *Banting*.

3.4.2 Istana Long Puteri

The palace belongs to Sultan Abdul Samad's granddaughter, Raja Long Puteri (Plate 3.23). The palace consist of 3 public spaces which are the living room and kitchen separated by an atrium. It also had 3 rooms and a guest room built with wooden structures, plank walls and concrete floor. Today, the only remaining parts is the foundation as well as the stone made staircase.

Plate 3.22: Remains of *Istana Long Puteri*.

3.4.3 Sekolah Kebangsaan Bandar

Sekolah Kebangsaan Bandar (Plate 3.24) is founded in March 13, 1890 with the initial name of *Sekolah Melayu Bandar Dandan Bakly Raja*. It was then 400 meters away from *Istana Bandar* but was moved due its land being used to set up a place of worship. In 1952, the school is again relocated but the building still stands relatively unchanged and it is currently used as a religious school. It was also known to be attended by many royalties such as *Almarhum* Sultan Hishamuddin Alam Shah dan YM Raja Uda (*Bekas Gabenor Pulau Pinang*) and DYMM Sultan Salehuddin Abdul Aziz Shah.

Plate 3.23: *Sekolah Kebangsaan Bandar*.

3.4.4 Tahfiz School

The current school (Plate 3.25) was built in 1999 for teaching and learning of Quran for the local Muslim children. Before its completion, *Istana Bandar* was once used as a temporary compound for both classrooms and dormitory.

Plate 3.24: Tahfis School beside *Istana Bandar*.

3.4.5 Makam Diraja

Makam Diraja (Plate 3.26) is a cemetery specially allocated for the royal family and relatives since the 1886. It is an enclosed area surrounded by brick walls while the cemetery beyond this area belongs to the commoner. The tomb stones of all the royal families are made of marble instead of normal gravestones. It is still being visited by royalties till today. A ruined remains of *Masjid Raja Muda Musa* can be seen beside the cemetery was once the first mosque being built in *Kampung Bandar*.

Plate 3.25: *Makam Diraja Kampung Bandar*.

3.4.6 Makam Sultan Abdul Samad

Located in the *Makam Diraja*, stands the *Makam Sultan Abdul Samad* (Plate 3.27) on Jugra Hills. Only cemetery of sultan are able to be located in the *Makam* Sultan Abdul Samad, the grandfather of Sultan Alaeddin. While the other royal family and relative grave are situated around it. The gravestones are also wrapped in different colors usually green, black, yellow or white to indicate their position and status in the Selangor Royalty.

Plate 3.26: *Makam Sultan Abdul Samad* in Royal Yellow.

3.4.7 Masjid Raja Muda Musa

Masjid Raja Muda Musa (Plate 3.28) was built in 1875 and be able to accommodate approximate 150 people in it. It was being used for 45 years until 1920 when it is no longer safe to be used due to its poor condition. It was then quickly replaced with *Masjid* Sultan Alaeddin which is built 200 meters away from *Istana Bandar*.

Plate 3.27: Actual Site of *Masjid* Raja Muda Musa.

3.4.8 Masjid Sultan Alaeddin

Built by Sultan Alaeddin himself 16 years after 1920 staying in the *Istana Bandar*, it is just 200 meters away from it. The architectural influence are mainly from Deli in Medan, North Sumatra. Being the religious leader, the Sultan delivered sermons on every Friday prayers. Even after his death, *Masjid* Sultan Alaeddin (Plate 3.29) is still used and maintained by the residents till today.

Plate 3.28: *Masjid* Sultan Alaeddin.

3.4.9 Jugra Prison

Jugra Prison (Plate 3.30) or also known as *Rumah Pasung* is built in 1875 in *Mukim Jugra*. It was used to execute an order through a judicial system during that time. It consists of two storeys and is the first jail ever built in *Selangor*. In 2002, restoration work was carried out by Department of National Heritage and had since serve as an in-situ museum for the public.

Plate 3.29: Jugra Prison.

4.0 Architectural Influence and Style

Istana Bandar is built since 1899. Until now, it has undergone several restoration and renovation. However, the architecture styles from the palace are still remained. These styles included Chinese, Colonial, Mogul, Moorish and Malay architecture style.

4.1 Chinese Architecture

4.1.1 Chinese Architecture in Malaysia

Chinese architecture is greatly influenced by Chinese tradition and culture starting from *Shang* dynasty. In early 19th century, many Chinese from the southern provinces of China migrated to Malaysia (Travelchinaguide.com, 2015). Hence, Chinese architecture was brought in by migration and mixed with the local Malay architecture forming the southern Chinese architecture together with the influence of British Victoria elements. It is mainly found in shop houses and terrace houses in Penang and Malacca (Plate 4.1). Many Chinese architecture elements can also be found in Bandar, such as the Chinese balustrade, Chinese ventilation block, terracotta roof style, ornaments and courtyard.

Plate 4.1: Penang Shophouses. (Ong, K. 2011)

Southern Chinese Architecture is greatly influenced by the local history, climate and religious beliefs. It is characterized by its unique elements. Courtyard, air well and jack roof are greatly used in this architecture to improve natural ventilation and allow better light penetration.

Feng Shui also has a great impact on Chinese architecture as many believe that it will bring luck and fortune. Therefore, many gorgeous ornaments and usage of different colours can be found in Southern Chinese Architecture style.

4.1.2 Chinese Architecture in Istana Bandar

Many Chinese architecture elements can be found in *Istana Bandar*, such as the Chinese balustrade (Plate 4.3), Chinese ventilation block (Plate 4.2), terracotta roof style (Plate 4.4), ornaments and courtyard.

Plate 4.2: Chinese Ventilation Block.

Plate 4.3: Chinese Balustrade.

Plate 4.4: The Arrangement of Roof style at Istana Bandar is influenced by Chinese Architecture.

Figure 4.1: Ventilation block of *Istana Bandar* influenced by Chinese Architecture.

4.2 Colonial Architecture

4.2.1 Colonial Architecture in Malaysia

Looking back to the history, Malaysia had been colonized by different countries which in turn leads to available of different Colonial Architecture Style. However, British architecture (Mogul and Moorish architecture) has the greatest impact on Malaysia architecture. This architecture style first appeared during the colonial period of Great Britain in Malaysia which utilized by Britain in order to withstand the climate and weather (Plate 4.5) (Muhammad, A. 2012).

Plate 4.5: City Hall of Penang is influenced by Colonial Architecture. (Muhammad, A. 2012)

According to Heritage of Malaysia Trust (1990), colonial architecture style has applied on the Malaysia's building since 17th century to mid-20th century. This architecture style is commonly adopted in administrative buildings such as government office. It also influenced the design of the commercial shop houses as well.

Doric or Corinthian column, louvered window (Plate 4.6) and portico (Plate 4.7) are some of the elements which belonged to the colonial architecture style.

4.2.2 Colonial Architecture in Istana Bandar

Colonial architecture style strongly influenced the design of Istana Bandar. Many elements of Colonial Architecture are found at the facade of the palace and mainly functioned as an aesthetic decoration for the palace.

Plate 4.6: Window and Column from Colonial Architecture.

Plate 4.7: Portico at the Façade of *Istana Bandar*.

4.3 Mogul Architecture

4.3.1 Mogul Architecture in Malaysia

Mogul architecture is a style of architecture which flourished on the Indian subcontinent during the reign of the Mogul Empire (Plate 4.8). This style is originated from 1526. At the same time, Mogul architecture is also known as the mixture of Islamic India and Persian architecture. Mogul architecture consists of few elements such as dome-shaped pavilion, Persian style garden layout, projecting eaves, overhanging enclosed garden and the latticed screen.

However, Mogul architecture is successfully adopted in the design of Malaysia's building due to the exquisiteness of Mogul art. It was employed on the Malaysia's building during the colonial period (Plate 4.9).

Elements such as minarets which located at the front of building and the Mogul carving on the arches are widely seen on the building in Malaysia.

Plate 4.8: *Taj Mahal* which is the famous building of Mogul architecture. (Karim, M. M. 2012)

Plate 4.9: *Masjid Jamek* is the famous building of Mogul architecture in Malaysia. (Hasany.T. 2012)

4.3.2 Mogul Architecture in Istana Bandar

Istana Bandar also employed the elements from Mogul architecture and mainly used at the exterior. Minarets are found at the façade to show the magnificent of the palace (Plate 4.10). Other than that, *Jali* also known as latticed screen is applied on some of the windows (Plate 4.11).

Plate 4.10: Minaret found on the pinnacle.

Plate 4.11: *Jali* found on some window at *Istana Bandar*.

4.4 Moorish Architecture

4.4.1 Moorish Architecture in Malaysia

Moorish architecture is a style of architecture which developed in the North Africa and south-western Europe, especially from Spain and Portugal. It is famous during 8th to 15th century and strongly influenced by the Islamic culture. Therefore, some of the elements from Islamic architecture is reformed and adopted on Moorish architecture.

The elements of this architecture include domes, arches (Plate 4.13), *muqarnas*, fountains, courtyard with garden and Islamic geometric ornament. However, crenellated arches and Ogee arches are the elements which are widely used (Plate 4.14).

According to *Azim* (2009), *Islamic calligraphy* and geometric pattern are the canon of Islamic architecture. The colour or geometric ornament such as star, crescent, hexagon and octagon are usually applied on the arches so that it can improve the outlook. Moorish architecture is brought in to Malaysia during the colonial period and commonly applied on the design of mosque and palace (Plate 4.12).

Plate 4.12: Arches with colour shows the special of Moorish architecture. (Moorish Architecture. n.d.)

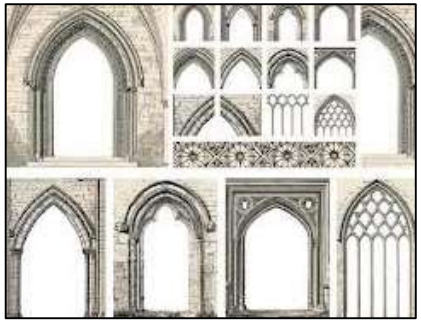


Plate 4.13: Ogee Arches is the feature of Moorish architecture. (Poyraz, 2013)

Plate 4.14: Dataran Merdeka shows the Moorish architecture in Malaysia. (KL Sultan Abdul Samad Building. 2015)

4.4.2 Moorish Architecture in Istana Bandar

At Istana Bandar, we are also able to appreciate the Moorish architecture. Elements such as geometric ornaments were found on the columns and arches. Whereas, crenellated arches (Plate 4.15) and ogee arches (Plate 4.16) are also placed at the façade of the palace.

Plate 4.15: Crenellated Arch at Istana Bandar.

Plate 4.16: Ogee Arches at the corridor.

4.5 Malay Architecture

4.5.1 Malay Architecture in Malaysia

Climate and weather are the main influence of the Malay architecture. It was appeared in Malaysia since 15th century.

Malay Architecture mostly can be found at the traditional *Malay* houses (Plate 4.17). Due to climate and weather in Malaysia, traditional Malay houses are designed with a wide overhanging roof, a large window and a raised on slits. This design is used to facilitate the natural wind with high velocity and control the exposure of sunlight meanwhile protecting the house from flood (Plate 4.18).

Other than that, no nails are used to build the traditional *Malay* houses. Instead, pre-cut hole and grove are used to connect the construction of the posts and beams.

In addition, *Malay* ornament and wood carving are the unique elements of this architecture style. Flora motif is usually adopted on both elements. Therefore, it can provide a better aesthetic outlook for the house.

Plate 4.17: Traditional *Malay* House. (The Traditional *Malay* House. 2015).

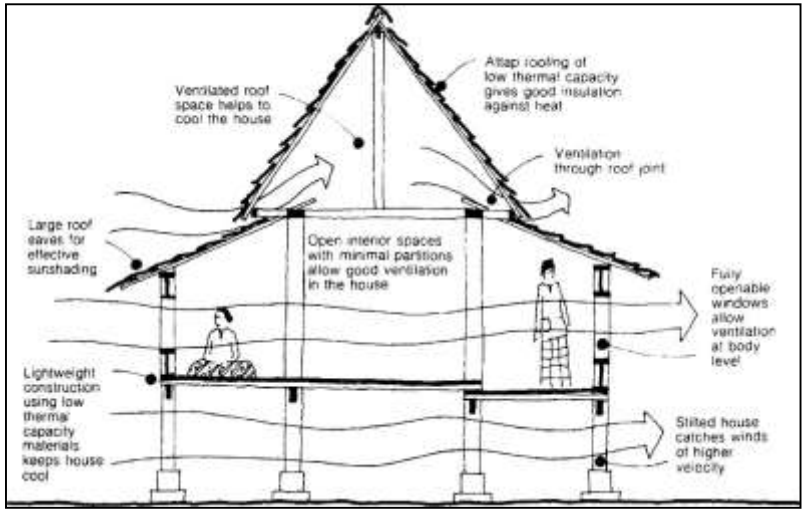


Plate 4.18: Feature of *Malay* Architecture. (The Traditional *Malay* House. 2015).

4.5.2 Malay Architecture in Istana Bandar

Malay architecture strongly influenced the design of Istana Bandar. Elements such as roof design (Plate 4.19 & Plate 4.20) and wooden carving are found at the palace (Figure 4.2).

Plate 4.19: *Sulur Bayung* is placed at the edge of roof.

Plate 4.20: Gable finial found at the façade of *Istana Bandar.*

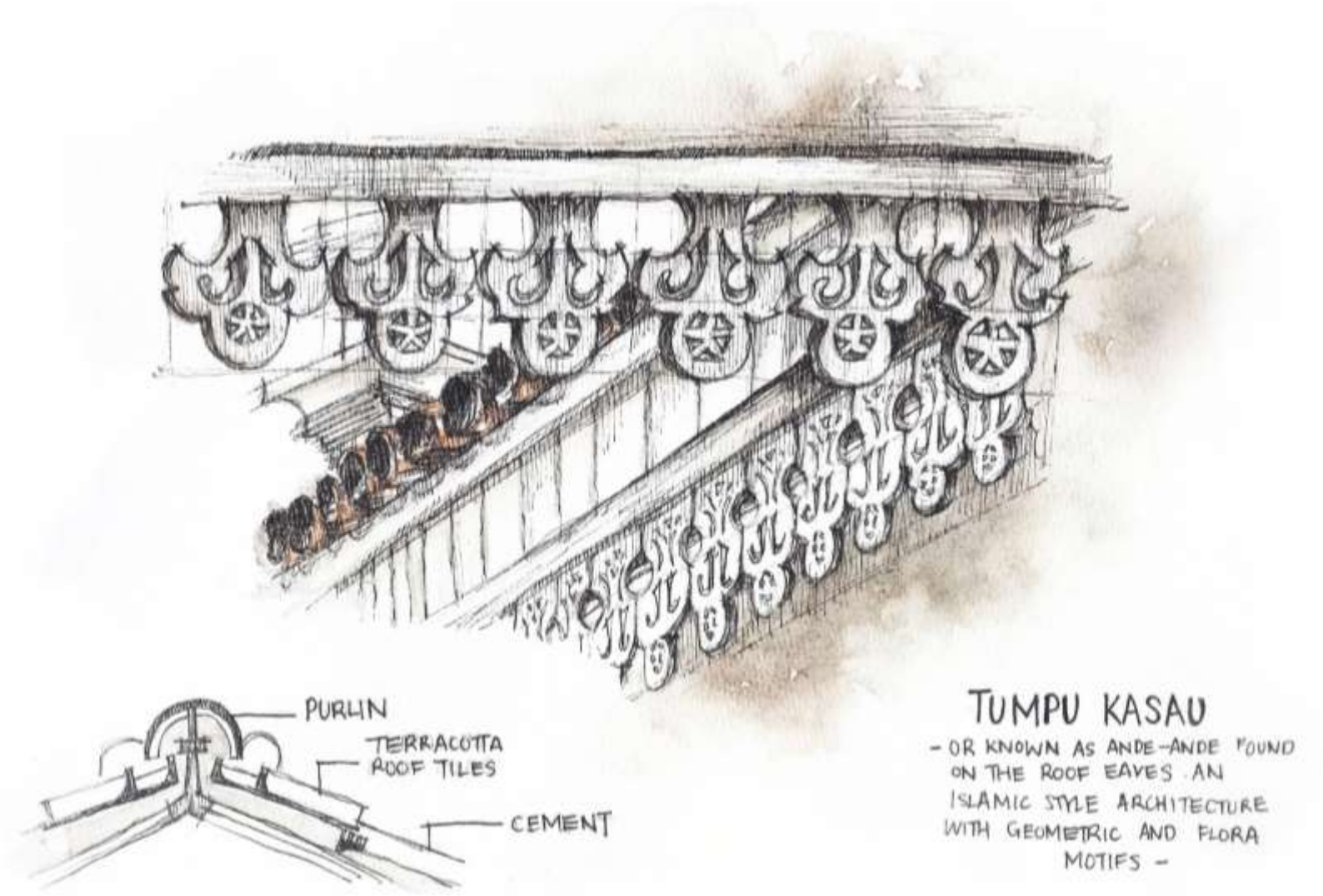


Figure 4.2*: Tumpu Kasau* of *Istana Bandar* is influenced by Malay Architecture Style.

4.6 Comparison of Five Architecture Styles

Style / Characteristic	Chinese Architecture	Colonial Architecture	Mogul Architecture	Moorish Architecture	Malay Architecture
Definition	Style which related with Chinese culture	The mixture of western, mogul and Moorish architecture	The mixture of Islamic India and Persian architecture.	Style which influenced by Islamic architecture	Style which influenced by climate and weather
Formation Period	*Shang* Dynasty	Colonial of Great Britain	1526	8th century	15th century
Architectural Design	Symmetry, repetition and hierarchy	Modern, repetition and hierarchy	Symmetry, repetition and hierarchy	Symmetry, repetition and hierarchy	Light and shadow and ventilation
Feature Element	Terracotta roof style, ornaments and courtyard	Greek column, portico and louvered window	Dome-shaped pavilion, projecting eaves, overhanging enclosed garden and latticed screen	Domes, arches, muqarnas, fountains, courtyard with garden and Islamic geometric ornament	Wooden carving, Malay ornament, overhanging roof and large window
Period which Started to apply on Malaysia's Building	Early 19th century	Colonial of Great Britain in Malaysia (17th Century to mid-20th Century)	15th century	17th century	15th century
Unique Building in Malaysia	Shophouses and temple at Penang, Malacca and Ipoh	City Hall at Penang	*Masjid Jamek* in Kuala Lumpur	*Dataran Mederka* in Kuala Lumpur	Traditional House

Table 4.1: Comparison of five architectural style.

5.0 Space and Culture

The palace of the Sultans were of paramount importance in feudal Malay society, not only as a place of residence but as the centre of administration, learning and culture. The palace not only incorporates many of the Sultan's beliefs and reflected their way of life, but also adopts the common styles of various regions of the Peninsula like Acheh, Sumatera, Java and Riau.

Plate 5.1*: Istana Bandar* were of paramount importance in feudal Malay society, not only as a place of residence but as the centre of administration, learning and culture.

5.1 Spatial Organization

Spatial Organization is a crucial factor in the design of a building. The human behaviour and movement in *Istana Bandar* is greatly influenced by the organization of spaces. There are many different types of spatial organization that can be observed from the plan of the *Istana*. They are as mentioned below.

5.1.1 Symmetry and balance

The spatial planning of the *Istana* is symmetrical and balanced a when a line is horizontally cut crossed the plan (Figure 3.1). This can be seen from both the elevation and the floor plan (Plate 5.2). Both sides are almost identical to each other and is seen as balanced from the size, form and function of space.

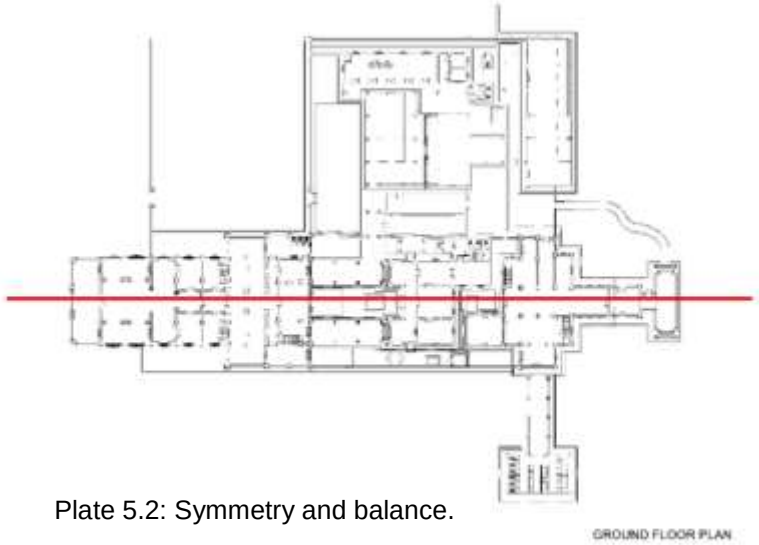


Plate 5.2: Symmetry and balance.

5.1.2 Spatial Hierarchy

The *Istana* is divided into three main areas which are arranged according to hierarchy as highlighted in the diagram. (Plate 5.3) The highlighted spaces are inhibited by the different classes of social hierarchy. The inhabitants of the *Istana* are to strictly adhere to their designated living quarters.

5.1.3 Public VS Private

The spaces in the *Istana* are also divided into public, semi-private and private spaces. (Plate 5.3); the public spaces are for commoners, the semi-private spaces are for palace officials and servants and the private spaces are for the royal family. The first floors are common spaces and semi-private spaces. Meanwhile, rooms for the Royal families are situated on the ground floors.

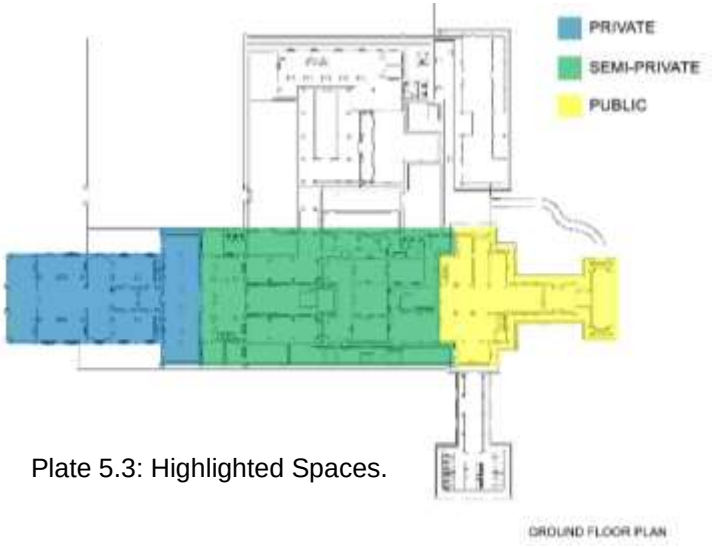


Plate 5.3: Highlighted Spaces.

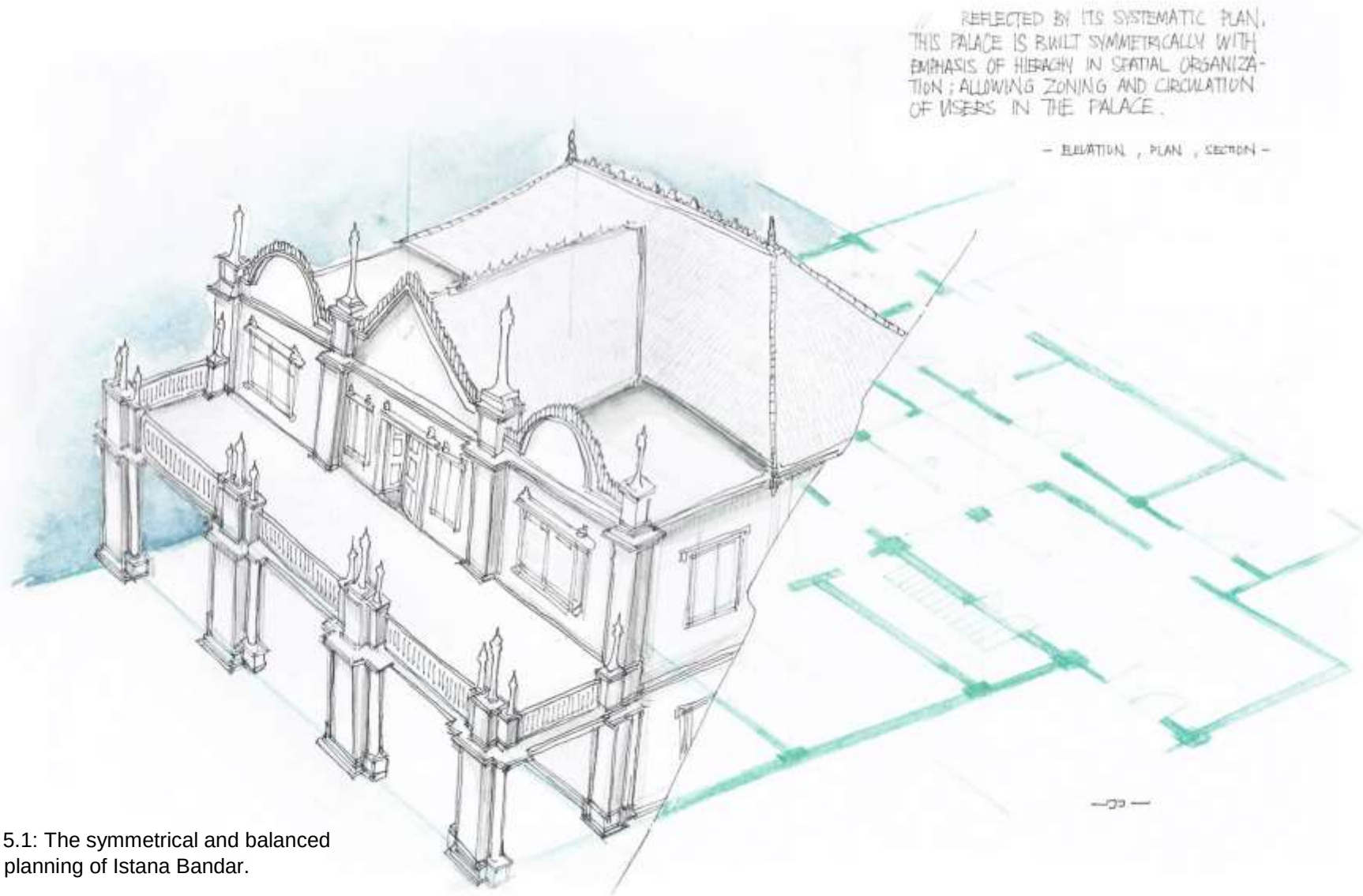


Figure 5.1: The symmetrical and balanced spatial planning of Istana Bandar.

5.1.4 Circulation

The cluster organization is at the centre part of the building located at the main area. It acts as a private space for the royals which creates an absolute circulation mainly for them. The commoners are allowed access the surrounding of the building freely and the public space to meet the Sultan when permission is granted. However, the semi-private spaces can only be accessed by the royals, officers and the servants with a specific circulation. Circulation path is shown in diagram. (Plate 5.4)

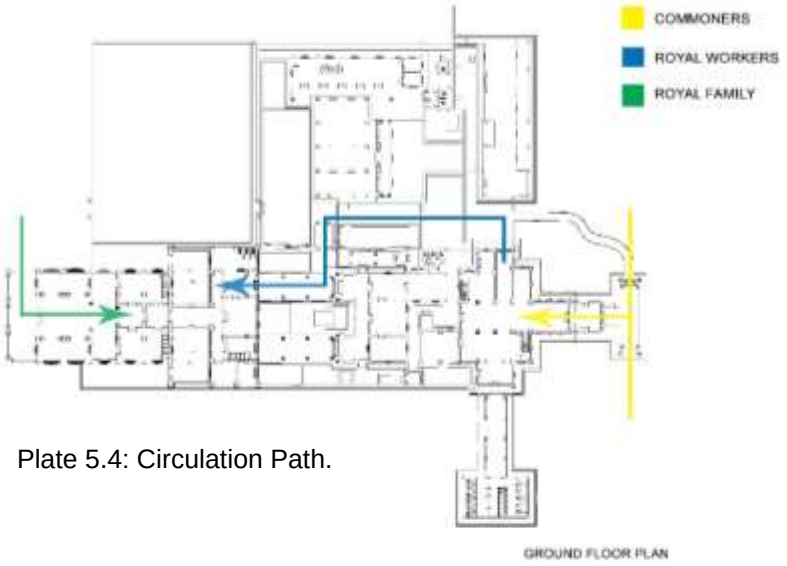


Plate 5.4: Circulation Path.

5.1.5 Division by Custom

The Sultan was known as a religious figure who is dedicated to his religious beliefs and customs. This is the other factor that influenced the spatial planning of the Istana. The Islamic rule that prohibits the socializing amongst unmarried men and women demands for the division between the opposite sexes that is shown in the diagram. (Plate 5.5)

Plate 5.5: Division of Spaces.

5.2 Function of Spaces

All the spaces and rooms in each area have different and specific function and users. Below are the main functions for the specific spaces and rooms that are located in the public, semi-private and private spaces during the reigning days of *Istana Bandar*.

5.2.1 Semi-private Spaces

These are spaces with some degree of privacy. Only certain people like the royal officials and servants has the authority to enter these spaces in the *Istana*.

- *Ruang Beristirehat* (Plate 5.7 :Resting Room)

This is the resting area (Figure 3.2) for the Sultan and the Royal Family to spend quality time together and relax. (Location of room refer to Plate 5.6)

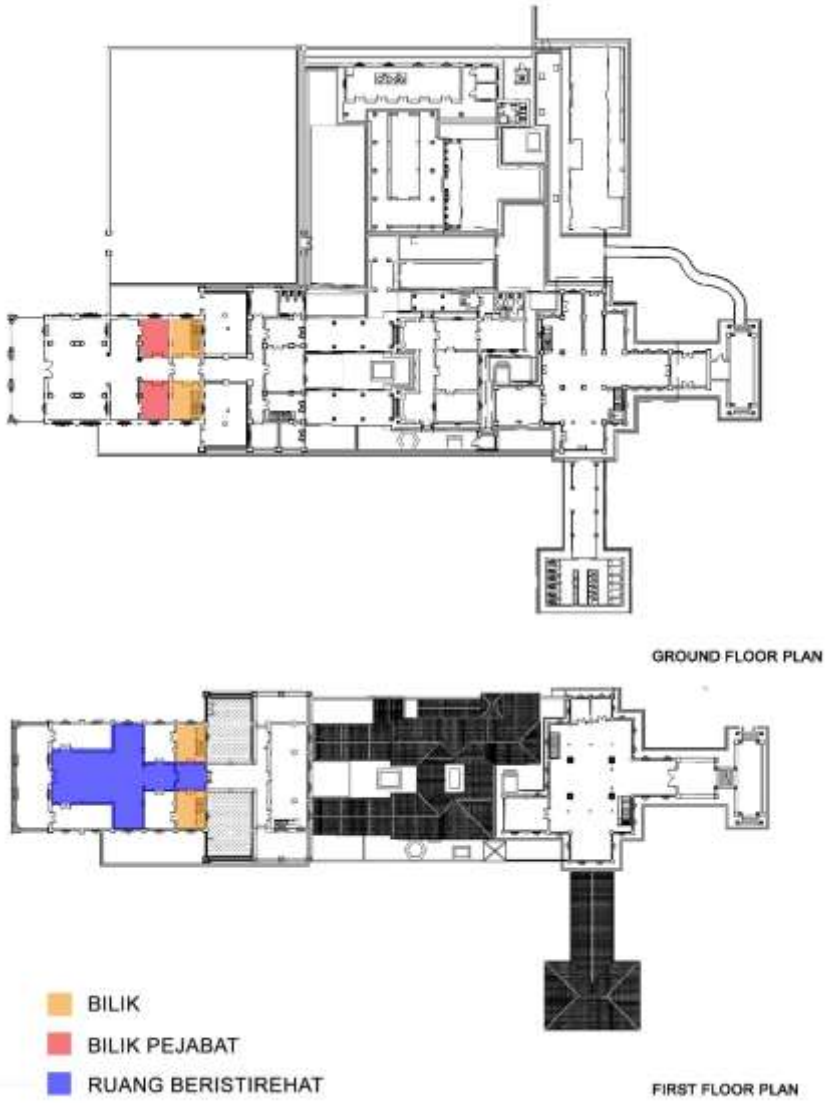


Plate 5.6: Location of Semi-private spaces.

- *Bilik* (Plate 5.8 Room)

These rooms are smaller than other common rooms, they are situated on both ground and first floors. It serves as a purpose of storage to keep certain items, such as light fixtures, furniture and etc. (Location of room refer to Plate 5.6)

- *Bilik Pejabat* (Plate 5.9: Office)

It is located on the ground floor there are two offices facing each other. It serves as a purpose of confidential rooms where official meetings are held. (Location of room refer to Plate 5.6)

Plate 5.7: Royal Seal in Resting Room.

Plate 5.8: Room.

Plate 5.9: Office.

Figure 5.2: The resting area for the Sultan and the Royal Family to spend quality time together and relax.

5.2.2 Private Spaces

These spaces are solely for the Royal family to inhibit. Only officials of higher authorities are allowed to enter the premises under specific permission.

- *Kamar Santap Diraja (Royal Banquet Room)*

This room is used for hosting social events such as, royal parties, banquets, receptions and etc. This area is connected to the royal kitchen for the circulation ease for such events. The guest who attends these events are personally invited by the Sultan. (Location of room refer to Plate 5.10)

Plate 5.10: Location of private spaces.

- *Kamar Beradu* (Royal Room)

This is where the bedrooms of the wives of the Sultan are located (Plate 5.11). It is strategically located for easy access to other main spaces such as the assembly hall, royal kitchen, and the royal banquet room. (Location of room refer to Plate 5.10)

Plate 5.11: The royal room for the wives of the Sultan.

- *Royal Bath*

The pond that is surrounded by the *Kamar Beradu* is to be used by the Sultan's wives as it is enclosed (Plate 5.12). The other pond however is more open is occupied by the Sultan Himself (Figure 3.3). The ponds are connected to a nearby river, therefore is never dries back in the day. One of the ponds can also be used to indicate the rise and low water level of the river tide. (Location of room refer to Plate 5.10)

Plate 5.12: Male Royal Bath.

Figure 5.3: The Royal Bath is where the Sultan takes his cooling and relaxing bath.

- *Laman* (Courtyard)

The courtyards in the middle of the buildings are one of the characteristics of the Moorish architectural style (Plate 5.13). It allows cooling effects to take part in the building. It also provides an aesthetic quality for the *Istana*. (Location of room refer to Plate 5.10)

Plate 5.13: Courtyards bird's eye view.

5.2.3 Public Spaces

This is a social space that is generally open and accessible by the public. It is a space that commoners can freely enter without the need of an authority. This space consists of a few rooms as mentioned below.

- *Bilik Menunggu* (Waiting Room)

The waiting room (Plate 5.15) which is located at the ground floor of the assembly hall is to serve the public who is interested in paying respects to the Sultan. (Location of room refer to Plate 5.13)

- *Balai Mengadap* (Assembly Hall)

It is a gathering hall for the commoners, palace officials and the Royal family (Plate 5.16). (Location of room refer to Plate 5.13)

- *Balai Rong Seri* (Throne Room)

This acts as a large common area/ hall of the Istana (Plate 5.17). It functions as a place for the Sultan to conduct official ceremonies (Figure 3.4) an office or a workplace for the Sultan. The official

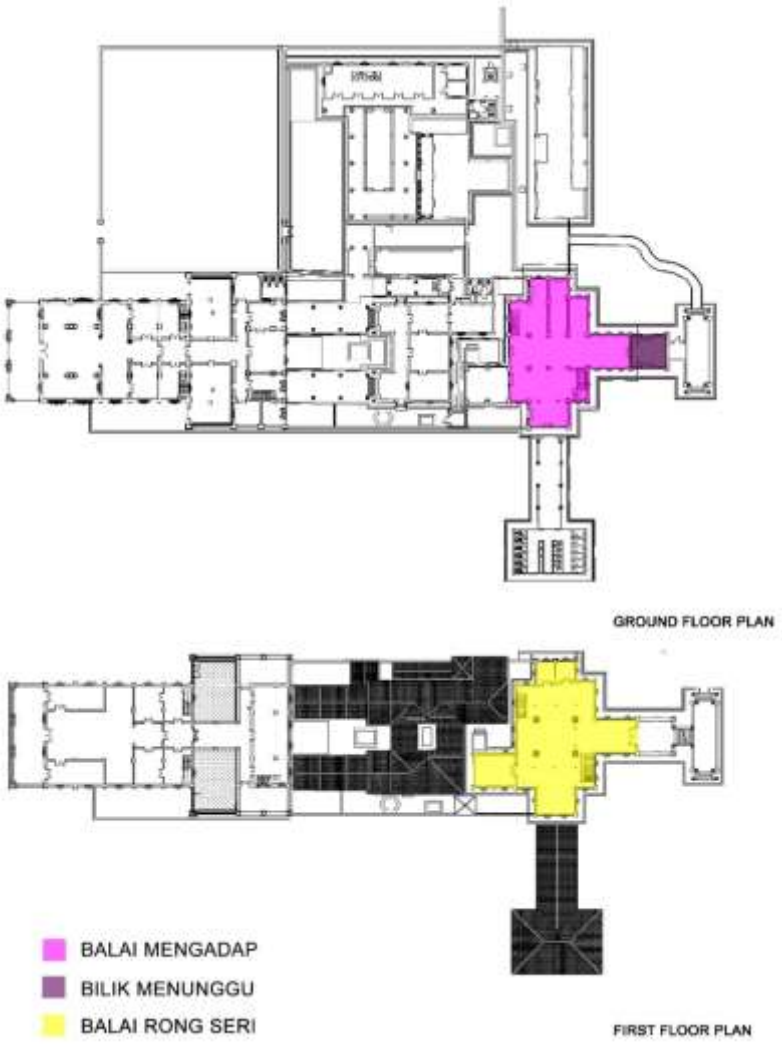


Plate 5.14: Location of public spaces.

ceremonies that are usually held in this space are council holdings and granting audiences. (Location of room refer to Plate 5.13)

Plate 5.15: Waiting Room.

Plate 5.16: Assembly Hall.

Plate 5.17: Throne Room.

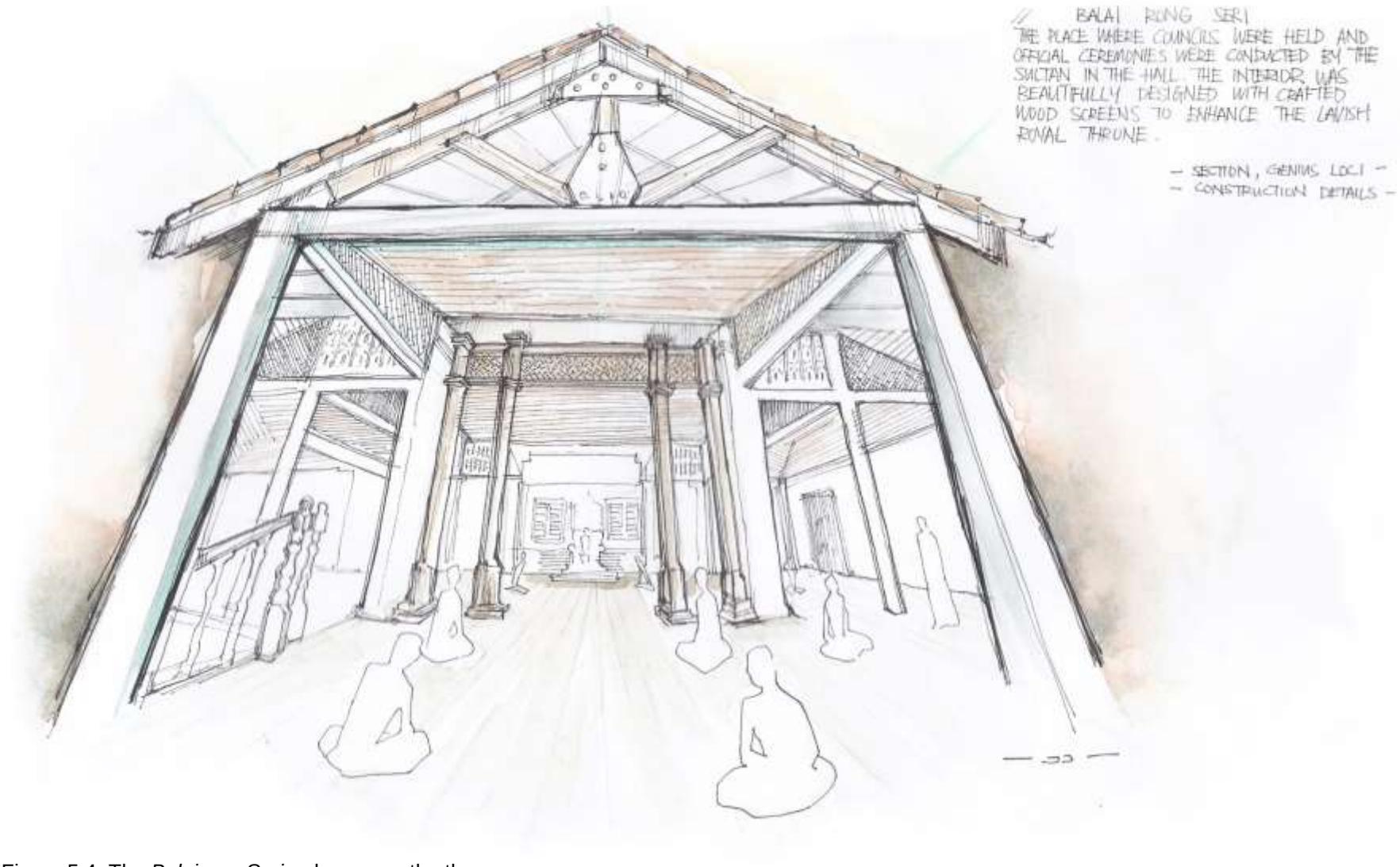


Figure 5.4: The *Balairong Seri* or known as the throne room.

5.3 The Relationship between Everyday Living and the Architecture of the Building

5.3.1 Social Hierarchy in the Istana

The social hierarchy in the Istana is divided into 4 ranks. The highest ranks are the Royal Families, subsequently the Royal Officials, the Royal Servants and lastly the commoners, (Plate 5.18). This however effects the spatial hierarchy of the building and has created a division of spaces in the *Istana*, mainly public, semi-private and private. Examples are the public wing I s where the Sultan interacts with the commoners during special occasions or official celebrations; the semi-private wings are where the Royal Families and the Royal officials and servants run their daily lives; and the private wing is where the Royal Families reside in.

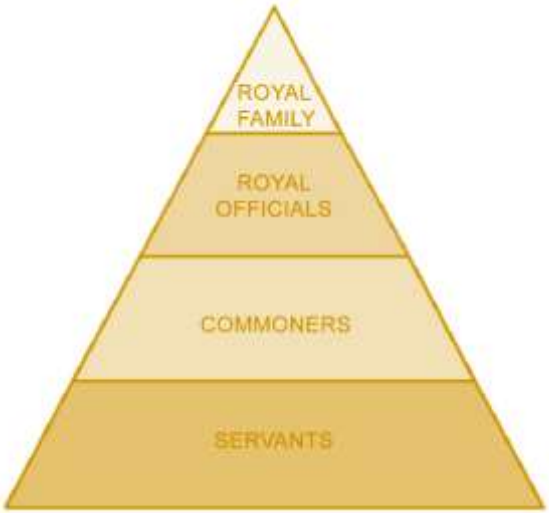


Plate 5.18: Social Hierarchy Pyramid.

Plate 5.19: Example of Granting Ceremony. *(Flickr.com)*

5.3.2 Daily Activities in the Istana

The Sultan often meets the commoners seeking for his consultancy in the *Balai Rong Seri*. This is also a place to held official ceremonies. The *Istana* is also functions as an office for the Sultan. He conducts all his official meetings in the *Istana*. As for the Royal Families, the just run about their daily lives in the *Istana*. According to an interview with *Pak Cik* Anuar (a local in

Kampung Bandar), he recently met the son of Sultan Sulaiman named Raja Mahmud who was borned in Kampung Bandar. He mentioned that some activities played by children back in the day such as *gasing*, kites and *gayau*; which are all traditional Malay games. *Gayau* is a game where the *Gayau* fruit will be arranged on a flat land, then from behind a person would have to shoot another *Gayau* fruit by kicking it. If it hits the front part of the *Gayau* then that person would have a high score. This game was commonly played in the west coast of Malaysia and is now a vanishing tradition (A. Ishak, personal communication, Jamuary 20, 2015).

5.3.3 Activities Relating to Entertainment, Religion & Culture

Kampung Bandar was once known as *Bandar Temasya* meaning having fun because during that time, there were lots of activities there such as traditional dances and games which were held in front the Istana. According to *Pak Cik* Anuar, long time ago there was a "U" shaped lake that has a stage placed in the middle, but unfortunately the now the lake id dried up and filled with layers of soil (A. Ishak, personal communication, January 20, 2015).

Plate 5.20: *Gasing* a Malay Traditional game.

(PHENG et al.)

Plate 5.21: Wau (kites) a malay traditional game.

(PHENG et al.)

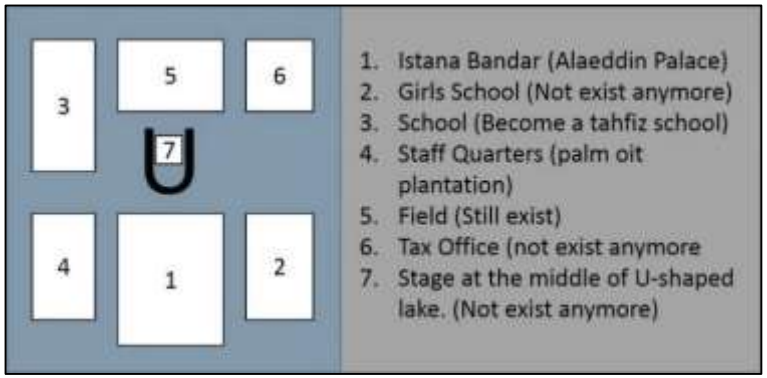


Plate 5.22: Site Orientation.

One of the activities back in the days is a tradition *Tarian Dabus*. According to an interview with Raja Sulong bin Raja Salleh (Royal Grave's Guard), he was one of the main dancers and usually performed in palace ceremonies and wedding ceremonies. This dance is believed to conjure the spirits and due to the extreme fanatical obsession of the dancers to the extend where they would injure themselves and hurt their bodies by cutting themselves using an *Anak Dabus*. Unfortunately, The Sultan was in contradiction of this tradition as it was against religious rule and has banned this entertainment (R. Sulong, personal communication, January 23, 2015).

Pak Cik Anuar also mentioned that The *Istana* was the centre for breaking the fast during Ramadhan month (fasting month for Muslims) back in the day. A cannon will be fired to indicate the time for *iftar* (breakfast). Food from the *Istana* was brought to the Mosque and the villagers will gather around and have *iftar* together.

Plate 5.23: *Tarian Dabus*. (profile)

Plate 5.24*: Anak Dabus*. (Dancemalaysia.com)

5.3.4 Cultural Beliefs

There is a so called “Death Door” in the Istana that leads into the Royal Kitchen Area. On the front of the gate, there is a craved ornamentation of a crescent moon and star which is the symbol of Islam and also a numerical ornament “1914” which marks the completion year of the construction of the Istana.

On the back of the gate, there are also *Jawi* word inscriptions:

‘Signature of the Sultan’

‘*Ingat- ingat*’

‘-- *Jalan Kecelaan* --‘

Those words are a reminder to the people to be aware of theirs actions. *‘Ingat- ingat, jalan kecelaan’* was said to be taken from a guide book for the children written by the Sultan himself. Thus, every time the students leave the Istana they will go through the door as a reminder to behave and to be proper (A. Ishak, personal communication, January 20, 2015).

The ‘Death Door’ is also believed to be for prisoners to walk through upon sentenced by the Sultan.

Plate 5.25: Numerical ornament.

Plate 5.26: *Jawi* word inscriptions.

Plate 5.27: Entrance of the 'Death Door'.

Figure 5.5: Walking through the death door.

5.3.5 Culture of Inheritance

Sultan Alaeddin Sulaiman Shah has also written some books during his free time. During his time, there was a special book produced as a guide for boys and girls to tell them about things to do and don't (A. Ishak, personal communication, January 20, 2015). There are also other books that can be seen at the Jugra Museum.

Istana Bandar displays how the culture and background of people and the site can be represented by the building. It also shows how the people respect and follow their ruler, Sultan Alaeddin Sulaiman Shah. *Istana Bandar* also provides different usage during its time. In the past, during Sultan Alaeddin's reign, this building became the centre of traditional events and activity in *Selangor*. After renovation this building offered services to younger generations to deepen their knowledge about Qur'an. Today *Istana Bandar* has become a living museum and one of the destinations to study different architecture style developed in Malaysia.

Plate 5.28: Books found in Museum Insitu Jugra.

Plate 5.29: Books found in Museum Insitu Jugra II.

6.0 Building Components of Istana Bandar

Istana Bandar consist of diverse influence of Architectural styles. Although the *Istana* has been undergo several renovation and restoration, its distinctive original design still remains. Most of them are originated from different architecture style such as Chinese, Colonial, Malay, Mogul and Moorish Architecture. All of the elements are significant and are of at great value to the Istana.

6.1 Window

The windows in *Istana Bandar* have different heights and width depending upon the functionality of the space. In terms of the window mechanism, the most common type of window used in *Istana Bandar* is the double shutter casement window, operated by using hinges. However, fixed light window and fixed louvered window is also used.

The casement windows can be differentiated into different types by the type of vent designs, ornamental designs and design of the frame itself. Based on these features, the casement windows can be differentiated into 5 different types

a) Double shutter casement window
b) Double shutter casement window with louver
c) Double shutter casement window with lattice
d) Double shutter casement window with glass
e) Double shutter casement window with pointed trefoil fixed glass

The casement windows in *Istana Bandar* are attached to its frame by using of hinges at the side of the window. All the windows are made from timber except the fixed light window. In addition to this, all most all the windows comprise of slender steel bars behind the shutters for protection.

6.1.1 Double shutter casement window

Istana Bandar consists of double shutter casement windows with various panel and ornamental details. The different panel and ornamental detail helps to determine the architectural style it reflects. Moreover, the panel details of the windows also respond to the functionality of the spaces used. For instance, double shutter casement window with glass is used to provide light into spaces whereas; windows with louvered panels are used in spaces where heat minimization is required.

WINDOW 1

This is a fully timbered double shutter casement window decorated with a bottom cornice which is initiated from a western influence, Georgian architecture. It is a general characteristic of Georgian architecture consist of cornices embellish with decorative mouldings as such.

WINDOW 2

A simple type of double shutter casement window with no ornamental designs or decorative elements. Some of the windows are fixed with inside locks for security reasons. These types of windows are observed in interior spaces of the building.

Plate 6.1: WINDOW 1.

Plate 6.2: WINDOW 2 type 1.

Plate 6.3: WINDOW 2 type 2.

6.1.2 Double shutter casement window with louver

Double shutter casement window with louver is used spaces where maximum ventilation is required. Most of these types of windows can provide minimum ventilation through the louvers even though the windows are shut.

WINDOW 3

This is a type of jalousie window with some western influence designed to provide maximum ventilation. No ornamental designs or decorative elements are observed other than balustrade design underneath the window which is seen on the exterior side.

WINDOW 4

A double shutter casement window with louvered head and a Moorish influenced lattice design on the window panel. The louvered head can offer some quantity of ventilation even though the windows are shut.

Plate 6.4: Exterior view of WINDOW 3.

Plate 6.5: Interior view of WINDOW 3.

Plate 6.6: Moorish window with Latticed Panels. (Moroccan Woodwork. (n.d.).)

Plate 6.7: WINDOW 4.

WINDOW 5

Window consists of adjustable louvers that can provide ventilation even though the windows are closed. The window comprise of a mogul influenced window frame with an onion dome and minarets. The vertical lengths of these windows. Therefore, a balustrade railing is used as a balcony in the interior for protection.

Plate 6.8: Interior view of WINDOW 5.

Plate 6.9: Exterior view of WINDOW 5.

6.1.3 Double shutter casement window with lattice

A double shutter casement window with lattice can provide ventilation through the lattice despite the windows being closed. The lattice and the louvered casement windows can both provide ventilation; however dissimilarities are observed in the design. A casement window with lattice cannot keep out the rain water like the louvered window.

WINDOW 6

This window consists of a Moorish designed window lattice that can provide ventilation whereas; the window panel demonstrates a western influence. It also has decoratively designed ornaments both above and beneath the window. Double shutter casement windows with similar lattice are often seen on Islamic mosque's influencing Islamic architecture.

WINDOW 7

This is a simpler casement window with lattice with ornamental designs on the four corner of the window panel seen on the exterior. The interior side of the window is fitted with steel bars for protection.

Plate 6.10: WINDOW 6.

Plate 6.11: WINDOW 7.

Plate 6.12: A similar doblue shutter casement window with lattice at Mohamed Ali mosque, cairo. (Aestheticsjr. (n.d.).)

6.1.4 Double shutter casement windows with glass

These types of windows can provide natural light to the interior spaces. It is can also offer protection from heat and rain. Different types of ornamental designs are seen as the window frames and walls which contribute to the different architectural influences.

WINDOW 8

The widest window observed in the *Istana*. It consists of a western influential window frame with glass lattice above. Furthermore, western architraves and a mogul minaret shaped arch also used as an ornamental design in this window.

WINDOW 9

This is a window with lattice window panels and a glass head. It is influenced from the lattice window frames used in Mogul architecture. The lattice window panels can offer protection and is also fitted with inside locks.

Plate 6.13: WINDOW 8.

Plate 6.14: WINDOW 9.

WINDOW 10

This is a western influenced double shutter casement window with three glass panels on top. The window also contains a decoratively designed ornament on the exterior of the window.

WINDOW 11

This window is influenced from both mogul and western architecture. The minaret present is an example of mogul influence. The glass head provides natural light for the interior.

Plate 6.15: WINDOW 10.

Plate 6.16: WINDOW 11.

6.1.5 Double shutter casement windows with pointed trefoil fixed glass

WINDOW 12

The pattern of the trefoil fixed glass enables more light to enter the interior space and is an influence from Mogul architecture.

Plate 6.17: WIINDOW 12.

6.1.6 Fixed glass window

Fixed glass windows can offer natural light even though it is incapable of ventilating air. Therefore, it is mostly used in spaces where air ventilation is not highly required. Since fixed glass windows are fixed, there are no mechanical parts and it can offer protection from rain.

WINDOW 13

This is a fixed glass window seen on the roof lantern of *Istana Bandar*. The window itself does not contain any ornamental designs. However, the roof is observed to be creatively decorated with ornamentals. This window is only used to direct natural light into Sultan's bedroom offering a more pleasing atmosphere.

6.1.7 Louvered windows

These types of windows can offer ventilation, and allow some light to enter the interior spaces.

WINDOW 14

Fixed louvered windows are seen on the Pagoda like roof in *Istana Bandar*, which is derived from Chinese influence. It can offer protection from rain and also provide natural light and some ventilation.

Plate 6.18: WINDOW 13.

Plate 6.19: WINDOW 14.

Figure 6.1: Jalousie window (Window 3) and double shutter casement windows with pointed trefoil fixed glass (Window 12).

6.2 Door

Istana Bandar mainly consists of two types of doors which are single hinged and double hinged doors. The features such as the height and the mechanism of the doors are occasionally reflected by the hierarchy and the functionality of the space. There are more than 40 doors found in *Istana Bandar*.

6.2.1 Single hinged doors

Single hinged door has one swing which allows entry to another space. Single hinged doors found in *Istana Bandar* are made from timber and most of these types of doors allow entry to relatively smaller spaces.

DOOR 1

This is a single hinged door with Georgian style panels and layered trim boards. The simplicity of this door, compared to other types of doors found in *Istana Bandar* demonstrates the small and simple space that it leads to.

DOOR 2

A single hinged door with 2 panels on the door swing which allows entry to the toilet.

Plate 6.20: DOOR 1.

Plate 6.21: DOOR 2.

DOOR 3

A single hinged door consisting of a top rail, lock rail and a bottom rail. Similar to other single hinged doors, this door also allows access to a smaller, more confined space which is the electrical room.

DOOR 4

This is a similar type of door as Door 3. However, it is smaller in terms of height and it is used as an alternative entrance to *Istana Bandar* through the rear side of the building.

6.2.2 Double hinged doors

Timber framed doors with hinges alongside its frame allowing the door to have two swings. It consists of a single rebated jamb which allows the door to be swung in only one direction.

There are different types of double hinged doors in *Istana Bandar*, with dissimilar sizes, design ornaments, and window types which are above the door.

Double hinged doors can be classified into the following categories.

Plate 6.22: DOOR 3.

Plate 6.23: DOOR 4.

a) Double hinged doors
b) Double hinged doors
c) Double hinged doors with architraves
d) Double hinged doors with fan light window
e) Double hinged doors with jalousie window
f) Double hinged door with fixed window
g) Double hinged door with pointed trefoil arch
h) Arched top braced door

DOOR 5

This is a double hinged door with a total of 4 door panels in which the top two is longer than the bottom two. Furthermore, well designed mouldings are observed on the panels of the door. It is important to note that the door lintel and the pilaster are seen to extend or stretch out of the wall.

DOOR 6

This door contains 4 panels of equal size with no mouldings. The overall design of this door is relatively simple and unlike door 7, door 8 stretches inwards against the wall.

6.2.3 Double hinged doors with architraves

There are a group of doors with different types of architraves, whereas most of the, are plain architraves, whereas most of the, are plain architraves. However, some decorated; architraves are see in some of the doors, leading to spaces with greater hierarchy.

Plate 6.24: DOOR 5.

Plate 6.25: DOOR 6.

DOOR 7

This is a largest door seen on *Istana Bandar*. It is to reflect the hierarchy of the space that it leads to, as it is the entrance to the *Balai Menghadap*. It contains a total of 12 panels of various sizes with six architraves surrounding it.

DOOR 8

This is a double hinged door with a plain architrave. Based upon the panels present in the door, it seems to be influenced from the Georgian style.

DOOR 9

This is a western influenced door with plain architraves and 6 panels of various sizes. Other than the decorative mouldings in the panels, no other prominent features are seen.

DOOR 10

This type of door contains 6 panels of different sizes decorated with mouldings and two pilasters, decorated as columns with two crowns on top. The decoration of the panels and use of pilasters as columns strictly demonstrates the western influence.

Plate 6.26: DOOR 7.

Plate 6.27: DOOR 8.

Plate 6.28: DOOR 9.

Plate 6.29: DOOR 10.

6.2.4 Double hinged doors with fan light window

Double hinged doors with fan light window are mostly used in semi-public spaces. These types of doors are used mainly in the interior spaces. Therefore the fanlight window plays an essential role in the penetration of light into the interior space. These types of doors are an influence from the Georgian style doors.

DOOR 11

This door has a total of 6 panels in which the top 2 panels have semi-circular shaped mouldings on top. It is observed to have decorated arch style pilasters.

DOOR 12

This door contains 6 rectangular panels with mouldings. The fan light window above the door penetrates sunlight into the interior space.

DOOR 13

This is a similar arch style door to door 11 with a similar type of fan light windows. However, this type of door contains a total of four panels with mouldings

Plate 6.30: DOOR 11.

Plate 6.31: Georgian front door that has a similar type of arch style door with fan window. (Old Doors of Chester. (n.d.).)

DOOR 14

This is also an arch style door with fan light windows above for light penetration. This door comes with pairs of rectangular panels of same size both above and below the door.

Plate 6.32: DOOR 12.

Plate 6.33: DOOR 13.

Plate 6.34: DOOR 14.

6.2.5 Double Hinged Doors with Jalousie Window

All most all double hinged doors with jalousie windows are seen in exterior spaces due to the fact that, the presence of jalousie windows above the doors, provides sufficient ventilation to the interior space and prevents rainwater from entering.

DOOR 15

This door contains 4 panels in which the mouldings of the top two panels are shaped in an arch style. A transom bar is seen which separates the door with the louvered windows above. The louvered windows, provides ventilation, allows the light to enter and prevents rainwater from entering into the interior space.

DOOR 16

This door consists of 4 rectangular panels of equal size with a jalousie window on top.

Plate 6.35: Exterior view of DOOR 15.

Plate 6.36: Interior view of DOOR 15.

Plate 6.37: Exterior view of DOOR 16.

Plate 6.38: Interior view of DOOR 16.

DOOR 17

Door contains 4 panels in which the bottom 2 panels are of a higher length than the top two. Transom bar separates the door with the jalousie windows. Jalousie window in this type of door is used for ventilation purpose, since it is located in the interior space.

DOOR 18

This type of door has 6 panels of various sizes. The transom acts as a barrier between the door and the louvers.

6.2.6 Double hinged door with fixed window

Some of the doors leading to the interior spaces are fitted with fixed windows to allow natural light into the interior space. This window also protects the interior space from heat and rain.

DOOR 19

This door has 4 similar shaped panels of equal size with 2 window strips fitted above the door head for light penetration.

Plate 6.39: Exterior view of DOOR 16.

Plate 6.40: Interior view of DOOR 17.

Plate 6.41: DOOR 18.

Plate 6.42: DOOR 19.

DOOR 20

This door has six panels fitted with windows that allow light to enter into the interior space. Well decorated pilasters with mouldings are also observed in this door.

DOOR 21

This door has 6 panels with a fitted window for light penetration. Apart from this, pilasters with a cornice in the entablature are seen with two ornaments.

DOOR 22

This is a type of door similar to the Door 21 although this door is seen to have a wider window fitted with a different patterned ornament above the door.

DOOR 23

This door has 4 equal panels with no mouldings and 6 window strips added above. This door is seen on the interior space.

Plate 6.43: DOOR 20.

Plate 6:44: DOOR 21.

Plate 6.45: DOOR 22.

Plate 6.46: DOOR 23.

6.2.7 Double hinged door with pointes trefoil arch

DOOR 24

This door is highly similar to the double hinged door with window. But one interesting factor about this door is that it has a pointed trefoil arch on top off the door head. The door is seen to have 4 panels in which the moulding of the first two panels resembles the shape of an arch.

DOOR 25

This is an arched top braced door with similar pointed patterns on top of the architrave. This door can be locked by a wooden timber piece which can be seen from the interior.

Plate 6.47: Exterior view of DOOR 24.

Plate 6.48: Interior view of DOOR 24.

Plate 6.49: Exterior view of DOOR 25.

Plate 6.50: Interior view of DOOR 26.

6.3 Column

Column is a vertical structural member used to support the weight of building other than using a solid wall. Unlike solid wall, it allows light penetration to the interior giving a brighter ambience. Sometimes, column can also become part of the building decorative elements.

Each order is formed by the base at the bottom; the shaft at the middle connects with the column and the capital on top. The capital is usually carved in natural form such as leaf and articulated with the entablature. The entablature consists of three parts, namely the architrave, frieze and cornice.

Columns found in *Istana Bandar* are influenced by Greek and Roman architecture.

Column first appeared in the Greek architecture. There are three main types of column in Greek architecture, namely Doric, Ionic and Corinthian.

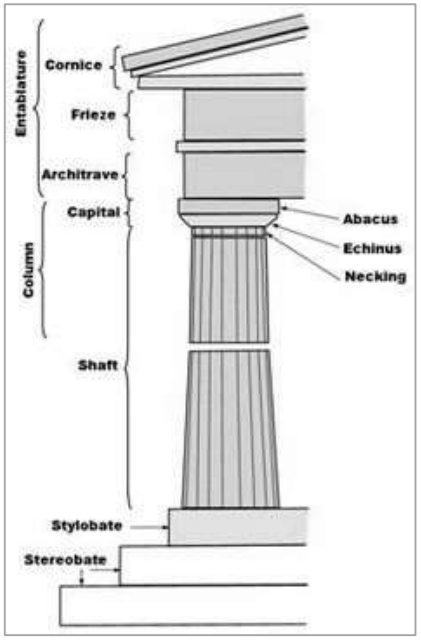


Plate 6.51: Column detail. (Columns. n.d.)

6.3.1 Doric Column

Greek Doric column is the simplest column. It is an unadorned design with a plain block or disk capital; there are no base and rests on the platform.

6.3.2 Ionic Column

Greek Ionic column is more complex than Doric column, consisting spiral volutes on the capital and a slender shaft. Composite column which also found in Roman architecture is a combination of Roman style column and Greek Ionic and Corinthian column.

6.3.3 Corinthian Column

Greek Corinthian column is the most detailed column. The capital of the Corinthian is ornate and curves upward in a reverse, bell-shaped form. It typically consists of acanthus leaf, floral or foliage carvings with multilayer base. Most of the columns found in *Istana Bandar* are Greek Corinthian Column.

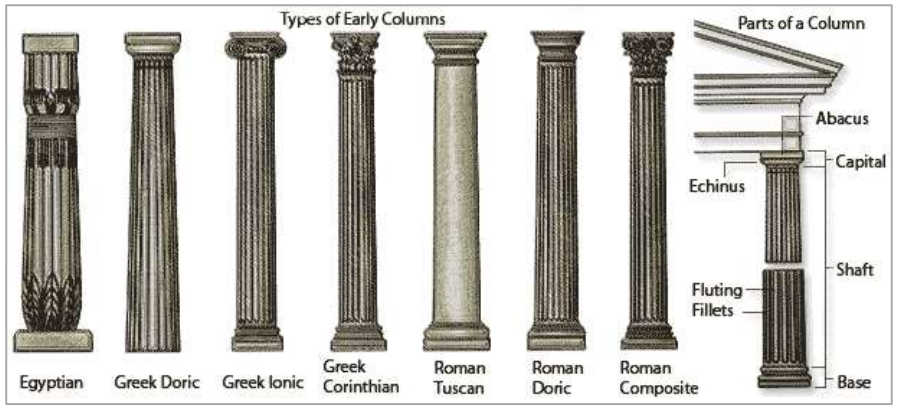


Plate 6.52: Different type of column. (Cartwright. M. 2012.)

Plate 6.53: Corinthian column in *Istana Bandar*.

6.3.4 Tuscan Column

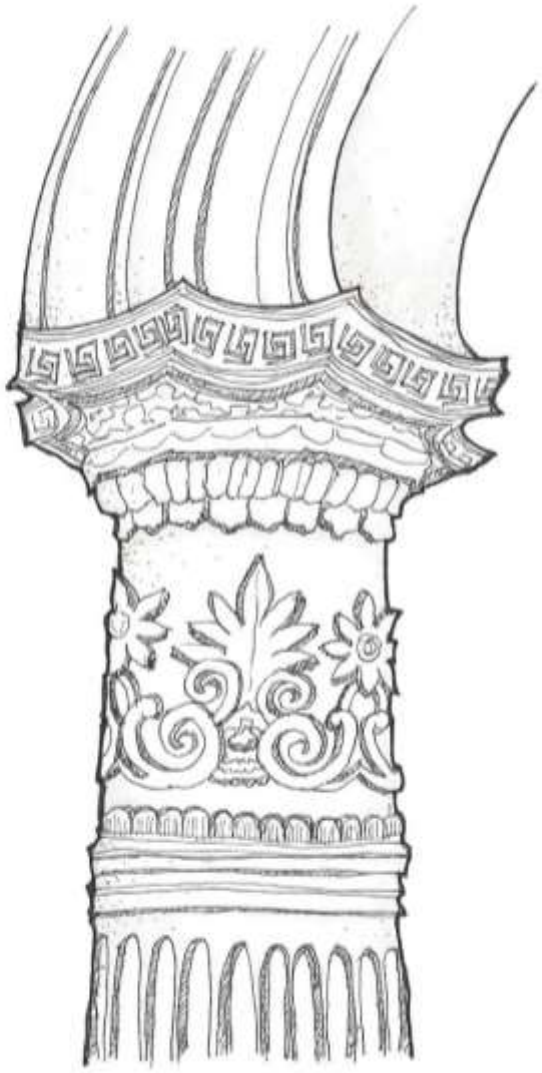
Tuscan column which found in Roman architecture is similar to the Greek Doric Column. Both columns are simple and plain at capital. However, Tuscan column was a simplified version with base, unfluted shaft and simply moulded capital. Tuscan columns are widely applied in *Istana Bandar* with different height and diameter.

6.3.5 Columns with arc

Columns work together with other structure such as arches to distribute the building loads evenly and transfer it to the ground. From the site, we can also find arch on the top of the columns. The arch helps to distribute the force of the ceiling from the first floor to the both columns.

Plate 6.54: Tuscan Column in Istana Bandar.

Plate 6.55: Columns with arc in Istana Bandar.



DECORATIVE COLUMNS WERE INCORPORATED IN THE PALACE.
THIS WAS DUE TO THE PAST INFLUENCE OF BRITISH ARCHITECTURE
DURING THE COLONIAL PERIOD OF GREAT BRITAIN IN MALAYSIA.
-CULTURAL ATTRIBUTES.

Figure 6.2: Columns with arch.

6.4 Staircase

There are two different types of staircase found in *Istana Bandar*; double dog leg staircase and *chengal* wood staircase. Double dog leg staircase was found at the external whereas *chengal* wood staircase was used in the interior. The double dog leg staircase was used to connect the external pathway with the entrance of the *Istana*. At the same time, it can also show the grandeur of the palace.

The internal staircase of *Istana Bandar* is designed with *chengal* wood and concrete landing. From the *chengal* wood staircase, we find that the height of the riser is higher than usual stairs. Concrete landing is used to prevent destruction of the *chengal* wood staircase if flood happened. Other than that, balustrade is applied onto the handrail of staircase to enhance traditional Malay architecture of *Istana Bandar*.

Plate 6.56: Double dog leg staircase at the front entrance.

Plate 6.57: *Cengal* wood staircase with concrete landing.

6.5 Courtyards

It is an unroofed area enclosed by walls and small buildings. *Istana Bandar* consists of two courtyards which is the centre courtyard and the back courtyard. The back courtyard connects with the garden while the centre courtyard consists of two walkways connecting to the building.

Courtyards were an architectural development of Malaysia which was influenced by a style called Straits Eclectic that instigated from 15th to 20th century. During this development many of the houses became a series of rooms with courtyards.

The two courtyards in *Istana Bandar* serve a different and distinct service or purpose although both the function of both the courtyards reflects the strong Islamic belief on how privacy should be assured to women and the two genders. The centre courtyard was used to separate the male and female bedrooms providing privacy while the back courtyard was utilized by ladies to spend their time without being observed.

Plate 6.58: Center Courtyard.

Plate 6.59: Back Courtyard.

6.6 Pool

There are three types of pools found in *Istana Bandar*. The pool with ornamental design was used as a bath for the royal male while the second pool is used as a bath for the royal ladies. The third pool demonstrates the strong religious belief of the sultan as it is used to take *wudhu* during that time. (It is a ritual washing performed in Islam in preparation for prayer and worship)

This element was an influence from Moorish architectural style, which uses pool in an unroofed area surrounded by walls, mostly for aesthetic and hierarchical purposes. It was built for Muslim Emir's (which literally means commander, general or prince) during the time Moorish architecture flourished.

Plate 6.60: Male Royal Bath.

Plate 6.61: Female Royal Bath.

Plate 6.62: Myrtles of the Palacios Nazaries, Alhambra is an Example of a Moorish architectural design with a pond, within an unroofed space. (Photos of the Alhambra Palace in Granada - Images | Photos Gallery. (n.d).)

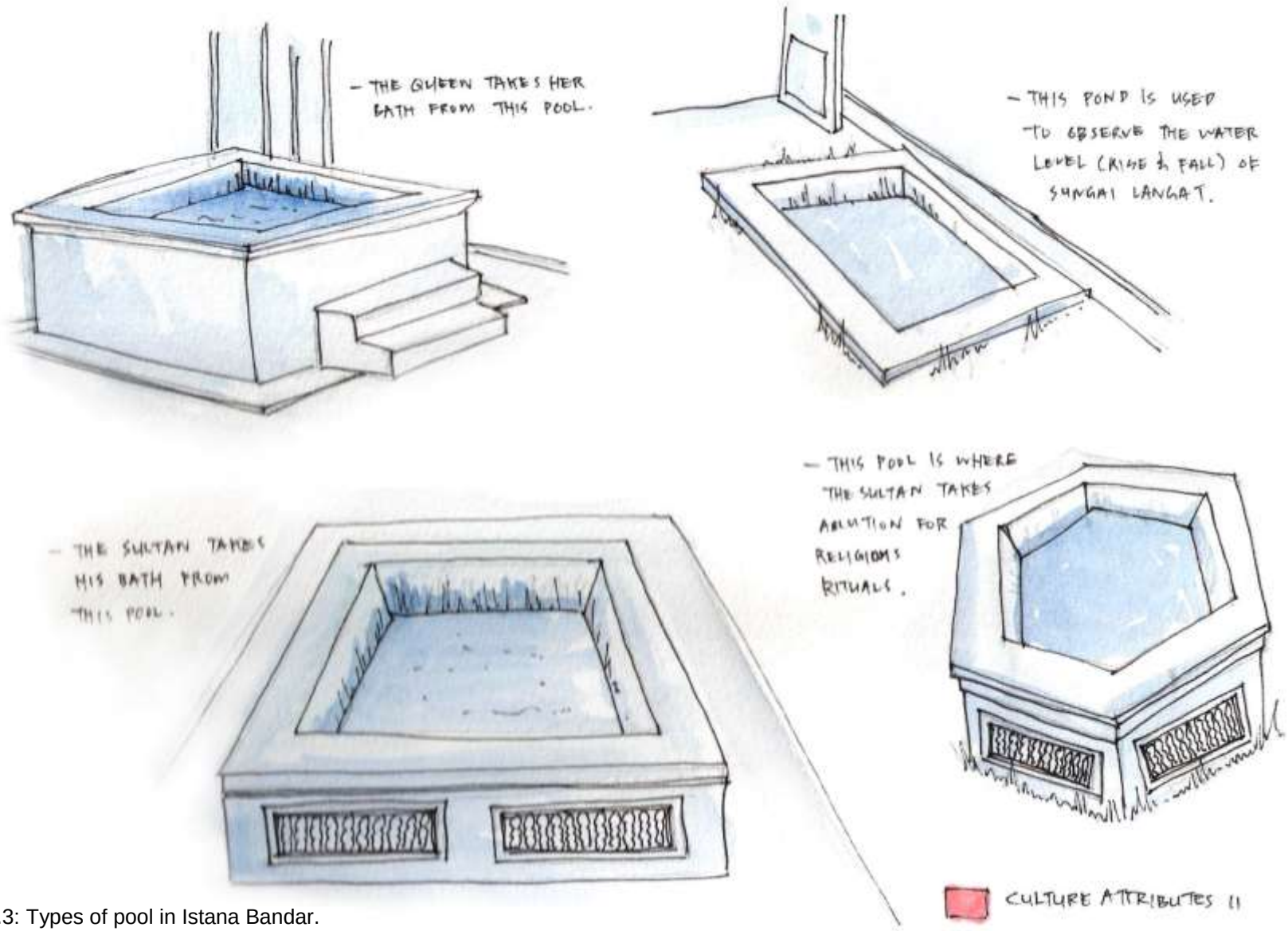


Figure 6.3: Types of pool in Istana Bandar.

6.7 Roof

Roof of *Istana Bandar* is made from terracotta u shaped tiles giving the roof a pleasant texture and is a good insulator of heat and minimize heat gain.

The roof has a mixture of influences from western, Chinese and Malay architecture with influences of Moorish ornamental designs. The building itself has several Flemish gable roofs mostly in the northern side, containing pagoda like roof lanterns in one roof.

The other type of roof used is *Bumbung Limas* (Plate 6.76) which is a Java influence originated from Chinese architecture.

The style of the roof in Istana Bandar is very well related to its atmosphere and climate. The steep roof pitch provides protection from the glazing afternoon sun and acts as good water drainage.

It is important to note roofs have heights are different depending upon the hierarchy of the spaces.

Plate 6.63: Top View of Terracotta Roof at *Istana. Bandar*.

Plate 6.64: Terracotta Roof of *Istana Bandar*.

Plate 6.65: *Bumbung Limas* (Jenis-jenis rumah: Rumah Limas Johor. (n.d.).)

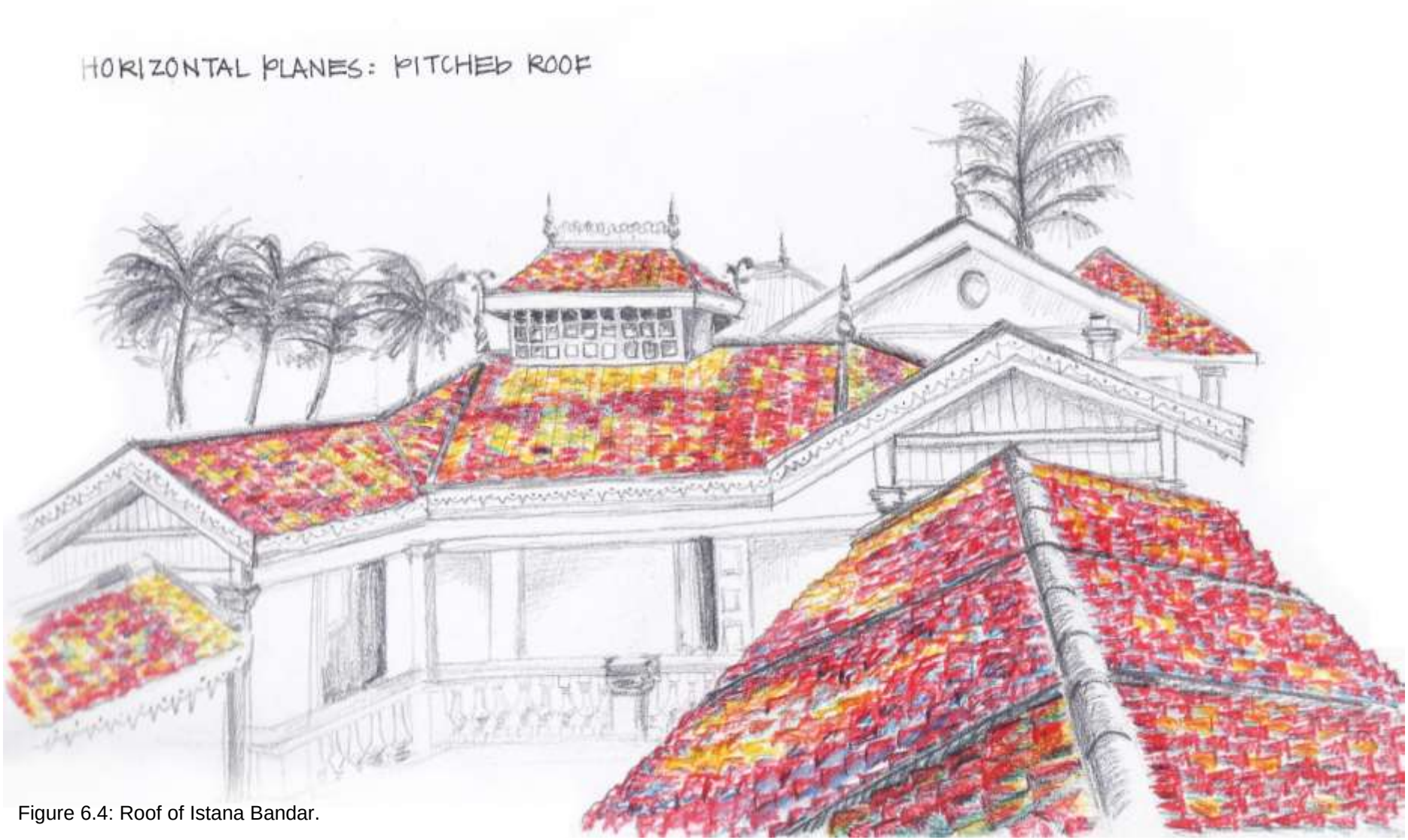


Figure 6.4: Roof of Istana Bandar.

6.8 Roof Lanterns

The roof lantern is a mixture of the Chinese pagoda roof and the western roof lantern. It is used to direct light into the Sultan's bedroom through the rooftop furnishing a pleasing atmosphere. The use of a single roof lantern and its elevation points out the hierarchical importance of the space. The façade of the overhanging eaves on the roofs comprise of Moorish influential ornamental designs.

Plate 6.66: Western roof lantern. (Warehouse Roof Lanterns. (n.d.).

Plate 6.68: Roof Lantern in Istana Bandar.

Plate 6.67: Chinese pagoda roof. (Grottoes. (n.d).)

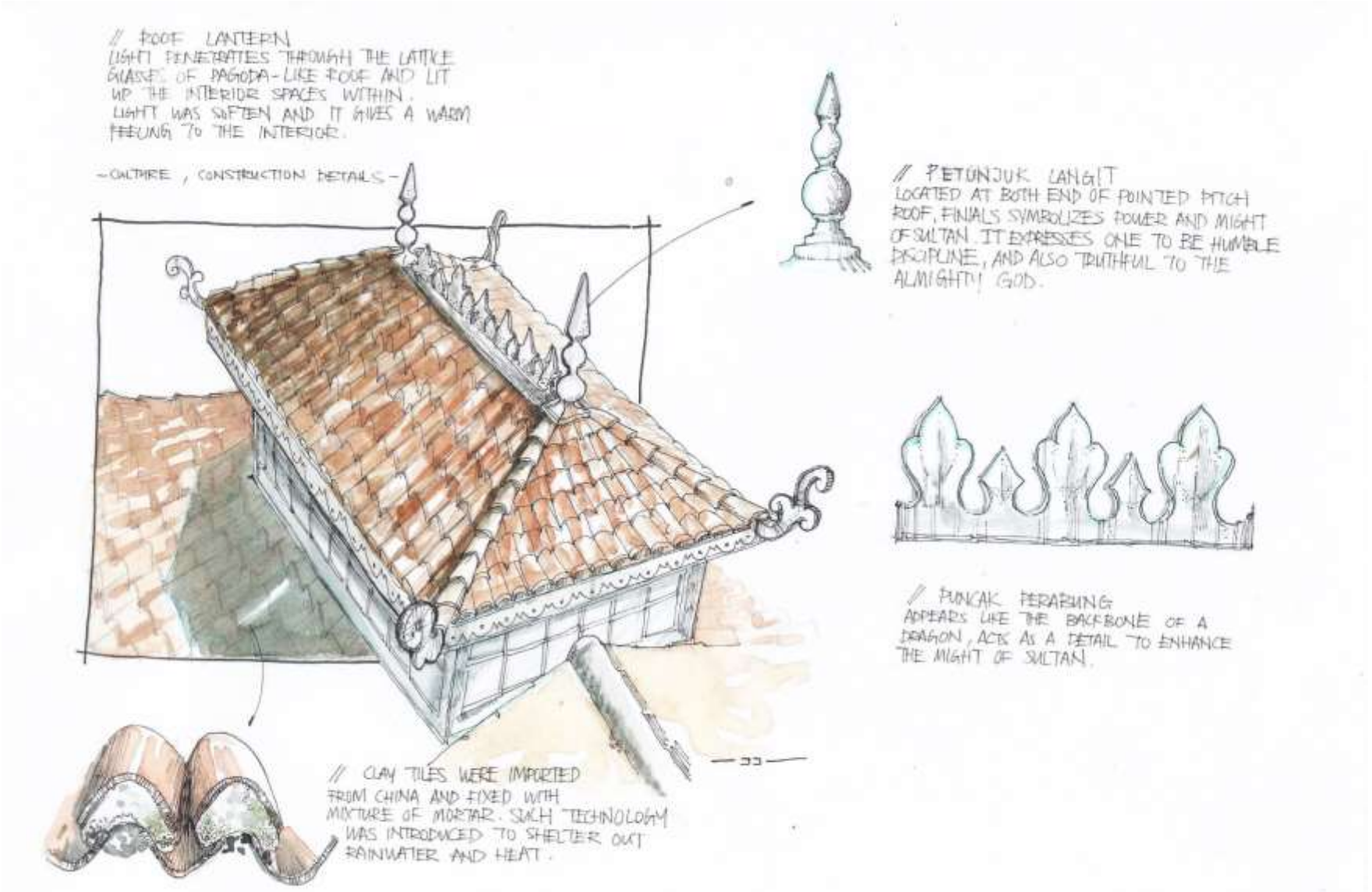


Figure 6.5: Roof of Istana Bandar.

6.9 Ornaments

Ornament acts as an important role at *Istana Bandar*. It brings out different style of architecture especially at the exterior of palace. Ornament is not merely serves as an aesthetic but also a symbolic of the *Istana*.

6.9.1 Balustrade

Porcelain balustrade is used to support the handrail which found at the veranda of *Istana Bandar*. It is influenced by Chinese architecture. Porcelain balustrade functions as a screen between the exterior and the interior. At the same time, it can also improve the outlook of the handrail.

In addition, there are Islamic balustrades found at the handrail of the veranda. It serves the same function as porcelain balustrade.

Plate 6.69: Porcelain Balustrade.

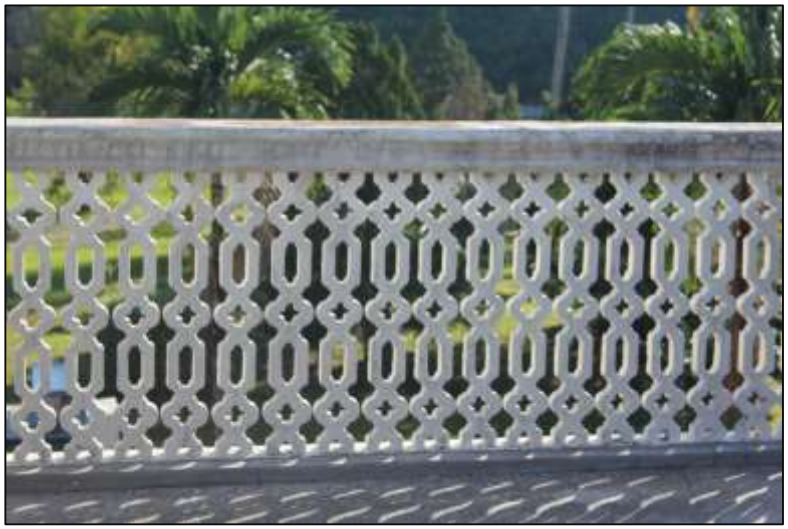


Plate 6.70: Islamic Balustrade.

6.9.2 Ventilation Blocks

Chinese ventilation block is applied on the top of the door and the handrail of the corridor. It offers better air ventilation and light penetration into the interior meanwhile maintaining the privacy of the *Istana*. In *Istana Bandar*, we are also able to identify Islamic ventilation block. i

Plate 6.71: Chinese ventilation block outside the room.

Plate 6.72: Chinese Ventilation Block at Veranda.

Plate 6.73: Islamic ventilation block from outside of the room.

6.9.3 Crenelated Arches

Crenelated arch is the feature of Moorish architecture. It represents the power of Sultan. It mostly can find at the façade of *Istana Bandar*.

Plate 6.74: Crenelated Arch.

6.9.4 Ogee Arches

Ogee arch is an arch with a pointed apex, formed by the intersection of two S curves. It also called as sigmoid curve and found above the door. Ogee arch acted as decorative element but not used in arcade arches.

Plate 6.75: Ogee Arches.

6.10 Roof Ornaments

Malay architecture is strongly used in the ornament of roofs. Therefore, the roofs of *Istana Bandar* are adorned with trimmings of intricate wooden carvings. The wooden carvings are usually designed with floral motifs and geometric shape.

6.10.1 Tumpu Kasau

Tumpu Kasau is a type of wood carving which found at the roof eaves of *Istana Bandar*. It is arranged horizontally at the roof eave and formed an aesthetic outlook of the roof. It also allows the rain water to drain to the ground meanwhile reduce the sunlight and heat into the interior.

6.10.2 Sisik Naga

Sisik Naga is another type of wood carving which found at the ridge of the roof. It represents believe and power of dependence. At the same time, it also acts as a decorative element on the roof. *Sisik Naga* is a famous decorative element hence we are able to find it at other traditional Malay houses and palaces.

Plate 6.76: *Tumpu Kasau* with single piece wood carving, type 1.

Plate 6.77: *Tumpu Kasau* with single piece wood carving, type 2.

Plate 6.78: *Sisik Naga*.

6.10.3 Sulur Bayung

Sulur Bayung is placed at the edge of the roof. It is influenced by Chinese belief and resembles the head of mythical dragon. It also signifies strong power against the devil.

Plate 6.79: *Sulur Bayung* placed at the edge of the roof.

6.11 Details

Architectural details are usually used in building to enhance the aesthetics in a building. There are many different types of details found in the Istana that has become a significant inheritance.

6.11.1 Star detail

The star details found on the top of the column. This details belonged to colonial architecture which is the combination of western and Islamic architecture. The star not only acts as a decoration, it also representing a wish of fortune.

6.11.2 Floral detail

Floral details are widely used in Malay architecture to enhance the outlook of the column.

6.11.3 Dentil

Dentil is a small rectangular block which used in a repeating order to form the moulding of cornice. It is widely used in the Roman and Greek architecture.

Plate 6.80: Star Detail.

Plate 6.81: Floral Detail.

Plate 6.82: Dentil.

6.11.4 Archivolt

Archivolt, originating from Greek architecture, is an ornamental moulding or band following the curve on the underside of the arches. It surrounds an arched opening which corresponds to the architrave in a rectangular opening. Archivolt found in *Istana Bandar* consists of floral motif. Floral motif is the famous Malay carving.

Plate 6.83: Details on Archivolt.

Plate 6.84: The Royal Symbol.

6.11.5 The Royal Symbol

There are few carvings on the pediment which located on top of the door. The carvings are designed with the flag and the symbol of Selangor Sultan in yellow colour. These are used to symbolize the magnificent of the royal *Selangor*.

Plate 6.85: The Royal Selangor Symbol.

6.11.6 The Royal Selangor Symbol

The symbol Ornament found at the top of the front façade of *Istana Bandar* is used to emphasize the presence of Selangor Sultan and the royal.

6.11.7 Cartouche

Cartouche found at the same place with the Royal Selangor Ornament. This ornament is influenced by Colonial architecture. It not merely acts as decoration and represents the royal of *Selangor*.

Plate 6.86: Cartouche.

6.11.8 Pinnacle

Pinnacle is a decorative element which mostly found at the façade of the *Istana.* This element is influenced by the Mogul architecture. Many believe that pinnacle has a strong power. Hence, it is applied on the façade to act as a protection of the palace.

Plate 6.87: Pinnacle.

Plate 6.88: Gable Finial.

6.11.9 Gable Finial

Gable finial is found at the façade of *Istana Bandar*. It is usually positioned at the middle of the end of the other elements. It symbolizes the strength of Sultan and the magnificent of the palace. Other than that, it also acts as an aesthetic decoration to enhance the outlook of the palace.

Figure 6.6: Cartouche and Pinnacles of *Istana Bandar*.

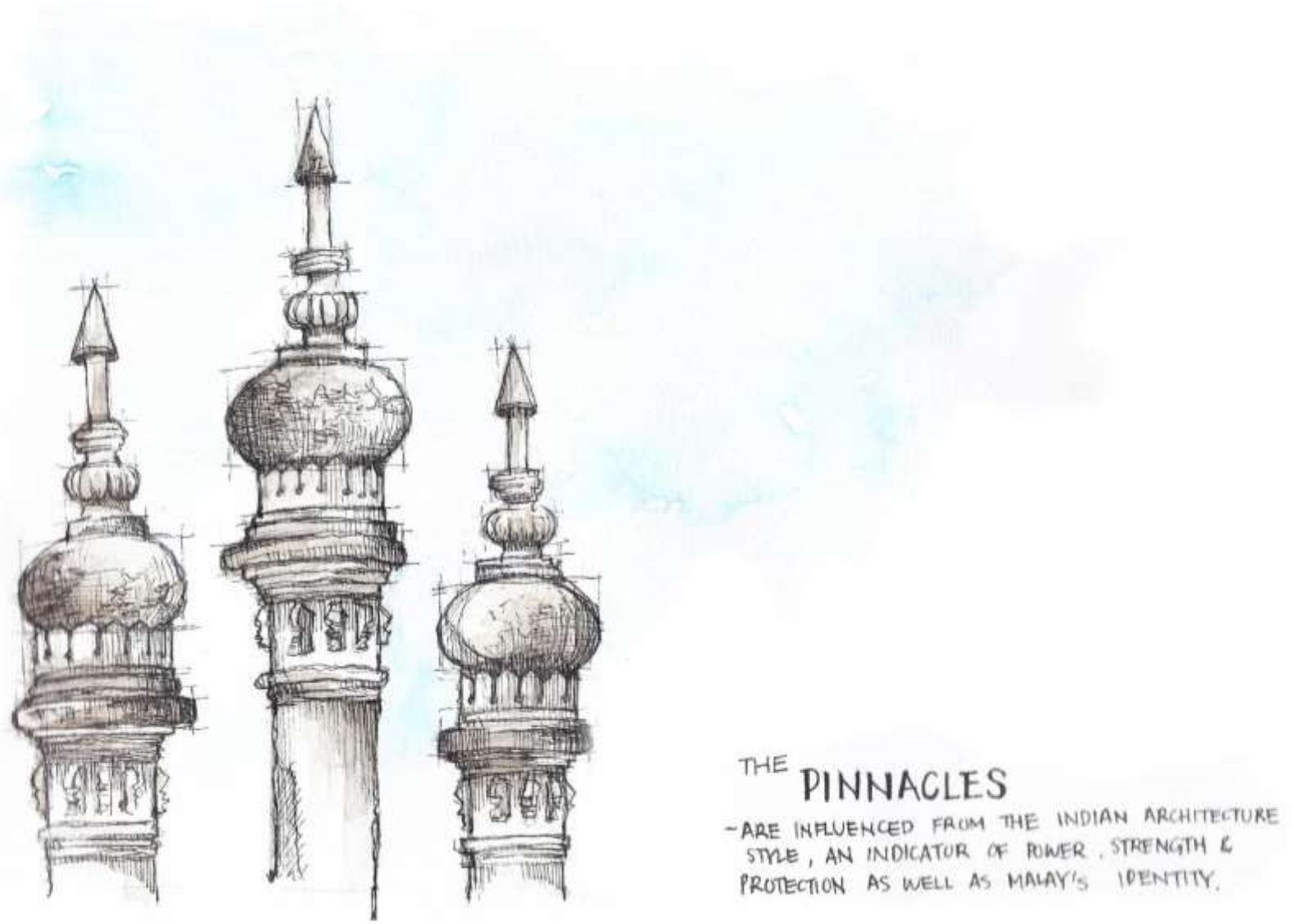


Figure 6.7: Sketch of the Pinnacles.

6.11.10 Kekisi and Kerawang

Kekisi is found at the royal bedroom, namely *bilik mengadap*. It is designed with star and floral motif. This element is used to create better ventilation for the room. *Kerawang* serves the same function as *kekisi*. However, one of the important functions of *Kerawang* is to indicate the space of *Balai Rong Seri.*

Plate 6.89: Star and Flora Motif (*Kekisi*).

Plate 6.90: Geometric Motif (*Kerawang)*.

6.11.11 Stucco

Art stucco can be found on the column. It is originated from the ancient Greek and Roman. Stucco is a mortar mixture of sand, lime and water which used for siding. It is used in the *Istana* due to its durable and weather resistant nature.

Plate 6.91: Stucco.

6.11.12 Tiang Seri

This ornament is an art stucco which influenced by the Colonial architecture. It is usually found on the column and reformed by imitating the floral motif from Malay architecture. It functions as decorative elements.

Plate 6.92: *Tiang Seri*.

7.0 Materials and Construction Technologies of Istana Bandar

7.1 Materials

7.1.1 Cengal Timber

The *Cengal* timber is classified as a heavy hardwood. The *Cengal* timber has been well known for its ability to sustain heavy load, it's resistance towards powder-post beetles, termite attack and fungal infestation (Ismail Said, 2001) which will contribute to a higher percentage of safety for consumers.

Besides that, it copes well with the weather in Malaysia which alters from the rise and fall of temperature as it does not rot easily. (Rasdi, 2005).

In *Istana Bandar, Cengal* timber is used for the decking of first floor (Plate 7.1), stairs that adjoin ground floor and first floor (Plate 7.2), ceiling and filigree timber carvings for decorations (Plate 7.3).

Plate 7.1: Column, Ceiling, Floor Decking Made Of *Cengal* Timber.

Plate 7.2: Timber stairs located at the middle block of the palace.

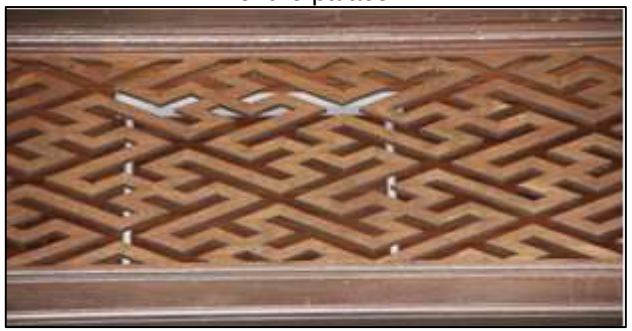


Plate 7.3: Carved Filigree.

7.1.2 Clay Bricks

Brick consists exclusively of the raw material loam or clay; it is dried and fired, ensuring healthy living because the four natural elements are united in brick. Because the raw materials used for creating bricks, clay and water, are natural products, bricks also contain no pollutants or allergens.

Bricks are resistant to noxious insects. Clay brick is durable because compressive strength and absorption values are also related to the firing temperatures.

On the other hand, the presence of moisture in the brickwork- example: rising damp- will cause the paint to peel off, which is why the hack off the plaster to draw the moisture out of the walls. (Wienerberger Ltd, n.d.).

Clay brick is used mostly in all the walls of *Istana Bandar* and covered with plaster (Plate 7.4 & Plate 7.5). When we did our measured drawings they were hacking off the plaster therefore we were able to see the clay bricks inside.

Plate 7.4: Close-Up View of clay bricks which can be seen during the restoration work being carried out.

Plate 7.5: Side entrance wall located at the left elevation.

7.1.3 Terracotta Tiles

The terracotta tiles is a clay-based ceramic which is commonly used for roof tiles. Natural clays kiln-fired at temperatures of 1100°c to produce the terracotta tiles.

This clay-based ceramic is famous for its resistance towards water and fire contributing a good shelter. Terracotta tiles is energy efficient as it is able to absorb heat during the day and release it during the night.

Besides that, terracotta tiles have natural insulation which helps insulate heat and noises in and out of a space. (Boral, n.d.) It is also resistant to termite and insects attack.

The natural appearance of the terracotta tiles (Plate 7.7) enhance the *Istana Bandar* as it blends in with the building as the building ages.

Plate 7.6: Top view of *Istana Bandar*.

Plate 7.7: Close-Up Roof Tiles.

Plate 7.8: Roof.

7.1.4 Concrete

Cement like water, aggregates and sometimes admixtures are one of the ingredients of concrete. The mixing of these materials in specified proportions produces concrete.

It is customizable, tactile, organic, dynamic, durable, green, earthy, and permanent, has mass, can be formed into any shape, can be polished and textured, can be stained.

Concrete can be handcrafted as a custom work of art in the form of balusters, stairs (Plate 7.9), columns (Plate 7.10), as well as wall deco to exude a sense of elaboration highlighting the royal superiority of the *Istana*. Concrete is not weakened by moisture, mould or pest, where as its gains strength over time. Concrete is widely because not only it can withstand heavy load, it can also withstand natural disaster

Despite its exceptional physical properties, concrete is fireproof and provides protection and shelter while readily adapt to its landscape and environment of the *Istana Bandar*. (Cement Sustainability Initiative, n.d.)

Plate 7.9: Concrete Stairs and Baluster.

Plate 7.10: Close-Up Column.

7.1.5 Ceramic Tiles

Ceramic tiles are made from natural clay minerals fired under a high temperature to produce a durable and tough material are often used to form wall and floor coverings.

Ceramic tiles are very durable, fire and water resistance. It is easy to clean as it has a smooth surface which is stain and scratch resistance. And it does not absorb heat. (The Kitchn, n.d.)

Ceramic tiles is used for the flooring for the guardhouse (Plate 7.11), seat for the bench at the garden (Plate 7.12) and the interior of toilets in *Istana Bandar*.

Plate 7.11: Guardhouse.

Plate 7.12: Bench at the Garden.

7.1.6 Glass

Glass is made by melting together several minerals at very high temperatures. Silica in the form of sand is the main ingredient and this is combined with soda ash and limestone and melted in a furnace at temperatures of 1700°c.glass is used for the top of the doors, windows and even the roof.

The use of glass provides natural sunlight to shine into the building, and also some openness to the outside surrounding there is two elevated roof (Plate 7.13: skylight roof), one with glass that is above the royal room. Light shine into the room give the spirit to the whole building. (09scigthekacassite. n.d.)

On the other hand, the elevated roof is high up causing maintenance a problem. Also, much of the glass are made according to the pattern (Plate 7.14), therefore once the glass are broken it cost more effort and money to make the same pattern as before.

Plate 7.13: Elevated Roof.

Plate 7.14: The use of glass at the door with pointed trefoil arch.

7.1.7 Plaster Wall

Plasterwork refers to construction or ornamentation done with plaster, such as a layer of plaster on an interior or exterior wall structure, or plaster decorative mouldings on ceilings or walls. Plaster is used to cover clay bricks instead of using paint alone for its aesthetic appearance (Plate 7.15).

PA plaster coating creates a stronger and more durable wall finish than drywall. The chemical reaction that occurs when water evaporates out of the plaster mixture develops strong bonds in the mixture. Plaster is more resistant to knocks and dents in most cases. (Kolifrath. J. n.d.)

On the other hand, when plaster cracks or crumbles due to shifting foundations or a strong blow to the wall, repairing the problem is tricky. Damaged plaster must be cut and scraped out without damaging the intact wall material (Plate 7.16).

Plate 7.15: Plastered Wall.

Plate 7.16: Close Up Of Plastered Wall.

7.1.8 Timber Wood

Timber wood is used in all of the windows and doors of *Istana Bandar* (Plate 7.17 & Plate 7.18). It shows the traditional Malay architecture in this building. Wood is still most popular choice of material for construction of doors, windows and ventilators because of ease of cutting, shaping and joinery with simple hand tools.

Wood requires less maintenance. A huge advantage of wooden frames is that they do not get rusted as compared to their counter parts. Latches and locks can be easily attached to the wooden doors. If good quality wood is used, wooden doors have a long life. Also, wood does not get rusted compared to metal door and are stronger compared to plastic door.

One of the major disadvantage of wood is that it absorbs moisture because of which it can easily rot. Wood does not get rusted, but it can be infested by termites and various insects in due time and cause allergy. (Wooden doors and panels advantages and disadvantages. (n.d.).

Plate 7.17: Corroded timber window.

Plate 7.18: Wooden Window.

7.1.9 Porcelain

Mixtures of raw materials are composed to produce the porcelain stoneware. Through a firing process at a high temperature, porcelain gain strength, frost, chemical and scratch resistance.

With its glazed surface, the porcelain is easy to clean, hygienic and water resistance. (Refin Ceramiche, n.d.)

The porcelain material can be seen used as ventilators (Plate 7.19) in the *Istana* and also balusters (Plate 7.20) around the *Istana*.

Plate 7.19: Chinese ventilation block made of porcelain.

Plate 7.20: Baluster made of porcelain located at the balcony at the first floor.

7.2 Construction

7.2.1 Site changes and development of Istana Bandar

Based on the research that we have done, condition of this building is senile and most of the floors in this building are collapsed or damaged. Nevertheless, before 1995, party of *Istana Shah Alam (Kerabat Diraja Selangor*) directed *Kerajaan Negeri* to overhaul *Istana* Sultan Alauddin by following the original design without making any changes.

The site, located nearby a river and road that connects *Bandar Temasya, Jugra and Kelang*, is belonged to Sultan Alauddin Sulaiman Shah. After the site is developed, foreigners like *orang Jawa* started to immigrate to the site. Other buildings were found inside the istana as well during the colonization of Sultan Alauddin Shah such as club house, office, weapons storage room and more. However, only *Istana* Sultan Alauddin survived throughout the years as the other buildings are all demolished or destroyed as the years passed by. Other than that, there are still some leftover components of the destroyed buildings on the site such as stump, stairs and more. *Istana* Sultan Alauddin is constructed by workers from China, local citizens and also citizens from *Kelantan*.

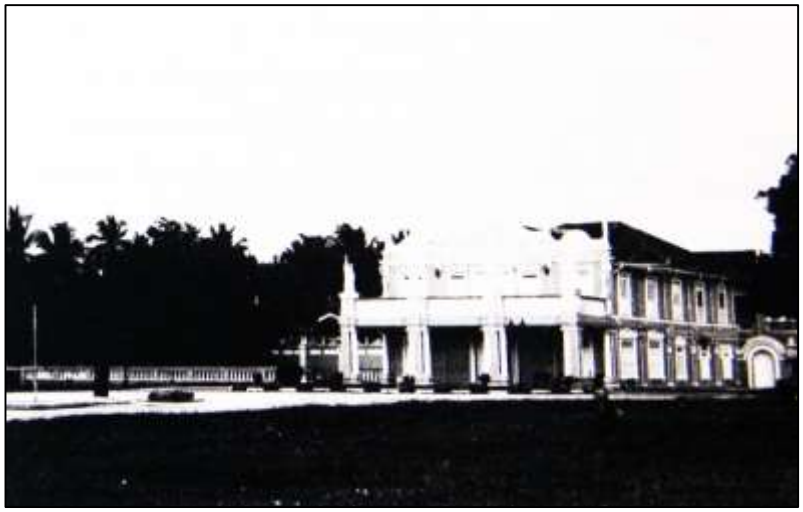


Plate 7.21: Restoration works going on to conserve this historical palace. (Abdul Aziz, A. 1997)

The construction of *Istana* Alauddin was done in stages during the reign of Sultan Alauddin Shah (Plate 7.21). The first block being built was the block with *Balairong Seri* and assembly hall at the late 1898 or 1899 (Plate 7.22). This part of the building was known as the front part of the building in the olden days which is now located at the rear of the main entrance. The other blocks are being built in stages later on. In the early construction stages, there is no porch at the back of the palace. In the 1914, the porch and two rooms are added to the back portion of the building (Plate 7.23). However according to the old folks in the village and the private secretary of the sultan, there was not much changes made to the palace except for the adding of new block to the palace. However, there is some confusion between the construction year of *Istana* Alauddin and *Istana* in *Kelang* where these two palaces are believed to have been constructed in the same year. Thus, it is hard to determine the exact construction year of all blocks of *Istana* Alauddin.

Ever since Sultan Alauddin Shah has moved his central administration to *Kelang*, that palace was abandoned. Restoration works are still going on not only to restore and conserve this historical palace but also to turn it into a royal state museum.

Plate 7.22: The first block being built at that time, the *Balairong Seri* and Assembly Hall. (Abdul Aziz, A. 1997)

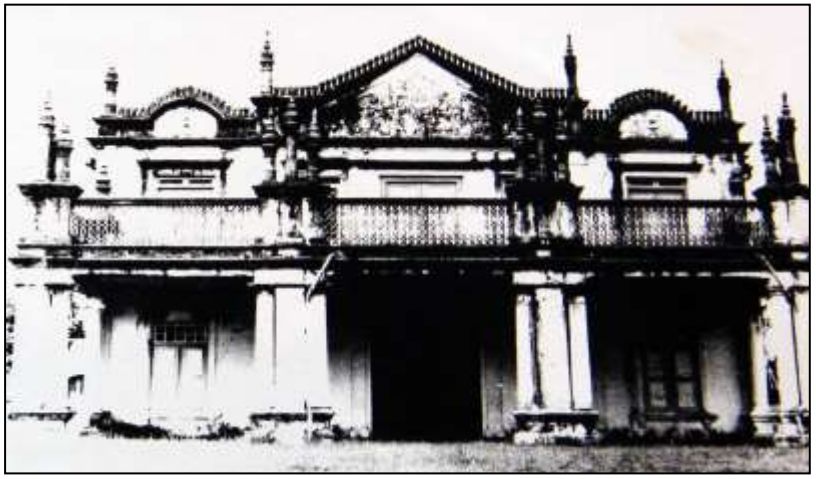


Plate 7.23: A porch and two rooms are added to the back portion of the palace. (Abdul Aziz, A. 1997)

7.2.2 Strip Foundation

The sorts of foundations seen in *Istana Bandar* are mainly strip foundation. Strip foundation is one of the shallow foundation and is used where the soil has good bearing capacity. The strip foundation used in *Istana Bandar* is one continuous stretch of strip where the load is spread evenly along the entire structure. The closely-spaced crows of columns of *Istana Bandar* render the use of pad foundation inappropriate and strip foundation may be a better alternative. The size and position of the strip is directly related to the overall width of the wall.

The continuous strip serves as a level base on which the load bearing walls are built to spread the load on the foundations to an area of subsoil capable of supporting the load without undue compaction. The subdividing of the walls brought out from the foundation itself and transformed into rooms or spaces. These spaces are strengthened by the use of columns and pilasters that in turn supports the wooden beams (Plate 2.24). The lower part of the building shows the exposed concrete and is also in grid has that the palace was built using strip foundation (Plate 7.25).

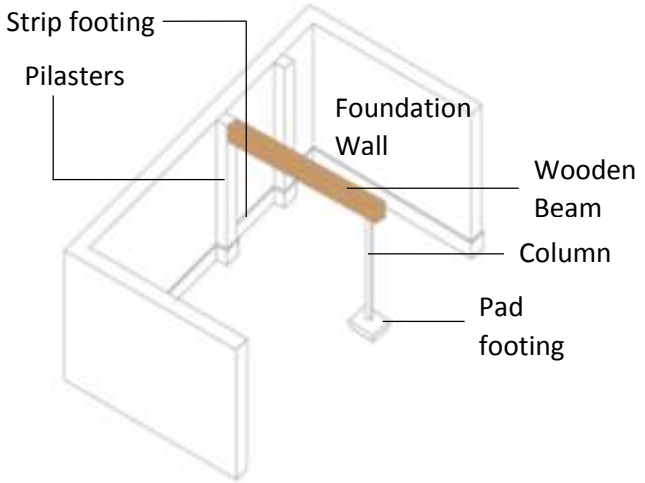


Plate 7.24: Load transfer to the foundation through walls and columns.

Plate 7.25: The exposed lower part of the building shows the strip foundation of the palace.

7.2.3 Wall System

Load Bearing Walls

Load bearing walls are mainly used in the construction of *Istana Bandar*. These load bearing wall bears a load resting upon it by conducting its weight to a foundation structure. Most of the walls have pilasters incorporated in them which are usually part of the column. Load bearing walls in *Istana Bandar* are the exterior walls and walls typically above the centre of the beam of the block. The walls are built with clay bricks with varying thicknesses appropriate to bear the load (Plate 7.26). The dimension of these clay bricks are 215 x 105 x 45 mm in average (Aziz, 1998). This is based on the remains of the buildings near the construction site of the palace. The thickness of these bricks are thinner compared with that used in the present which is 65mm wide. However there are several wall thickness found in the palace: 150mm, 200mm and 300mm (Aziz, 1998).

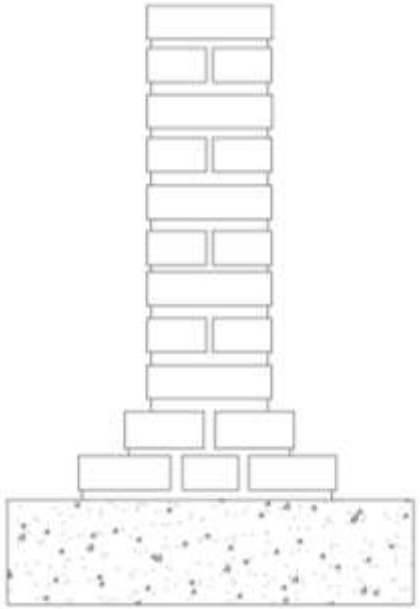


Plate 7.26: Piles of bricks to form the load bearing walls of *Istana Bandar.*

Post-and-beam Wall System

Another types of wall found is the post-and-beam wall type located on the first floor corridor and also building parts with long span structure. Post and beam framing supported on columns footings or continuous foundation walls is designed to carry the imposed loads (Plate 7.27), known for efficient expansive open spaces of *Istana Bandar*. This system is not restricted by traditional framing and load bearing walls and is reinforced with bolted steel plates for its connection. Both inside and outside wall of the *Istana* is plastered.

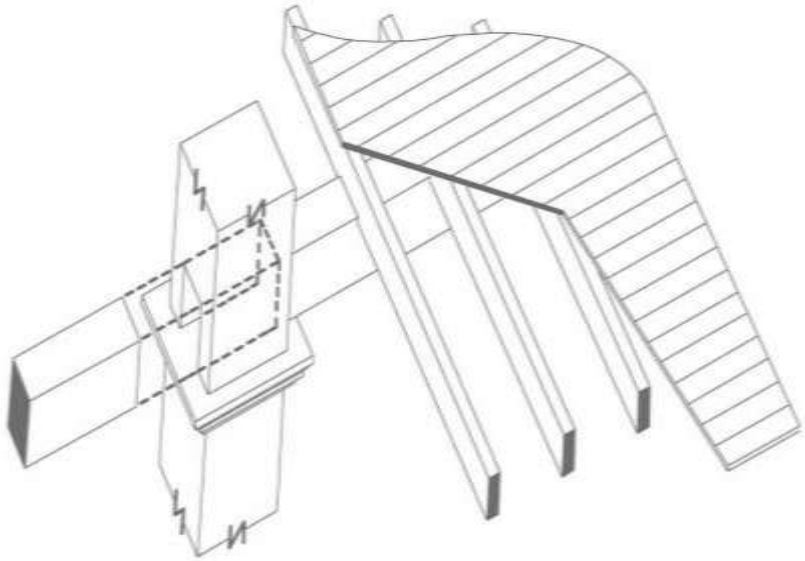


Plate 7.27: Sections of columns, beams and floors of the *Istana* connected using mortise and tenon joint method. (Abdul Aziz, A. 1997)

7.2.4 Columns

The materials for *Istana Bandar*'s columns are mainly constructed using timber and concrete. It is because wooden columns can save costs and times, that's why they were used more often than load bearings during colonial period. The column was an architectural invention which allowed for the support of ceilings without the use of solid walls. The wooden column is made to attach tightly to the concrete footing and beam being slotted to the column. (Courtois, 2003) Concrete footings exist to transfer the structural loads from the building to the Earth. *Istana* has the similar construction of the footings for the ground beams.

There are several styles of columns can be found in *Istana Bandar*. Firstly, the single footed concrete column (Plate 7.28 (a). This footing is commonly used and plentiful in two storeys structure. This footing has the column in the middle of the footing. As the force acts downward from the column, the spread footing distributes that force to the soil. The bottom of the spread footing is in tension from the bending moment created by the column force and the earth resistance.

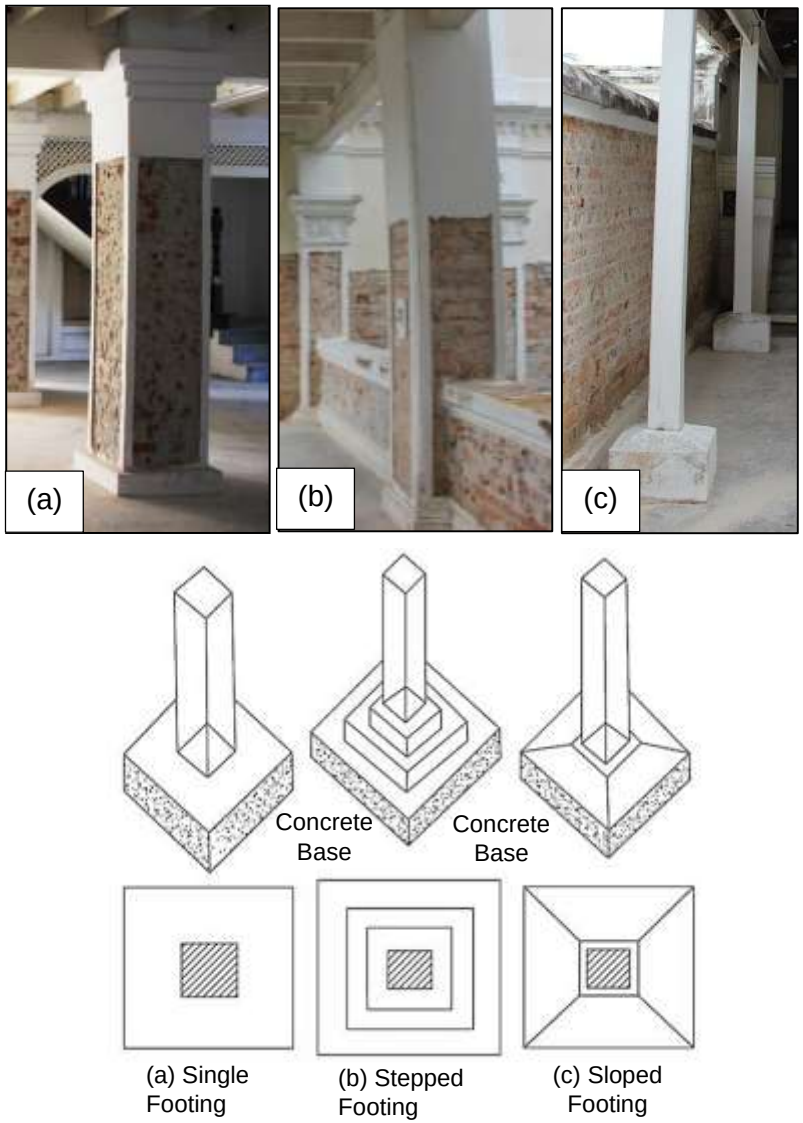


Plate 7.28: Types of Footing.

Secondly, the stepped footing (Plate 7.28 (b) can be found in places with high roof and upper floor of hall. Stepped footings allow depth of footings to transition from one elevation to another. (More in Selangor. n.d.). Thirdly, sloped footing (Plate 7.28 (c) is commonly used throughout the whole *Istana*. The wooden column is held by the concrete footing which rose out of the ground. The column elongate all the way up leading to the joining of the wooden beam. The wooden beam is slotted into the column.

7.2.5 Flooring and Ceiling

Concrete flooring

Unlike the traditional Malay architecture of using timber as the main construction material, the Istana applied a combination of concrete flooring (Plate 7.29) and timber flooring (Plate 7.30). The ground floor in the Istana was constructed straight from the foundation. The concrete from the foundation was levelled up and hence forming concrete flooring in most of the spaces on the ground floor. Concrete slabs resting on earth are used to transmit the superimposed loads to the supporting ground, spreading point loads to ensure bearing capacity of the ground is not exceeded. This concrete flooring are packed with tile size 150 x 150 mm (Aziz, 1998).

Plate 7.29: Concrete flooring at the *Balai Mengadap* (Assembly Hall).

Timber Flooring

The first floor, in contrast to the concrete ground floor was constructed using timber. Meanwhile the first floor of the *Istana* applied suspended timber flooring constructed from *chengal* wood with floor thickness 20mm x 35mm wide (Aziz, 1998).

Plate 7.30: Suspended timber flooring at the first floor of the *Istana.*

Mortise and Tenon Joint

All joints in timber flooring are connected using mortise and tenon joint made of wood or also known as tongue and-groove and slotting method (Figure 7.1). The beam is slotted into the column whereby the tongue fits in the groove. The joists are slotted in perpendicularly on the beam in rows on which the wooden floor planks rest to complete the flooring. The first floor uses timber planks resting directly on exposed joist and beam which can be seen from the floor below (Plate 7.31). This results in exposed beam structure which can be seen in kitchen's ceiling and most ground floor ceiling.

Perforation System for Wood and Brick Joist

Almost the whole structure of the building was made of bricks and mortar with timber beams and joists for the upper floors. Perforation system (Plate 7.32) are used where the beams are placed on top of a pile of bricks with bricks arranged surrounding the beam and form the pole on the floor above.

Plate 7.31: Exposed floor girder can be seen at ceiling of the porch and the assembly hall which showed the exposed beam structure of the *Istana.*

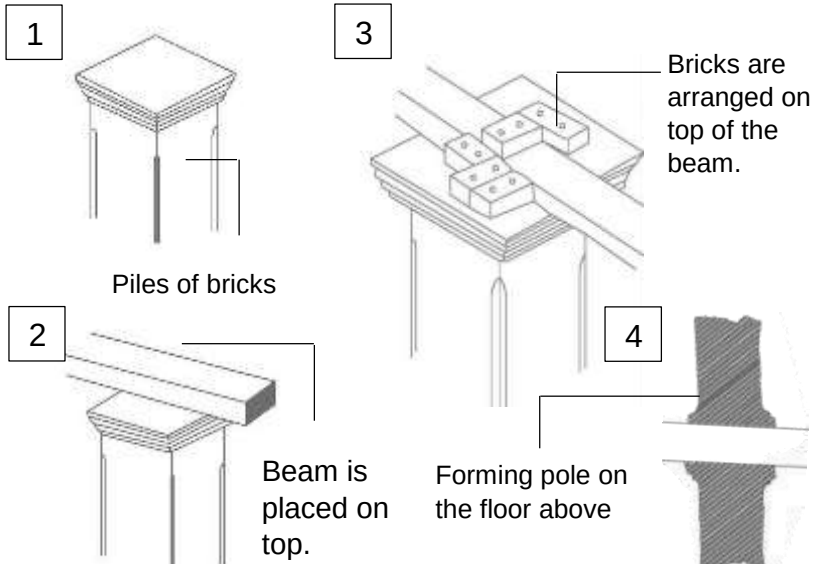


Plate 7.32: Perforation System for Wood and Bricks Joist. (Abdul Aziz, A. 1997)

Figure 7.1: Exposed floor girder can be seen at the ceiling of *Istana Bandar*.

7.2.6 Roof

Roof Type

Gable roof type with the combination of hip roof type are mainly used for the roof system of *Istana Bandar* (Plate 7.33). The *Istana* has many roofs of varying heights including an *astaka* or pavilion like Jack- Roof that allows light and ventilation into the heart of the building. This *astaka* is adorned with a decorative ridge board and carved finials, befitting a palace, while like the remaining roofs, is edged with beautifully carved, perforated fascia and bargeboards, along the eaves. The quality of carved decoration is a fine example of the precise and artistic talents of the skilled artisans of that era. Elements of the original construction of the *Istana Bandar* were undertaken using skilled Chinese artisans whose carvings and decorations clearly demonstrate Chinese influences.

Plate 7.33: View from the balcony towards the top roof of the public and semi-private spaces.

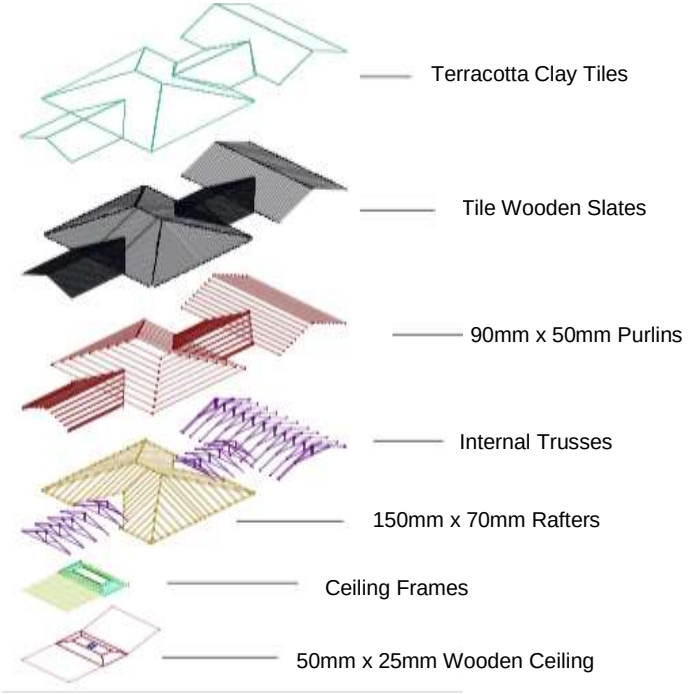


Plate 7.34: Exploded isometric roof structure.

Roof Truss

There are two types of truss system that are used in *Istana Bandar*; common roof truss and king post truss. The king post truss is common in the main roof systems of the Istana whereby the king post truss is stronger and has bigger load bearing capacity. The post (the king), located in the centre keeps the bottom horizontal tie beam from sagging and breaking of (Plate 7.35). The roof truss is connected using strong steel bolts and nuts on the steel gusset plate that holds it firmly after construction (Plate 7.36 & Figure 7.2).

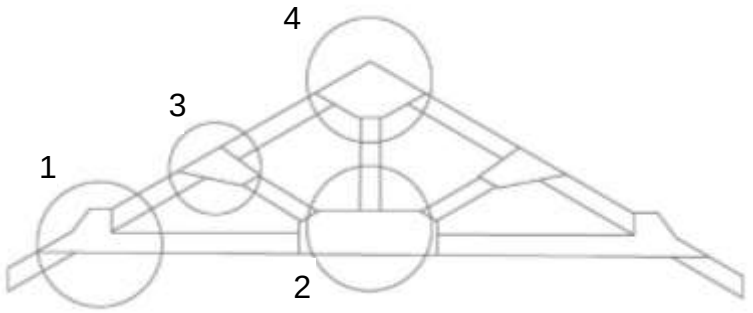


Plate 7.35: Gable Roof Truss Structure Connection.

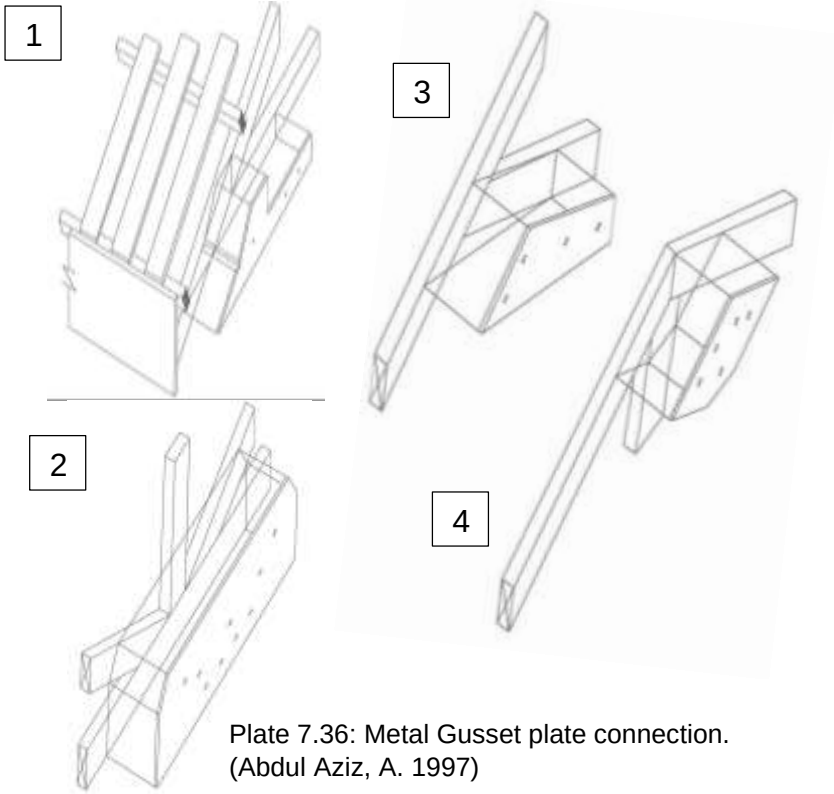


Plate 7.36: Metal Gusset plate connection.
(Abdul Aziz, A. 1997)

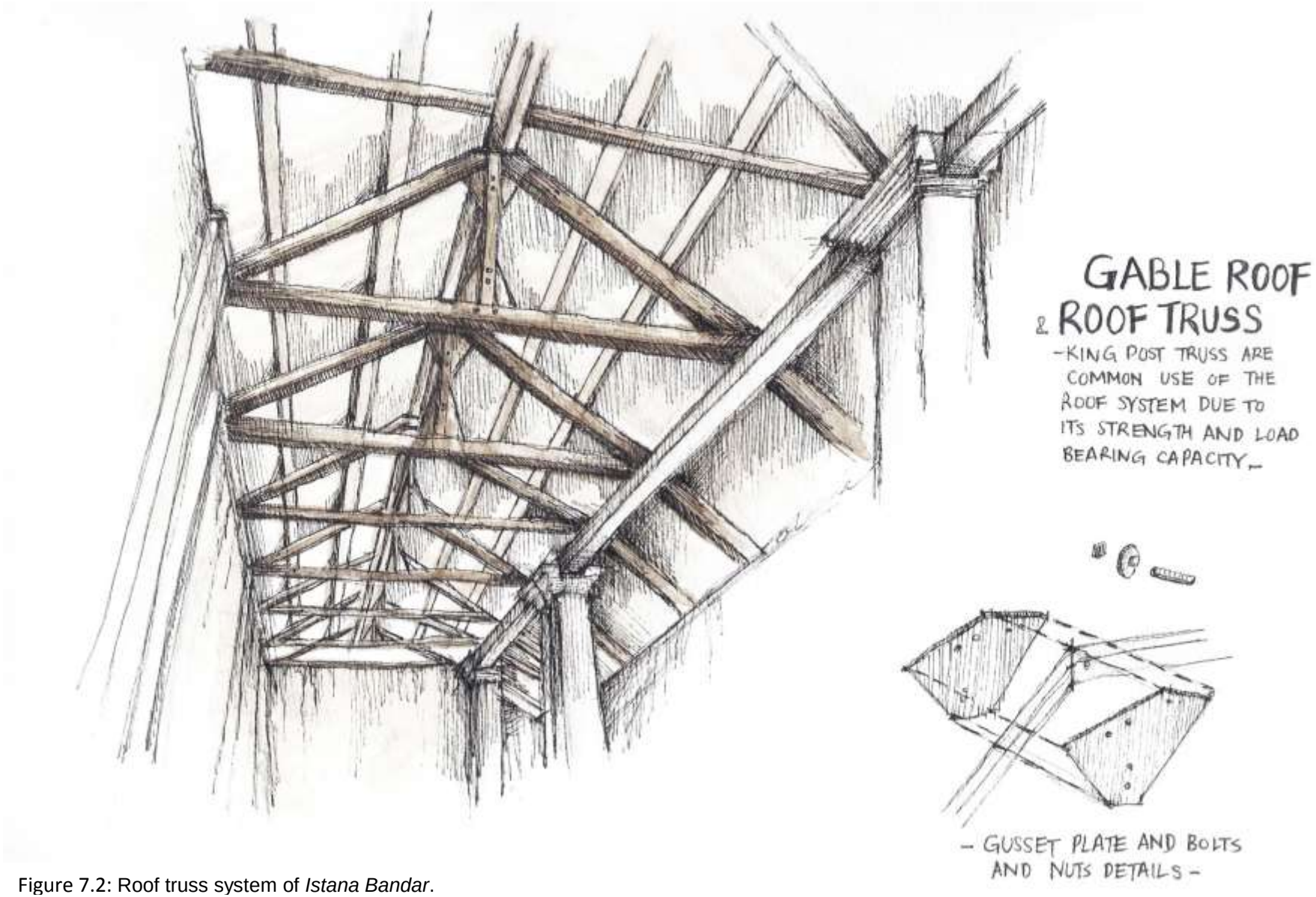


Figure 7.2: Roof truss system of *Istana Bandar*.

Clay Roof Tile

Layered Indian ‘V’ shaped terracotta tiles imported from China were used for the roof covering (Plate 7.39). They are laid on the top of the ridge and rafter without any insulation. The roof tiles in *Istana Bandar* are unique by the way they are held together on the roof as a whole structure. In common pan-and-cover roof tile roof tile systems, the tiles are interlocked with the perpendicular battens and strips that run through the roof with interlocking mechanism that allows the tiles to be held in its place using fixtures units (Plate 7.37). While in *Istana Bandar*, the tiles are held by a permanent layer of cementuous grout in longitudinal manner. This traditional two-piece style, also called barrel- or Mission-style, is installed in pairs with the cover tile overlapping the pan tile (Lower, B. 2010.)(Plate 7.38). This technology was used to prevent rainwater and heat using closure with mortar to cover the ridge and rafter of the roofs with terracotta roof tiles installed with 18 degrees pitch.

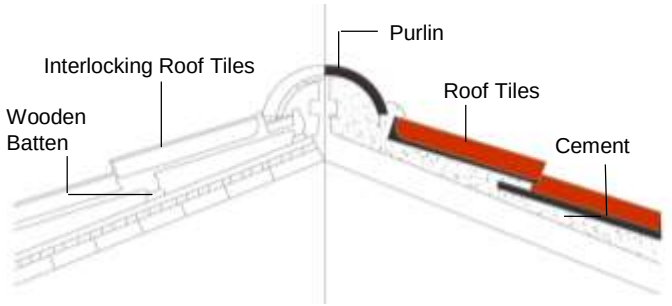


Plate 7.37: Common roof tile system vs roof tile system in *Istana Bandar*.

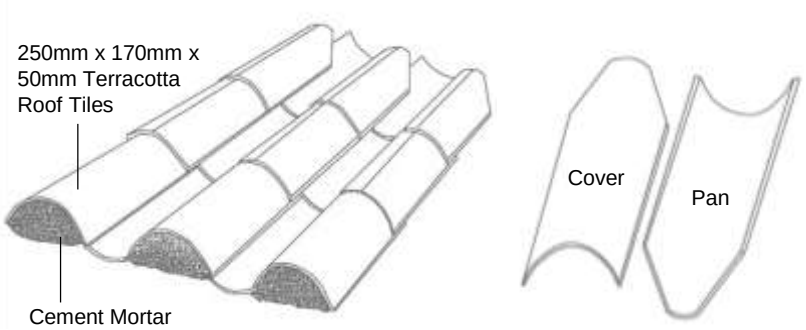


Plate 7.38: Pan-and cover roof tile system in *Istana Bandar*.

Plate 7.39: Layered Indian ‘V’ shaped terracotta tiles for roof covering.

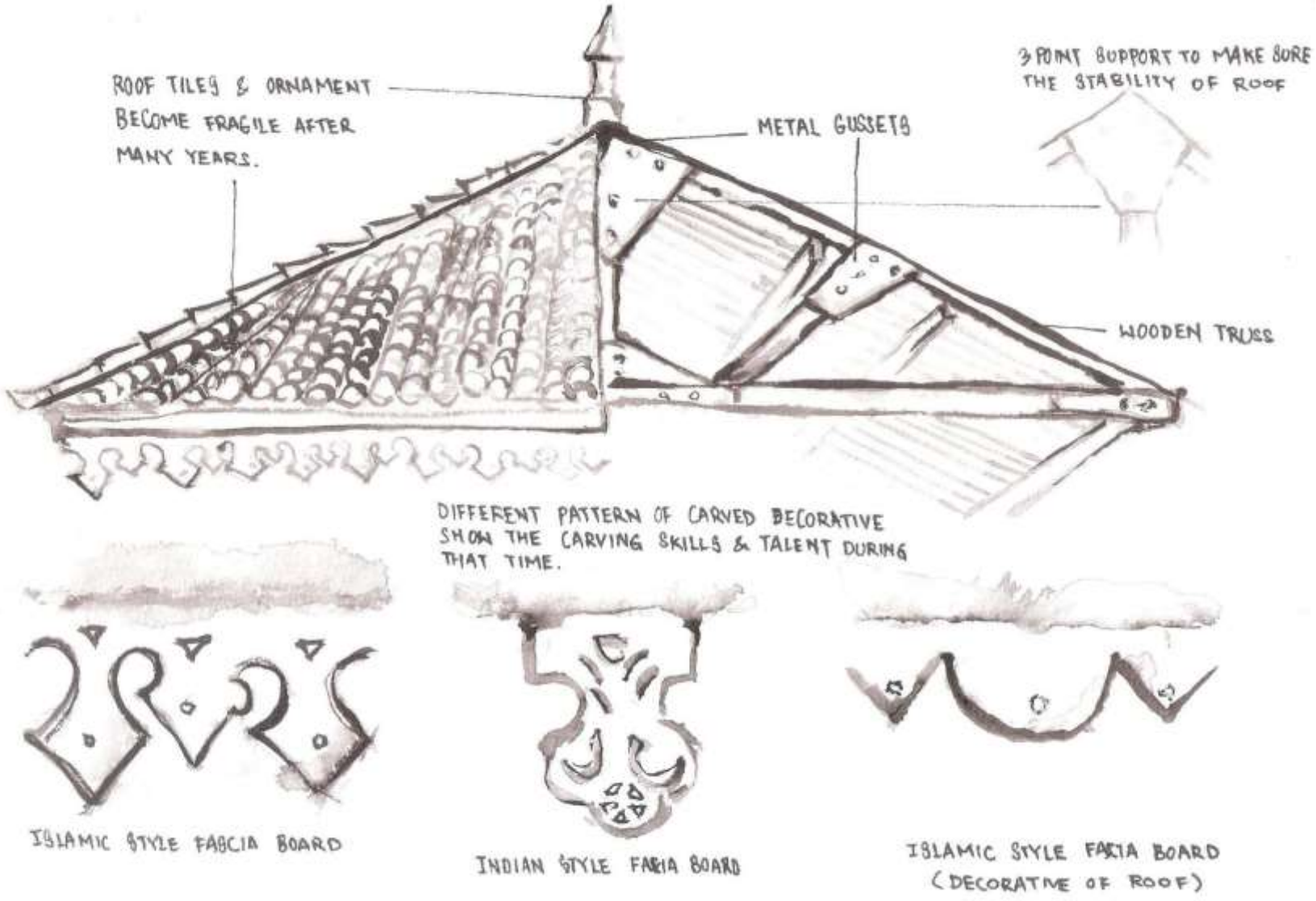


Figure 7.3: Roof components of Istana Bandar.

7.2.7 Staircase

Stairs provide means for moving from one level to another, therefore it's an important links in the overall circulation scheme of a building. The common type of staircases in *Istana Bandar* is straight staircases which extend from one level to another without turns or winders. The indoor staircase are all made of timber, with a total number of 5 timber staircase leading to the first floor of the *Istana* (Plate 7.41).

There are thirteen staircases which made of timber and only three made of concrete. The outdoor stairs leading to the *Balairong Seri* use concrete for the landing while the railings and balustrade (Plate 7.40). The concrete stair is designed as an inclined, one-way reinforced slab with steps formed on its upper surface. (Featured Project. n.d.). Enclosed Riser arrangement was used as the construction of stairs. The risers are the vertical boards that close off the stairs space which closed with timber plank while the balustrades dovetailed into treads by using tongue and groove. The top of the baluster also uses tongue and groove as the mode of joining into the handrail. (Construction Methods. n.d.). The same goes for the Newel Post.

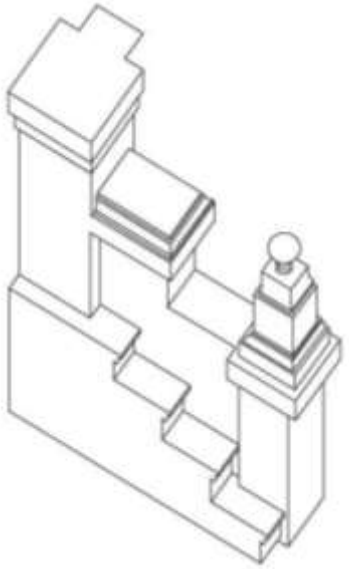


Plate 7.40: Staircase at the *Balairong Seri*.

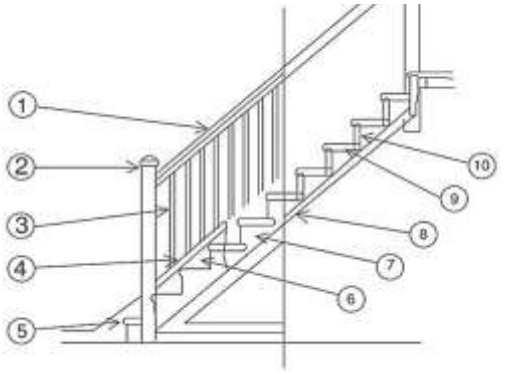


Plate 7.41: Timber staircase leading to the first floor of the *Istana*. (1. Handrail; 2. Newel; 3. Baluster; 4. String capping; 5. Nosing; 6. Closed string; 7. Cut string; 8. Carriage; 9. Tread; 10. Riser).

7. 3 Defects and Restoration Method

7.3.1 Settlement

Being beside the sea and near to the swamp, the soft earth under the building is exposed to tremendous stress, causing consolidation. According to the datum line, there was slight uneven settlement happening to the building. Uneven settlement of building may cause safety concern that may lead to the premise no longer safe to be occupied. Movement of the foundations and footing will cause columns to shift vertically, causing walls to crack and openings such as doors and windows to malfunction.

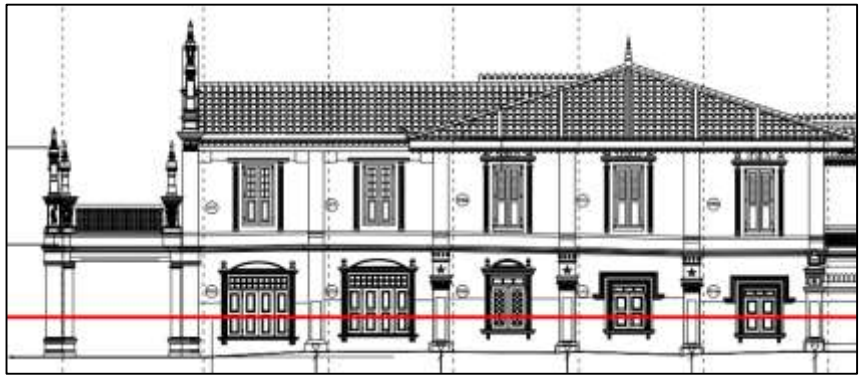


Plate 7.42: Datum line to show settlement on the left elevation of *Bilik Beristirehat*.

The only way seem to repair this issue is through hydraulic jacking or piercing. (Freeman, 1995) Steel posts are driven through unstable soil and hydraulic jacks are used to raise or stabilize concrete slabs affected by changes in the underlying soil. Once raised, the beam is held to elevation by a specially designed spread footing and pier. The footing is set deep enough so that it will be independent of variations in soil moisture. It is also designed to adequately distribute the load without creating unnecessary bulk or mass. The pier is tied into the footing with steel and supports the foundation beam.

Plate 7.43: Hydraulic jacking.

7.3.2 Parasitic Plants Growth

A parasitic oak fern plant can be seen growing wrong side up through the opening the roof gutters. Fern plant prefers shady and warm and moist area which explains a lot why the plant is creeping beneath the roof to avoid direct sunlight as well as to obtain moisture from the drenched gutter using its hairy rhizome root.

Another stag-horn ferns or bird's nest fern can be observed growing healthily out of the overlapping gap of the *Bilik Beristirehat* roof. The roof may develop through the gap of the terracotta tiles and causing water leakage in the building. (Mabberley, 1997)

Lack of proper maintenance is the main reason for its growth and the plants may cause wood to decompose if not exterminated immediately. The only way to treat this issue is to avoid and extract the plants as early as possible through frequent inspection and maintenance of every corners of the building.

Plate 7.44: Parasitic oak fern plant on gutter.

Plate 7.45: Bird’s nest fern plant on roof.

7.3.3 Biological Deterioration & Damage to Wooden Components

Damage done by soft-root fungi on the external door located on the third garden wall. (Cohen, 1981) The fungus secrete cellulose to break down the fiber in the wooden door, especially the lower part as it is situated to the fungi infested garden ground as well as longer exposure to moisture being the lowest point of the vertical panel.

Other notable wooden components going through decay include the wooden windows, wooden roof ornamentation, exterior doors and suspended timber flooring at the first floor.

Although they are all made of hard wood like *cengal,* but they still risk the attack of fungi if not maintained properly and frequently. The solutions to this matter include replace all deteriorating wooden parts with a completely new one and code all wooden parts with a layer of paint, shellac or varnish to protect it against abrasion, weather condition and fungi attack. The restoration process may risk the loss of original details to the building if not done professionally.

Plate 7.46: Decayed garden door.

Plate 7.47: Damaged windows with a missing piece.

Plate 7.48: Deterioration of wooden ornamentation.

7.3.4 Salt Attack and Rising Damp

The problem of salt attack is closely related to rising damp. The moisture from the rising damp can either make the salts in the building material itself soluble or the ground water that contains salt dissolve into wall of the building. This moisture then evaporated on the surface leaving the salt residues behind. High salt concentrations in masonry walls may cause extensive fretting and crumbling of the lower parts of walls.

Restoration progress can be seen on the stripped brick walls which are getting ready to carry out cocoon treatment and chemical damp-proof injection course. The cocoon layer which is a poultice medium designed specifically to remove salts associated with rising damp from masonry walls is applied for two to six weeks. Pressure injection chemical damp-proof courses with salt retarder additive are injected to the lower part of all walls and columns to prevent rising damp. Later, the walls will be plastered.

Plate 7.49: Cocoon treatment and Westox

Plate 7.50: Pressure injection process done by

Plate 7.51: Injection machine and Westox Injection Fluid product.

7.3.5 Broken Roof Tiles

The terracotta roof tiles are brittle and fragile which can be seen from the figure when measuring activity was carried out on the roof. Without the insulation layer, the broken tiles will expose the interior to water leakage, weather condition and enter of pest such as birds or bats. The water leakage and animal dropping will cause biological deterioration on the first floor's wooden flooring.

A harder and stronger material of roof tile can replace the old ones without changing to design so that the authenticity of the building can be maintained.

Plate 7.52: Broken roof tiles near the roof lantern.

Plate 7.53: Piles of new tiles kept in the store

7.4.6 Degrading Paint

Paint can be seen cracking and flaking off, exposing the previous paint color as well as the concrete base, affecting the aesthetic of the building. The remove all of the paint by scraping or using a heat gun, sand the surface until smooth and even, prime, and repaint with a quality latex paint.

Plate 7.54: Current white paint with seen through old yellow paint.

8.0 Conclusion

8.1 Significance of Istana Bandar

8.1.1 Historical Significance

Every single man-made marvel is made with its very own significant intention and *Istana Bandar* is no exception. It is a respectable that many national and independent department came together to preserve and conserve this magnificent building for the reassurance that this building retain the best condition and remain a piece of standing history for many more generation to come. History that is only taught in books will never triggers as much patriotism and emotions compared to standing in it to experience and reminisce the past commotion and events. A well preserved heritage will be pointless and again succumb to the ravages of time if it's not being utilized and appreciated due to the fact that the reputation and history will fade and taken for granted over time.

Through this assignment, we find out how unique and special every single architectures was back in the past before modern construction existed as every single details and fine points was in fact hand crafted and build by delicate touches. Architecture was always a form of mammoth scale art until industrial revolution causes building to be mass produced and pre-fabricated. By understanding the significance and history of the building, we can perceive the architectural trend and status of the royalties back a century ago. It also reminds us of how times had changed from the architectural styles as well as the whole nation's governing system.

8.1.2 Cultural Significance

The cultural significance of the building also proved to us that how culture and root was such an important key to architecture in the olden days. Sultan Alaeddin also proved that different cultural characteristics of different country and continent could effortlessly blend in together without being odd or radical. In fact it turned into an icon to the *Selangor* heritage by having the most unique architectural elements and components. Moorish, Mughal, Malay, Chinese and Colonial architectures all depict the greatness and significant of the building with all their individually cultural attribution and architectural values

complementing each other to a single direction - to symbolize the status and power of the Royalties. This such intermingle of

diverse culture is truly one of the kind as it resonate the matchless historical background of Malaysia, from the colonization, immigration of labourers and craftsmen to the religious and diplomatic allies relation of the country a hundred years ago. Such rich and meaningful cultural quality is no longer applied into modern architecture which causes buildings around the world to look similar, identity-less and monotonous. There-fore it is imperative for younger generation to do such field studies on such culturally and historically rich heritage to ensure the continuation of realization on the identity of a community and a nation. Identity is important as it aid one to recognize who he and she is and what he or she stands for in a given situation or society.

8.2 Comparison between Istana Bandar and Istana Mahkota Puri.

These Istana has a relation with Sultan Alaeddin Sulaiman Shah.

	Istana Bandar	Istana Mahkota Puri
Location		
History	*Istana Band*ar or Alaeddin Palace was built during the reign of the late Sultan Alaeddin Sulaiman Shah, the fifth Sultan of *Selangor*. It was constructed in 1899 and completed in 1903. The palace was built in the middle of a family conflict as a second home for Sultan Alaeddin's second wife, Cik Aminah binti Pelong while his first wife, Tengku Ampuan Mahrum remain reside in the official royal palace of *Mahkota Puri.* *Istana Bandar* was left abandoned after Sultan Alaeddin passed away in 1938.	*Istana Mahkota Puri* is located in *Klang.* It was built in 1899 to *replace Istana Bandar*. It was built near the British Colonial Administrative Center as the official residence for Sultan Alaeddin Sulaiman Shah built by the British Government. In 1903 Sultan Alaeddin Sulaiman Shah was crowned as the Sultan of *Selangor* in *Istana Mahkota Puri.* *Istana Mahkota Puri* was demolished during the reign of Sultan Hishamuddin Alam Shah to build a new palace, *Istana Alam Shah. Istana Alam Shah* was built on the same site of *Istana Mahkota* Puri in 1950.
Architecture Influence and Feature	*Istana Bandar* has several combination style of different influence which are : • Chinese Architecture Feature that is influenced by Chinese culture such as the Chinese balustrade, Chinese ventilation block, terracotta roof style, ornaments and courtyard. • Colonial Architecture	The *Istana* has a Moorish architecture and a little bit of Indian architecture influence. • Moorish Architecture The feature/ style influenced by Islamic architecture. The palace is rich with Moorish element in terms of structural and non-structural part of the *Istana*. Illustrated by using rows of keyhole arches as opening and scalloped arches and more.

	The mixture of western, Mogul and Moorish architecture such as Greek column, portico and louvered window. • Mogul Architecture The combination of Islamic India and Persian architecture such as the mini minaret that can be found at the façade of *Istana Bandar.* • Moorish Architecture Feature/Style which was influenced by Islamic architecture such as geometric elements, crenellated arches and ogee arches found in *Istana Bandar*. • Malay Architecture The style which influenced by climate and weather such as wooden carving, Malay ornament, overhanging roof and large window/opening.	• Indian Architecture The usage of pinnacles as a division of indication to express the rank of the sultan.
Architecture Element	- *Istana Bandar* has a number of pinnacles especially from the front façade. - It has many opening such as windows and doors to allow the ventilation of air and penetration of lighting both at ground floor and first floor. - It has a Islamic two line casement window with horizontal squares fixed windows and Federal style hinged double doors at the ground floor while on the first floor are the Chinese two-line casement window with horizontal fixed window and Georgian hinged double door. - One of the significant structure of *Istana Bandar* is the skylight. The skylight was built at a higher position to show its importance. It was the Sultan's chamber.	- *Istana Mahkota Puri* also has a number of pinnacles. It also has domes at the rooftop of *Istana* that indicate an architectural element that holds no spiritual or symbolic significance but entirely aesthetic. *Istana Mahkota Puri* has a stronger Moorish architectural element compare to *Istana Bandar.* - Since the British was the one who constructed the place, the *Istana* structure is more to using the drainage system instead of fabricating it to the traditional Malay structure. Unlike *Istana Bandar, Istana Mahkota Puri* doesn't has eaves or extended roof which is the characteristic of a traditional Malay structure.
Architecture System	- *Bumbung Limas* is the type of roof of *Istana Bandar* which is under the Acheh influence. The roofs have different height depending on the hierarchy of the spaces. - Columns found in *Istana Bandar* are influenced by Greek and Roman architecture which support the weight of the structure.	- *Istana Mahkota Puri* has a Malay influenced roof which is the pitched roof. It is used because of the dependability in the tropical climate which allows air circulating surrounding the palace. - There are varies type of arches used as part of opening: • Keyhole Arches Used as an opening on the walkway on the perimeter wall which the weight of the structure distributed evenly through the horseshoe arches. • Inflected Arches

		Used on extended front porch at the entrance of the palace to show that the section is the main entrance. • Scalloped Arches Can be seen on the side elevation of the palace as the opening to the exterior.
Ornamentation	Chinese Style: • Chinese Ventilation Block Act to improve ventilation, allows natural lighting and also part of aesthetic feature. Moorish Style: • Crenellation Showing power and strength of the Sultan and also as a prevention against evil force. • Malay Style: -*Tumpu Kasau* which is the horizontal decorative timber roof eaves. • Indian Style: -Pinnacle which act as the indicator of power. It also used to hide timber joint and solve finishing problems wisely.	Moorish Style: • Crenellation *Istana Mahkota Puri* has a rows of crenellationon top of the perimeter roof similar to *Istana Bandar*. It is also used to avoid dark forces. • Stalactites Placed under the minor balcony of the front façade • Onion Dome Located on the extended drum from the front elevation. • Malay Style: -Malay gable finial Located on top of the onion dome used to indicate power of the Sultan. • Indian Style: -Pinnacles A number of pinnacles are placed on the building showing the importance of the owner. It also hide the structural problems and construction errors.

8.3 Learning Outcomes

Throughout this three months of learning process, it is undeniable that we gained countless of very valuable lesson or values. Working in a 40 people group is tougher than anyone can imagine as so far the biggest group we worked in is nothing more than ten people. We learnt to compromise with each other as in such a big group, it is bound to have clash of ideas and disagreement, but we all do want the best for the group. Without any fundamental respect or ethics, things will get chaotic and offensive which will jeopardize the progress of the whole assignment.

Being led and guided by two leaders and two lecturers will also cause confusion among members of whose command or instruction to follow. It all came down to the rational thinking and sensible analysis of every individual to make wise decision that will contribute to the project. Therefore it is important for leaders or sub-leaders to act fast to discuss with both of the lecturers to settle with a mutually agreed solution.

Responsibility appear more crucial than before as the hiccups of negligence and inattentiveness will cause a domino effect, and effecting the rest of the progress. It all comes to constant reminding of each other's mistake and reprimanding of bad habits to ensure there is a constant flow of positive working attitude in the community. The leaders also play a huge role in being a great role model and pushing the limits everyone's capability to ensure we all give our very best to the team.

Regarding the limitation of time factor, we learnt to plan ahead and to have proper time management to ensure our progress are on schedule or ahead if possible. Members from different sub-group will never hesitate to lend a hand to other group when there is a need to help or assist each other as all group are doing different task, therefore the difficulties faced will vary.

10.0 REFERENCE & APPENDIX

10.2 Interview

To search for more information about our building, Istana Bandar, we conducted a few interviews, one of them is Raja Sulong bin Raja Salleh, the Royal Cemetery Caretaker who is now still doing his job as requested by Sultan although he is 84 years old currently. Raja Sulong once lived during the Sultan Alaeddin's time and still remember some old memories that he had during that time. We also did interview the locals who know more about Istana Bandar, Pak Cik Anuar bin Ishak and also Encik Aidy Khairunizam, PADAT chairman of the South District Museum who based in Kuala Langat as well as Mr. Haji Abdul Rahman bin Haji Abdullah, Chairman of JKKKP of Kampung Bandar.

Interviewer 1: Raja Sulong bin Raja Salleh, the Royal Cemetery Caretaker

Interviewer : Good morning Raja Sulong, we are students from Taylor's University. We come here because we have to do some research about the Istana Bandar (Alaeddin Palace). So, can we ask you some information about that palace because we heard that you are one of the villagers that live during Sultan Sulaiman's (Sultan AlaeddinSulaiman Shah) time?

Raja Sulong : So, what is the name of this village?

Interviewer : It's Kampung Bandar.

Raja Sulong : So, why they called Kampung Bandar?

Interviewer : We are not sure.

Raja Sulong : It is because the Sultan stayed here (in Kampung Bandar). So, what we do we have here (landmarks)?

Interviewer : the palace?

Raja Sulong : There are 11 landmarks that you can find here. They are Istana Bandar, flag poles, police station, Arabic school, royal club, stores, Bandar Malay School, Alaeddin Mosque, Custom office and barber shop. (He didn't mention about the eleventh landmark). So, how many wives that Sultan had?

Interviewer : We are not sure how many wives he had.

Raja Sulong : He had eleven wives. Tengku Ampuan Maharum, Tengku Ampuan Zabedah (Daughter of Sultan Perak), Tengku Ampuan Fatimah (from Perak), Raja Meriam (from Jeram), Che Hasnah binti Pilong, Che Johari, Che Anjung, Che Chik, but I forgot the rest. There are 4 wives from the royal families and 7 of them are not from the royal family. Then, what are the crops that can be found here? There are rubber, coconut and coffee beans. How they exported these crops? They will ship the crops cross the sea to Indonesia.

Interviewer : What are the other characteristics of the palace?

Raja Sulong : There are more than 30 rooms in that palace. The behind part of the palace was built in 1914. Regarding the Sultan, Sultan Sulaiman died in 1938. Sultan Abdul Samad has a child named Raja Abdullah, who is a grandfather of Sultan Sulaiman. Sultan Sulaiman's father, Raja Muda Musa ibni Sultan Abdul Samad, who was supposed to be the king after Sultan Abdul Samad, died when he was young. That's why; the throne was given to Sultan Sulaiman. My grandfather was a brother to Sultan Sulaiman.

Interviewer : We heard from ketua kampong that you know about the traditional dance, Tarian Dabus? Is that true?

Raja Sulong : Yes, it's true. I still remember the poem from the dance,

"Beli cempedak baiklah nangka,Nangka itu panjang tangkalnya,

baik-baik memilih janda, Janda itu pandai akalnya.

Tebu liat tebu kapur, Mari dikerat di bagi-bagi,

Apakhabar kakak di dapur, Sudah masak bawa ke mari."

Interviewer : Is that the famous dance during that time? When and where did you do this dance?

Raja Sulong : Yes, everyone was excited to watch this play. We usually play in palace ceremony and also in the wedding ceremonies. (Then he continued read the poem)

"Pulau pandang jauh ke tengah, Gunung daik bercabang tiga,

Hancur badan dikandung tanah ,Budi Raja Sulong dikenang juga.

Interviewer : However, I heard the Sultan banned that dance after that?

Raja Sulong : Yes, because during that time, the dancer was so fanatic to the extant they are willing to torture themselves til they bleed.

Interviewer : What is the uniform for that dance?

Raja Sulong : The dancer will wear black cloth with tanjak for the performance. Usually, the crowd loves the poems part because we recite many poems. (Then he continued read the poem)

"Tabik encik, tabik tuan, Saya bermain berkawan-kawan,Mana yang salah tolong ampunkan, Mana yang silap harap maafkan."

Interviewer : Do you have any experience from the palace?

Raja Sulong : Yes, there were 2 person died there. One of them fell down from the stairs.

Interviewer : So, Raja Sulong, we heard about the mystical things happened in the palace. Did you had any experienced with them?

Raja Sulong : Yes. It usually related to "Daulat", which every Sultan has. It shows the different between Sultan and ordinary people. Some people heard someone walking with terompah inside the palace. But it is normal for abandoned buildings to experience this activity. This place was a center of knowledge during that time. Nowadays, the people just ignored about it and did a lot of bad things.

Interviewer : Had you ever meet Sultan Sulaiman?

Raja Sulong : Yes, when I was kids, I always meet him.

Interviewer : So, I think that all for today.

Thank you so much for your cooperation.

Raja Sulong : Welcome.

Interviewer: Raja Sulong

Interviewer 2: Pak Cik Anuar bin Ishak, a local who knows a lot about the history and culture surrounding Istana Bandar.

Interviewer : Assalamu'alaikum and good morning Pak Cik Anuar. We are students from Taylor's University would like to conduct an interview with you about the history of Istana Bandar. Can you tell us what do you know about Istana Bandar and Kg Bandar itself generally?

Pak Cik Anuar : Firstly, I would like to welcome you to Kg. Bandar. Kg. Bandar was once known as Bandar Temasa because of Istana Bandar itself and because there used to have a lot of games conducted. This area is a 12 acres wide.

Interviewer : 12 acres wide towards the field?

Pak Cik Anuar : There used to have a lake nearby the field. That is where all the activities were conducted. The meaning of temasya (game) is having fun. Istana Bandar is divided to three hierarchy. One area is open to the public for example the kitchen. The other area is semipublic and the third area is private area, the area that is fenced. For your information the kitchen area was once a place for students to eat. There was a different school at the Tahfiz School's site before the Tahfiz School existed. There was also an all-girls school at the end of the opposite road.

Interviewer : So there was an all-girls school in this area?

Pak Cik Anuar : Yes, there was. During their recess time they will go to Istana and have their lunch there.

Interviewer : Before this there were two schools in this area?

Pak Cik Anuar : Yes, there were two schools in this area. Before, girls are not allowed to attend schools but the Sultan provided a school just for girls because in his opinion if the girls are not allowed to attend school then how are they going to learn to cook, pray and more. The girls will be carried to school by riding a cow-cart covered with a net.

Interviewer : Oh the net is to cover and protect the students?

Pak Cik Anuar : Yes. I will talk about their daily activities. The students will go out through the door that has writing saying, "ingat-ingat, jalan kecelaan". The writing was taken from a guide book for the children. The book consist of lists about things that can be done and things that can't be done. Every time they go out they will go through the door as a reminder.

Interviewer : Does the guide book still exist?

Pak Cik Anuar : Yes, the book is still exist. There is also a book that was written by Sultan himself. I have the book but the museum is using it at the moment.

Interviewer : Can we borrow the book?

Pak Cik Anuar : You have to ask from the museum because they are using it right now.

Interviewer : Alright. I read an article from the internet saying that Istana Bandar have two kitchens. Can you show us the second kitchen?

Pak Cik Anuar : I am not sure about that because as far as I know there is only one kitchen. I don't know who said that there were two kitchens.

Interviewer : If I'm not mistaken, there were several rooms that were destroyed. Why the room destroyed and what was the function of these rooms?

Pak Cik Anuar : There used to be a number of officers and children. The back area used to be a prison but was never being used because it was just a myth to scare off the children. There was a Chinese clerk who always wear a postman cap. Before he became clerk, he always fight with his clan in Lukut. Lukut was still part of Selangor during that time. His highness Sultan save him and appoint him to be a clerk. If it's not because of the Sultan, the Chinese clerk might have been killed by his clan. He became one of the important person of the Istana.

Interviewer : May I know the name of the clerk?

Pak Cik Anuar : I'm sorry but I don't remember his name. From what I remember, the people called him with a Malay name. The Chinese people in this area were involved in the construction of Istana Bandar. If I'm not mistaken the pulpit (mimbar) of the mosque was built by a Chinese called Ah Choon. He was said to be someone who was really good in carving and his hands were really flexible in doing it.

Q : At the beginning of the interview you mentioned about a lake nearby the field.

A : Yes. The lake was in "U" shape. Unfortunately the lake was already filled with soil. There was a stage in the "U" shape. The plan of the stage can be referred from the book. There was also a building on the field area that functioned as a place to collect tax but the building does not exist anymore.

Interviewer : Was the building being destroyed during that time or it was destroyed recently?

Pak Cik Anuar : The building collapsed on its own. The Sultan has built another Istana in Klang because Sultan has married to new wife and the Istana was given to his wife who was from the local folk called Cik Nah. Sultan Iskandar Shah Perak who is also the father-in-law of Sultan Alaeddin, has officiate Masjid Sultan Alaeddin in 1926.

Interviewer : May I know how many wives does the Sultan have?

Pak Cik Anuar : If I'm not mistaken Sultan have more than four wives including the divorced. Sultan also has a Chinese wife called Cik Safiah. He has a wife named Mahrom who left Istana Bandar and went to Kedah because the Sultan has married to new wife called Cik Nah. The Sultan has built another Istana in Klang for his first wife. His highness has ascended the throne in 1898 and was coronated in 1903 without a queen, five years after he ascended the throne.

Interviewer : What is the original colour of the Istana?

Pak Cik Anuar : The Istana is the same since I was a child until now only the building that was called yellow house is said to be the place where Cik Nah live.

Interviewer : There were buildings that were located nearby Istana which are not existed anymore. May I know the function of the buildings?

Pak Cik Anuar : The buildings that were not exited anymore are schools, office and quarters. The office and quarters were located behind the oil palm plantations if I'm not mistaken. Also the building to collect tax at the field. This is the information that I got directly from the elders staying here. Istana Bandar used to be called as "rumah gedung" by the children.

Interviewer : Why does the Istana called as rumah gedung?

Pak Cik Anuar : It was because the Istana is huge in size in this town. Before the Istana was built, the site of the Istana has a wood construction owned by the Sultan himself. Sultan Alaeddin/ Sultan Sulaiman is the fifth Sultan of Selangor after Sultan Abdul Samad. Sultan Abdul Samad is the grandfather of Sultan Sulaiman. Sultan Sulaiman's father, Raja Muda Musa, died in the age of 40 because of santau/black magic. During that time, black magic was

strongly practiced by the Malay community as their weapon. Cik Nah, wife of Sultan Sulaiman is also said to be dead because of black magic by other people.

Interviewer : Does the Sultan has enemy?

Pak Cik Anuar : Sultan Abdul Samad was originally from Kuala Selangor then he moved to Jugra. The succession of the previous Sultan of Selangor, Sultan Muhammad fell to his son-in-law, Sultan Abdul Samad. The queen of Sultan Muhammad wants to make her prince as the next Sultan but he was too young at that time. The prince was 8 years old. Sultan has his people, ahli Jemaah who will choose the next sultan. Sultan Abdul Samad went to Jugra because he has many followers in Jugra. Sultan Abdul Samad was installed as the Sultan of Selangor when he was a sultan representative in Jeram, Kuala Selangor.

Interviewer : Does the post as Sultan representative is the same as today's menteri besar?

Pak Cik Anuar : No, the post Sultan representative is the same as todays' Orang Besar Daerah. Because of the death of the son of Sultan Abdul Samad, Raja Muda Musa who died early, he chose his grandson, Sultan Sulaiman as the next Sultan of Selangor. Sultan Sulaiman was educated as a Sultan as a child. During the time, if someone who didn't pray in the mosque, they will have to pay RM5 fine. RM5 was a big value back then. One day, Sultan Sulaiman himself purposely didn't pray at the mosque to test his worker who was assigned to fine and write the name of those who didn't pray at the mosque. So his worker had to write Sultan's name as well. The Imam of the mosque that time was Ustaz Azhari Mahmud who is the father of Ustaz Hassan Azhari. Ustaz Hassan Azhari is the father of ex-police chief of Malaysia, Tan Sri Musa Hassan and also Malaysian actor, Jalaluddin Hassan. Ustaz Azhari Mahmud was born in Mecca. His mother is an Arab. He was brought to Kg. Bandar by Sultan Sulaiman. Ustaz Azhari Mahmud was assigned as the Imam of the mosque and was given an amount salary as well. The Imam before Ustaz Azhari Mahmud was Haji Muhammad bin Sulaiman. There were two position of Imam back then which are Imam Sultan and Imam qariah.

Interviewer : What was the taboo and manners that need to be control during that time?

Pak Cik Anuar : What I know is the protocol to face the Sultan during that time.

Interviewer : There was a taboo about public not allowed to wear yellow because yellow is the royal colour right?

Pak Cik Anuar : Yes. Sultan Sulaiman was friendly to his people. Even during activities where the people gather to clean the area/cooperative activities, the Sultan joined them as well. Sultan's real name is Sultan Sulaiman while the name Sultan Alaeddin is his nickname. Sultan Sulaiman gives himself the nickname Sultan Alaeddin. Some said that they make a nickname to confuse the ones who wants to use black magic against the Sultan so that they don't know which one is his real name. The nickname was started by Sultan Sulaiman and followed by the next generations. If the name has –din at the back, it means that was the nickname.

Interviewer : Is it because Deen means religion in Arab?

Pak Cik Anuar : Yes.

Interviewer : What is the daily activities of the royal families? Or does the public were not allowed to see?

Pak Cik Anuar : Recently we met the son of Sultan Sulaiman named Raja Mahmud who was born here in Kampung Bandar. He told us about some activities that were played by children back then such as gasing, kites and gayau which is the traditional game. I, myself have played the traditional game gayau when I was child.

Interviewer : What is the traditional game Gayau?

Pak Cik Anuar : The Gayau fruit will be arranged on a flat land. Then from behind you have to shoot another Gayau fruit by kicking it. If it hits the front part of the Gayau fruit then you got a high mark for it. This game was played in west coast of Selangor. UKM (Universiti Kebangsaan Malaysia) had once conducted an event where they showed the public how to play the game. There was also a traditional dance called Dabus. The dance is still practiced until now.

Interviewer : So the culture is still practiced until now?

Pak Cik Anuar : Yes, some of them is still being practiced until now such as the Dabus dance. Back then during the fasting month, the Istana is the center for breaking the fast. Cannon was fired as sign for time to break the fast. Foods from Istana was brought to the Mosque for breaking the fast. The people of the town will gather around and break the fast together.

Interviewer : Does the traditional game Gayau played at the field?

Pak Cik Anuar : No, the game was played in the Istana area

Interviewer : Does the grass grows here since before?

Pak Cik Anuar : No, there was a guava tree back then. Sultan Salahuddin often come with his wife. Sometimes I will climb the tree and get the fruits for Sultan Salahuddin.

Interviewer : Does this space (the place where we put out things) was an eating space?

Pak Cik Anuar : Yes, this is where the Sultan eat. The building behind it is a surau. It's a place where they conduct a "solok" activity. "Solok" is similar to "tarikat". Most of them practicing tarikat and because of that a lot of Javanese people came here. "Solok" is like devoting yourself to God. For your information, Sultan of Selangor is Javanese. Sultan Sulaiman brought a number of Javanese people to Kampung. Bandar to live here. Some was brought through the British boats. Same goes to Chinese and Indian. There was no crow in here back then. The crow was brought by Mr. Carey from Sri Lanka to Pulau Carey to eliminate rats and snakes at the end of 1800. If you need more information you can refer to the red book that I lend to you.

Interviewer : Thank you Sir for spending your time with us today.

Pak Cik Anuar : You're very welcome.

Interviewer: Pak Cik Anuar

Interviewer 3: Mr. Haji Abdul Rahman bin Haji Abdullah, Chairman of JKKKP of Kampung Bandar.

Interviewer : How long have you been in this position?

JKKKP : Actually, I had involved in the community for many years. I hold many positions such as a committee members and secretary of JKKKP. I became the chairman started from last year. So, I had involved in community for 30 years. I also brought our village's youth organization into many competitions and the highest level is the Commonwealth level. As you know, Bandar Jugra is one of the historical places in Malaysia.

Interviewer : What else you know about the history of Sultanate in Selangor?

JKKKP : For your information, the Sultan of Selangor right now is Sultan SharifuddinIdris Shah, or known as Sultan Idris. The "Shahrifuddin" title is just a title given to a Sultan same as the Sultan before, such as Sultan (Salahuddin) Abdul Aziz and Sultan (Alaeddin) Sulaiman Syah. The Sultan of Selangor from the first generation was originally from the Bugis descendant.

Interviewer : What is your opinion about the mystical things happened at the palace?

JKKKP : Actually, it doesn't only occurred in the palace. It also occurred in our house. For example, after being away for a month, we felt strange about the house. So, it is normal for some abandoned building especially for that building which was already left for a few decades. If we recalled back to history, it's said that the Sultan and the wise men during that time had a extraordinary power such as "Tulah" and "Daulat". For the palace itself, it maybe still has strong "Daulat" power laid behind the wall of the palace. So, if we do something against that power, it may repel us in the negative way. For example, when the Tahfiz School was opened, nothing bad happened there during that period. It was because of their good intention, which was to learn about religion. I think this issue was not a big deal.

Interviewer : How many years was the Tahfiz students stayed there?

JKKKP : They stayed there about 4 years. If I'm not mistaken it was around a year of 2000.

Interviewer : So, before the Tahfiz School was opened, what else the palace was used for?

JKKKP : Nothing except for the visitors and the renovation projects.

Interviewer : What were the renovations are done?

JKKKP : The renovations happened many times. It involved for both small and big renovations around the palace.

Interviewer : What is an example for big renovations projects?

JKKKP : The big renovation was involved the tiles, doors and windows replacement. They also make sure that palace is still well-built to be used.

Interviewer : Who funded the cost for renovations?

JKKKP : The government provided the fund for the renovation process.

Interviewer : Is there any royal cemetery around here?

JKKKP : Yes, there is.

Interviewer : I heard the caretaker for that royal cemetery is still alive. Is that so?

JKKKP : Yes, he lives near my house. For the caretaker's salary it still fund by Sultan himself.

Interviewer : Can you show me where his house is?

JKKKP : Sure.

Interviewer : Thank you for your information and your cooperation.

JKKKP : Welcome. I hope the information that I gave to you was helpful.

Interviewer: Haji Abdul Rahman bin Haji

Interviewer 4: Encik Aidy Khairunizam, chairman of the south district museum in Kuala Langat

Interviewer : You may introduce yourself and tell us what do you know about Istana Bandar generally.

En. Aidy : Assalamu'alaikum and good morning. My name is Mohd Aidy Khairunizam, I am the chairman of the south district museum which based in Kuala Langat in Klang. Things I can tell about Istana Bandar is that the Istana was built by Sultan Alaeddin Sulaiman Shah, the fifth Sultan of Selangor after Sultan Abdul Samad. Sultan Alaeddin Sulaiman is the grandson of Sultan Abdul Samad. Istana Bandar was basically built in 1899 and was used until 1938. Generally Istana Bandar is also known as "Istana Alaeddin" or "Istana 40 bilik". Istana Bandar was funded by Sultan Alaeddin Sulaiman Shah himself with his own money. He ascended the throne in 1898. I think I can talk a little bit about the design of the Istana. It has a Malay, Chinese, Moorish and a little bit of Indian influence in the design. For Malay design influence you can look at the roof design, "bumbung limas" which can also be found in other states such as Johor and Perak. For Chinese design influence you can look at the one near the roof which has dragon design. For Moorish influence you can look at the towers or the switch on the roof (cucuh atap?) that looks like the Taj Mahal's dome. If I'm not mistaken His Highness Sultan Alaeddin Sulaiman loves art. Plus he is a well-educated man and he was educated in Singapore thus it is not possible that he knows some art values (jadi tidak mustahil jika sultan telah diterapkan dengan nilai2 kesenian). The Istana was called as "Istana 40 bilik" because it has 40 rooms altogether if you did some research and study the building including the toilets. Toilet back then was not like toilet nowadays. Some of the toilets are outside of the buiding. There was no piping system back then. Istana need some number of workers such as guards and dayang(lady-in-waiting). The dayang will get water from the well nearby. How many well are there in the Istana?

Interviewer : There are four wells.

En. Aidy : There supposed to be five but the other one was destroyed. It was supposed to be next to the meeting room but it was already covered with cement. From one of P.Ramlee's film, Orang Minyak, you can see how the people back then used the wells. The well was used to measure the high tide and low tide of water of the nearby river or sea. But I believe the well was covered with cement. Before this there was a restoration work for Istana Bandar by Jabatan Warisan Malaysia. When you were measuring the Istana, there were people fixing the wall of Istana so what do you think when you see the original form behind the wall? From what I know previously there was a department who was in charge of restoring Istana Bandar after it was abandoned. I saw a photo of Istana Bandar which was completely abandoned after 1938 but the photo was not in the museum. There is one wall at the back

which I think is not relevant because why was the wall built that way. So I think the previous restoration in 1980s was not as accurate as the original. So in my opinion the Istana Bandar's restoration project in 2008 was more on the preservation work. The surrounding soil which is peat soil also affected an old building like Istana Bandar. Usually peat soil has termites and fungus. Moths (kelkatu) will come over when it rains. A UTM lecturer once told me that Istana Bandar is the only concrete Malay castle that is still standing until today. I think it's true because the Istana in Perak is timber, the Istana Seri Menanti is timber as well and the Istana in Johor is made up from timber too. If you see Istana/castles that was made of concrete then it was built in modern days such as Istana in Putrajaya and Istana Negara. The one in Kuala Lumpur was not Istana but it was actually a house belong to a rich Chinese guy and they preserve it for the old Istana Negara.

Interviewer : During the Japanese occupation, did they used Istana Bandar?

En. Aidy : I won't deny that Istana Bandar was used during the Japanese occupation but it was not emphasized about it in Istana Bandar's fact maybe because they don't want to further discuss about this matter. The royal gallery in Klang was used as office for the Japanese army same goes to Istana Bandar. This is because the Japanese army will use any concrete building or castles as their office during the Japanese occupation.

Interviewer : There are two stories about the door that has a writing saying "ingat-ingat jalan kecelaan". One is to remind the children to always be careful and to remind them to not do any wrongdoings and the other one is because of the court which is located nearby the door to remind the prisoners about their wrongdoings so which one is the exact reason behind the writing?

En. Aidy : I never heard about the reminding the children to be careful but the court yes. The place near the door was the place where Sultan will sit together with his officer to discuss about the state's matter. I can't tell where was the exact position that Sultan sit because at one end it was near the kitchen and at the other end it was near the door. In my opinion Sultan sit at the other end which is near the door because there were several number of guards looking after the Sultan back then. Plus, there was not a heavy case because of heavy crime judged at the court back then. There wasn't a real prison or dungeons in Istana Bandar.

Interviewer : So the place was used as a court not as a place for Sultan to have his meal?

En. Aidy : Yes. The reason why Sultan Abdul Samad's grandson, Sultan Alaeddin became the next Sultan and not the father of Sultan Alaeddin is because Sultan Alaeddin's Father, Raja Muda Musa died early. When Sultan Abdul Samad died,

Sultan Alaeddin was in Singapore so he was called back to ascended the throne as the fifth Sultan of Selangor. If I'm not mistaken, Sultan Alaeddin was taught about management matters since he was a child by Sultan Abdul Samad. Sultan Alaeddin was sent to Singapore to learn about the administration and management matter by British so that he can lead and manage the state without order from British. Sultan Alaeddin is a humble and friendly person especially to the children. During early 1900 the people hardly get food. Even if they have money, they don't have shops that sell food like today so they have to work hard and plant themselves. Sultan Alaeddin likes to serve food for the people especially in Kampung Bandar. Sultan Alaeddin also sets a rule, those who didn't come for Friday prayers, they have to pay some amount as a fine. He sometimes give a sermons for Friday prayer as well.

Interviewer : Ok the next is question is what is the function of the underground space at certain places? I heard it's either for underground ventilation or as a prison to keep the prisoner.

En. Aidy : Most old houses were built higher than the ground to avoid wild animals. In my opinion the underground space is impossible to function as a prison because it is a Sultan's house so why would they keep a prisoner there so I think it is one of decoration of Istana Bandar. Usually in kampong when they have underground space they will keep their pet there but I'm not sure about Istana Bandar. For me the underground space is impossible to function as a prison.

Interviewer : Back to the question, why does the external part of the pool being demolished?

En. Aidy : I'm not sure about that because it was under different management who handled that. Maybe they have more accurate answer because I don't have a true information about this. I don't really remember about this. Maybe you can ask Puan Intan. You as an architecture student, you should know that genting of Istana Bandar is really important because Jabatan Warisan has classified that genting of Istana Bandar as the identity of Selangor because it's not the same as other states. If you go to Malacca, they have V shape. Sabah and Sarawak uses bark.

Interviewer : The colour of the building used to be yellow and now it's white. Is there any reason of the changing of the colour?

En. Aidy : In 2008, there was a preservation work by Jabatan Warisan Negara and they didn't simply do it. They refer to Istana and ask opinions from the Sultan himself (Sultan Sharafuddin Idris Shah). Jabatan Warisan also did a colour scheme research from the wall that they hacked to trace the original colour of the Istana Bandar. They found a bright yellow colour from the hacked wall and they showed to Sultan Sharafuddin Idris Shah but he didn't like it because people might mistook it for a temple. He asked for cream and white colour similar to the Galeri Diraja in Klang.

Interviewer : It was said that there was a lake in front of Istana Bandar during the reign of Sultan Alaeddin but it's no longer exist now and why is that?

En. Aidy : Sultan chose a few days to have a couple of activities with his people in Istana Bandar. He also give foods to the local. There was a game where they need to swim to catch a duck or who can breathe in water the longest and fishing. I did a discussion with a few historian expert and they are not sure too about the lake because some people said that the back of Istana Bandar is the front and vice versa. Some people said the lake was at the field, some people said it was the Tahfiz School and some people said the lake was at the kindergarten. It was said that the lake was huge. There used to be a few British house in Istana Bandar as well. The British was in Kuala Lumpur since 1888 so I think it's relevant to say that there was a British house in Istana Bandar. I asked the local people but they didn't know where the British house was. The British houses were located nearby Istana Bandar.

Interviewer : There was a strip land but it was no longer used and there is only strip wiring left. Do you have any plans about this?

En. Aidy : Is it in the building?

Interviewer : Surrounding the building and there is also in the courtyard.

En. Aidy : I don't think they used electric back then.

Interviewer : I saw a lamppost in an old photo

En. Aidy : I think it was during the restoration work. The contractor only did the PowerPoint.

Interviewer : Do you have plans to maintain it?

En. Aidy : We don't have budget for that yet and we were busy with other plans. But I don't think they used electric back then. It was said that there were diamonds at the eye of the fish and at the decoration at the Selangor door on the first floor of Istana. During the day, sunlight will come in and reflect to the diamonds that then reflect to inside the building and brightened the area.

Interviewer : Next question, why does the Sultan uses different architectural design from different culture? Why didn't he just used Malay architectural style?

En. Aidy : I can't answer that since I'm not the Sultan but I can assume that since Sultan Alaeddin is a very well-educated so he was exposed to different culture and he has a lot of friends from different country. So he might be interested with different culture as well. Plus he used his own money to build Istana Bandar. But I agree that Istana Bandar has gone through a few changes from the original design.

Interviewer : The window near the verandah that is nearby the kitchen is concrete right? Was it used as a window or it was locked?

En. Aidy : This façade doesn't have any changes accept for the colour.

Interviewer : But there are three real windows on the other side of the façade?

En. Aidy : Because the room used to be a princess room. Back then man are not simply allowed to see/look at the princess. It was the law during that time. It was a private space for the princess. Plus the façade was facing the door written "jalan kecelaan" so in my opinion they won't allowed prisoners to look at the princess. Princess is usually related to forbidden garden (taman larangan). Istana and forbidden garden can't be separated. The forbidden garden is the playground for the princess because there was no theme park back then and that is the only place where they can play.

Interviewer : Is it true that Istana Bandar was used as a living museum last year?

En. Aidy : No we didin't used it as a living museum. We had an event called 'Jalinan Adat' where we will conduct a program at one place every month in Selangor. It was at different place every month. We chose Istana Bandar to conduct the event in June 2012 if I'm not mistaken. When we announced about the event in Kampung Bandar, many of the local came and became interested with the event because they said after the Istana was left in 1938, there wasn't any activity happened in Istana Bandar since then. Some of them who worked in Istana Bandar came and cried reminiscing the moment when they were working in Istana Bandar. The event happened for two days only. I really want to thank all of you for doing this research and measured drawing project about Istana Bandar.

Interviewer : So now Istana Bandar is under restoration work right?

En. Aidy : It's not really restoration work. It was more towards cocoon type. The technique is quite new so I don't really know about that. Even Jabatan Warisan haven't applied the technique on their buildings yet. At the meantime we will maintain the building as it is. For a long-term plan we do have plans to make Istana Bandar as a living museum but it depends on the decision of the state because it requires a lot of budget.

Interviewer : There was a rustic frame figure at the front of the Istana which is near to the guardhouse. What was the function of the rustic frame back then?

En. Aidy : I heard some of you said it was a place to receive punishment. I think it's not a place to receive punishment because as far as I know, someone told me that it was actually a clock. It was a sundial. I don't think they make a place for punishment at that side of Istana Bandar. What I know is that during the Japanese occupation, the place for punishment to cut their head off is under the big tree facing the palm oil plantations but the tree wasn't there anymore.

Interviewer : Alright that is all the questions that we have. Thank you for your time

En. Aidy : You're welcome.

Interviewer: Aidy Khairunizam Abdullah

10.3 List of Glossary

A

Anak Dabus - A prop for the tarian dabus.

Arch - Any overhead curvature above the window or door, resembling an arch.

Architrave - A molded frame around a door or a window.

Archivolt - An ornamental molding or band following the curve on the underside of the arches.

Astaka - Royal pavilion

Axonometric views - Using or denoting an orthographic projection of an object, such as a building, on a plane inclined to each of the three principal axes of the object; three-dimensional but without perspective.

B

Balai mengadap - Assembly Hall

Balai rong seri - Throne Room

Baluster - Short column used in a group to support a rail, as commonly found on the side of a stairway

Balustrade - A railing with supporting the handrail.

Balustrades - A railing at the side of a staircase or balcony to prevent people from falling.

Bandar Diraja - Royal city.

Bargeboard - A board fastened to the projecting gables of a roof to give them strength and to mask, hide and protect the otherwise exposed end of the horizontal timbers or purlins of the roof to which they were attached.

Barrel-style or Mission-style - Semi-cylindrical tiles laid in alternating columns of convex and concave tiles. Originally they were made by forming clay around a curved surface, often a log or the maker's thigh. Today barrel tiles are mass-produced from clay, metal, concrete or plastic.

Batten - Has multiple meanings in construction and shipbuilding but is generally a strip of solid material, historically made from wood but can also be made from plastic, metal, or fiberglass used to hold something in place or as a fastening against a wall.

Bekas Gabenor - Former governor.

Bilik - Room

Bilik menunggu - Waiting room

Bilik pejabat - office

Bolts and nuts - A nut is a type of fastener with a threaded hole. Nuts are almost always used opposite a mating bolt to fasten a stack of parts together. Bolt is a type of fastener characterized by a helical ridge, known as a male thread (external thread) or just thread, wrapped around a cylinder.

The two partners are kept together by a combination of their threads' friction, a slight stretch of the bolt, and compression of the parts.

Bosh GLM 250 VF Professional - A type of construction tool that provides numerous useful measurement such as distance, angle and volume and calculation functions.

C

Capital - The upper part of a column that supports the entablature.

Carriage - A framing underneath stairs which functions to add support to the entire structure.

Cartouche - A carved tablet or drawing representing a scroll with rolled-up ends, used ornamentally or bearing an inscription.

Ceiling Frames - The horizontal area between the top of walls and the roof. Consists of: ceiling joists, trimmers, hanging beams and counter beams.

Cement Mortar - a building compound used to bind masonry blocks together or to plaster over masonry created by mixing lime, cement, sand, aggregate and water

Chinese architecture - A style of architecture which greatly influenced by Chinese tradition and culture starting from Shang dynasty.

Closed string - A string with the face housed/trenched to accommodate treads and risers of staircase so their profile cannot be seen.

Colonial architecture - The mixture of western, mogul and Moorish architecture style.

Column - A tall vertical cylindrical structure standing upright and used to support a structure.

Concession - the right to use land or other property for a specified purpose, granted by a government, company, or other controlling body in return for services or for a particular use.

Cornice - The topmost projecting part of an entablature and a molding at the top of wall.

Courtyard - An area wholly or partly surrounded by walls or buildings.

Crenelated Arches - a curved symmetrical structure spanning an opening and typically supporting the weight of a bridge, roof, or wall above it with a rampart built around the top of a castle with regular gaps.

Crenelated arches - An arch which built on the top of the façade of palace with regular gaps.

Crenelation - A rampart built around the top of a castle with regular gaps for firing arrows or guns.

Cut string - A string with the upper edge cut away to the shape of the treads and risers so that their profile can be seen from the side of staircase.

D

Dabus - A traditional Malay dance Malay that originated from the Perak and contain religious elements associated with the heroism of Hadrat Ali.

Datum line - A standard of comparison or point of reference, the horizontal or base line, from which the heights of points are reckoned or measured.

Dentil - A small rectangular block which used in a repeating order to form the moulding of cornice.

Door frame - The surrounding edge of the door in which the panel is attached

Door panel - A piece of wood placed into openings of a door. A leaf placed inside the stiles and rails held by moulding.

Double dog leg staircase - A half return staircase forming by two straight flight which connected side by side by the intervening landing.

Duli Yang Maha Mulia Sultan - The title of Royal, on a par with His Royal Highness, which is used in speeches or words addressed to the government of the Kings in Malaysia.

Dumpy level - Also known as builder's auto level, levelling instrument, or automatic level is an optical instrument used to establish or check points in the same horizontal plane. It is used in surveying and building to transfer, measure, or set horizontal levels.

E

Entablature - The upper part of the door usually supported by columns comprising of an architrave or cornice.

F

Fascia - A frieze or band running horizontally and situated vertically under a roof edge, or which forms the outer surface of a cornice, visible to an observer. Typically consisting of a wooden board or sheet metal.

Finials - An element marking the top or end of some object, often formed to be a decorative feature.

Fixed light window - A window or a portion of a window, mainly of glass that does not open.

Frieze - An architectural ornament consisting of a horizontal sculptured band between the architrave and the cornice.

G

Gable Finial - A relatively small, ornamental, terminal feature at the top of a gable.

Gable Finial - A vertical ornament positioned at the middle of the end of the other elements.

Gable roof - A roof sloping downward in two parts at an angle from a central ridge, so as to leave a gable at each end. It is easy to build, sheds water well, provides for ventilation, and can be applied to most house designs.

Gasing - A Malay traditional game where spinning tops can rotate on its axis, while balancing on one point.

Gayau - A type of traditional game play by using fruit called Gayau.

Gusset plate - A thick sheets of steel that are used to connect beams and girders to columns or to connect truss members.

H

Handrail - A railing at the side of a staircase or balcony to prevent people from falling and a fixed to posts or a wall for people to hold on to for support.

Harness - A support consisting of an arrangement of straps for holding something to the body.

Hinge - A movable mechanism in which a gate, window or a door opens and closes

Hip roof - A type of roof that slopes upward from all sides of a structure, having no vertical ends.

Horseshoe Arches - Also called the Moorish arch and the keyhole arch is the traditional arch of the Islamic architecture. Horseshoe arches can take rounded, pointed or lobed form.

I

Iftar - It is the evening meal when Muslims end their daily Ramadan fast at sunset.

Inflected Arches - Change in curvature of an arc

Installed - place (someone) in a new position of authority, especially with ceremony

Islamic architecture - A style of architecture which was influenced by ancient structures that have already existed in Egyptian, Roman, Mesopotamian, Byzantine and Persian lands. Muslims conquered all of these places in the 7th and 8th centuries. Other than that, it was also influenced by Chinese and Indian architecture.

J

Jali - A term for a perforated stone or latticed screen from Indian architecture, Indo-Islamic Architecture and Islamic Architecture. The ornament pattern is usually formed via the use of calligraphy and geometry.

Jalinan Adat - A sharing session of a custom.

Jalousie window - A window comprising parallel glass, acrylic or wooden louvers set in a frame.

Javanese - The Javanese are an ethnic group native to the Indonesian island of Java.

Jawi - An Arabic alphabet for writing the Malay language Acehnese, Minangkabau, Banjarese and several other languages in Southeast Asia.

K

Kamar santap diraja - Royal Banquet Room

Kamar beradu - Royal Room

Kekisi - A type of ornament which provided better ventilation.

Kerawang - A type of Malay traditional wooden craving.

Keyhole Arches - Also called the Moorish arch and the horseshoe arch is the traditional arch of the Islamic architecture. Horseshoe arches can take rounded, pointed or lobed form.

King post truss - A type of roof truss with a vertical framing member that connects that upper and lower chords in the truss.

L

Laman - Courtyard

Lattice window - Window with a structure consisting of wood or metal crossed and fastened together with square or diamond spaces left between.

Leveller - Used to make sure that correct measurements are taken when measuring the elevation or the grade of an area. Levels provide accurate readings on the correct horizontal level, and some of them give an accurate vertical level as well.

Lintel - Top part of a doorway, also known as the top jamb or the head.

Load bearing wall - A wall that bears a load resting upon it by conducting its weight to a foundation structure.

Lock rail - Horizontal element of a door in which the locking mechanism is installed.

Louvered window - Windows with horizontal slats that ventilate light and air but prevent rain, direct sunshine and noise.

Luwu - The oldest Kingdom in South Sulawesi, Indonesia

M

Malay architecture - A style of architecture which influenced by climate and weather.

Minaret - A tower like structure, mostly with a balcony in which muezzin calls Muslims to prayer.

Mobile crane - A type of major construction cranes which is used to hoist and place materials and machineries.

Mogul architecture - The mixture of Islamic India and Persian architecture which flourished on the Indian subcontinent during the reign of the Mogul Empire. This style is originated from 1526.

Moorish architecture - A style of architecture which developed in the North Africa and south-western Europe, especially from Spain and Portugal. It is famous during 8th to 15th century and strongly influenced by the Islamic culture.

Mortise and Tenon joint - One of the most common joints used by woodworkers and is the traditional corner joint for sturdy frames. It's a joint made by inserting tenon on one piece into mortise holes in the other.

Mortise joint - Any of various joints between two pieces of timber or the like in which a tenon is housed in or secured to a mortise.

Motif - A decorative design that consists of recurring shapes or colors.

Moulding - Material fitted with decorative architectural feature.

N

Newel - Also called as a central pole, is the central supporting pillar of a spiral staircase. It can also refer to an upright post that supports the handrail of a stair banister.

Nosing - The edge of the tread projecting beyond the face of the riser and the face of a cut string.

O

Ogee Arches - A pointed arch which has an S- shaped curve on both sides.

Ogee arches - Ogee arch is an arch with a pointed apex, formed by the intersection of two S curves.

Ornament - An element used to make either the door or window more attractive but usually having no practical purpose.

P

Pad foundation - A square or rectangular foundation that is use to support individual or multiple columns, spreading the load to the ground below.

Pagoda - Normally a Hindu or Buddhist temple, in the form of a many-tiered tower.

Pangkalan - Depot/ jetty.

Perforation system - Beams are placed on top of a pile of bricks with bricks arranged surrounding the beam and form the pole on the floor above.

Pilaster - A rectangular column projecting out from the wall.

Pinnacle - An ornament which formed by the cap or crown of a buttress, as well as the small turret. It resembles a small spire which commonly used in Gothic architecture. It was later used on the parapets at the corners of the tower.

Pitched Roof - A roof having one or more surfaces with a slope greater than 10° from the horizontal.

Pond - A small lake.

Portico - A porch leading to the entrance of a building, or extended as a colonnade, with a roof structure over a walkway, supported by columns or enclosed by walls.

Post-and-beam - A general term for building with heavy timbers framework of upright and horizontal beams.

Protectorate - A state that is controlled and protected by another.

Purlin - Any longitudinal, horizontal, structural member in a roof except a type of framing with what is called a crown plate.

R

Rafter - A beam forming part of the internal framework of a roof.

Railing - A barrier consisting of a horizontal bar and supports.

Ramadhan month - It is the ninth month of the Islamic calendar; Muslims worldwide observe this as a month of fasting.

Rebated jamb - A jamb with a recess or groove cut into the edge of a door.

Ridge board - A timber laid along the ridge of a roof, to which the upper ends of the rafters are attached.

Ridge - The line or edge formed where the two sloping sides of a roof meet at the top.

Riser - The board that forms the face of the step of staircase. The maximum individual rise for domestic flights is 220mm.

Riser - The vertical part of a stair or step.

Roof eaves - The edges of the roof which overhang the face of a wall and, normally, project beyond the side of a building.

Roof lantern - A mixture of the Chinese pagoda roof and the western roof lantern.

Roof truss - A structural components of houses or commercial buildings, support the weight of roof timbers and coverings and of wind loads on the upper chord.

Roof - The structure forming the upper covering of a building.

Ruang Beristirehat - Resting Area

Rumah Pasung - Police station/ jail.

S

Safety line - A line serves to protect the laying personnel.

Sampan - A small boat of a kind used in East Asia, typically with an oar or oars at the stern.

Santau - Black magic involving the supposed invocation of evil spirits for evil purposes.

Scalloped Arches - An arch having more than five foils, a design found in Moorish architecture.

Single footing - The lower part of a foundation of a column, wall, building. The loaded area of the column has been spread to the size through a single spread. The base is generally made of concrete.

Sisik naga - A type of wood carving which found at the ridge of the roof in palace.

Skylight - A window set in a roof or ceiling at the same angle.

Slabs - A large, thick, flat piece of stone or concrete, typically square or rectangular in shape.

Slate - A fine-grained grey, green, or bluish-purple metamorphic rock easily split into smooth, flat plates.

Sloped footing - The concrete base that does not have uniform thickness, but is made sloped, with greater thickness at its junction with the column and smaller thickness at the ends.

Staircase - A way of access consisting of a set of steps.

Stalactites - Also called as Muqarnas in Arabic, is an architectural ornamentation reminiscent of stalactites, a type of corbel employed as a decorative device in traditional Islamic and Persian architecture.

Stepped footing - A footing in which the desired width is secured by a series of steps in about the proportion of one unit of horizontal dimension to two units of vertical dimension.

Straight staircase - A single, straight flight of stairs that connects two levels or floors in a building.

String capping - The over-the-post handrail fitting installed over a newel post for continuous or smooth handrail

Strip foundation - Consist of a continuous strip, usually of concrete, formed centrally under load bearing walls.

Stucco - A plaster which mostly made from cement, sand and lime; applied while soft to cover exterior wall and surface.

Sulur Bayung - An ornament placed at the edge of the roof. It is influenced by Chinese belief and resembles the head of mythical dragon.

Suspended flooring - A floor slab where its perimeter is, or at least two of its opposite edges are, supported on walls, beams or columns that carry its self-weight and imposed loading. It spans the entire distance between end supports without additional support in the middle.

T

Tarian dabus - A traditional Malay dance where it is believed to conjure the spirits and due to the extreme fanatical obsession of the dancers to the extend where they would injure themselves and hurt their bodies by cutting themselves using an ‘Anak Dabus’.

Temasya - games

Terracotta Roof - Roof tile that made of a hard, fired clay, brownish-red in colour when unglazed.

Theodolite - An optical instrument consisting of a small mounted telescope rotatable in horizontal and vertical planes, used to measure angles in surveying.

Tiang Seri - Major pillars of the Malay houses are usually build up at first during the construction.

Transom bar - A structural beam or a bar separating a door from the window above it.

Tread - The top or horizontal surface of a step of staircase.

Tumpu Kasau - Also called fascia in English, a flat horizontal band or member between mouldings, especially in a classical entablature. / A type of wood carving which arranged horizontally and found at the roof eaves of palace.

V

Ventilation block - A decorative ornament which allowed the fresh air and light penetration into the interior.

Veranda - A porch along the outside of the building and sometimes partly enclosed.

W

Window cornice - A decorative moulding that crowns a window.

10.4 List of References

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