

# Analysis of Space Management Following the Successful Transformation of the Malaysia Agriculture Expo Park Serdang (MAEPS) into a Low Risk COVID-19 Quarantine and Treatment Centre

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## ABSTRACT

The conversion of the Malaysia Agriculture Expo Park Serdang (MAEPS) is the fastest built Low Risk COVID-19 Quarantine and Treatment Centre catering for the predicted overflow of COVID-19 patients in Malaysia. This study examined the reasons for the successful transformation, as well as identified the building characteristics that allowed spaces to be selected as sites for a Low Risk COVID-19 quarantine and treatment centre. The methodology employed was a qualitative analysis of secondary resources, a site observation at MAEPS, and a focus group interview. The findings indicated that the architecture of MAEPS, especially Hall A, contributed to the successful transformation through the design of a columnless interior and positive cooperation and the sharing of expertise between the parties involved. The results enhance our understanding of architectural influences on social needs and space conversion. The management of the team and compliance with the guidelines and procedures of pandemic management led to a successful transformation within a short period of time.

**Keywords:** Covid-19, MAEPS, space transformation, quarantine.

## I INTRODUCTION

This study examined the factors facilitating the magnificent transformation of a conventional hall in Malaysia Agriculture Expo Park Serdang (MAEPS) into Malaysia's first Low Risk COVID-19 Quarantine and Treatment Centre (PKRC) with 600 beds. MAEPS was also honoured as the "Fastest to Complete Interim Treatment Centre" by the Malaysia Book of Record (MBR) on 15 July 2020, during the closing ceremony of the PKRC (Ramayah, 2020; Saipul, Mahaizura and Rosyahaida, 2020). It was the brainchild of the prime minister and entailed a multi-agency collaboration between the Ministry of Health

(MOH), National Disaster Management Agency (NADMA), Angkatan Tentera Malaysia (ATM), Polis Diraja Malaysia (PDRM), Jabatan Bomba & Penyelamat Malaysia (JBPM), Angkatan Pertahanan Awam Malaysia (APM), Jabatan Imigresen Malaysia, Jabatan Penjara Malaysia, Jabatan Sukarelawan Malaysia (RELA), Malaysia Genome Institute (MGI), Jabatan Kebajikan Masyarakat (JKM), MAEPS and various private entities and non-government organisations (NGOs) (Abd Samad, 2020). This PKRC officially opened on 16 April 2020 and the first treatment was administered on 21 April 2020. A total of 1362 patients received the treatment, of whom 94% were males and 69% were illegal foreigners. The total workforce comprised 1157 personnel from various agencies (665 medical and 492 security personnel) (Abd Samad, 2020). The successful recognition of MAEPS as a PKRC was therefore examined with a focus on space management and how the work was completed to fulfil the vision of the prime minister. This was to transform the convention hall into a PKRC with completed facilities and services similar to that of a hospital such as clinical services, a ward for COVID-19 patients, a pharmacy, X-ray room, resuscitation rooms to stabilise patients in emergency situations, and pathology laboratory services (interview with Encik Zaidi b Shahrim, CEO Mardi Corp., 2020).

## II METHODOLOGY

A qualitative methodology was employed to achieve the objectives of this study. Secondary sources were examined to study the guidelines for the transformation process and the design characteristics of the MAEPS, especially the design of Hall A. A focus group interview was conducted with the Chief Executive Officer of Mardi Corp and staff to determine the exact operational works undertaken during the transformation by the Mardi Corporation, which was responsible for the venue owner and facilities. The sharing of experiences illuminated the

management and monitoring of all teams and the spaces needed. The data were analysed and the findings utilised to determine the factors underpinning the successful transformation of MAEPS in a short period of time into the first massive interim quarantine centre for Malaysia.

### III RESULTS AND FINDINGS

Several guidelines were provided by the Ministry of Health (MOH) and the National Disaster Management Agency (NADMA) that focused on developing and operating the quarantine centre. The facilities provided in MAEPS were the first in Malaysia to form part of a quarantine and Low Risk COVID-19 Treatment Centre comprising two main halls covering 14200 m<sup>2</sup> and 604 beds for PUS. The transformation was led by NADMA to the Work Department (JKR) overseen by Arkitek Hasnah Yun and had to face the challenge of complying with requirements regarding spatial organisation and human movements to control the infectious disease. The design also had to fulfil the active and passive fire protection requirements of the Fire Fighter Department. This included a requirement for pathways and an emergency assembly point, the location of fire extinguishers, and appropriate signages. Figure 1 presents a Summary on the Management of Cases in the Quarantine Centre by the Ministry of Health (MOH, 2020).

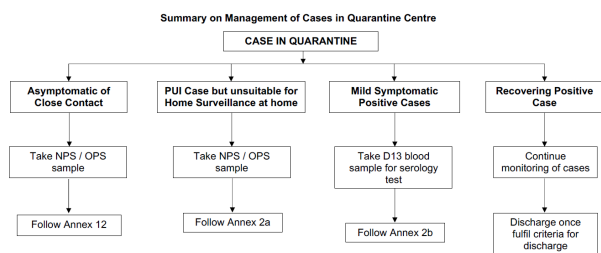


Figure 1. The Flow of Operation in a Quarantine Centre by MOH (MOH, 2020)

MOH also announced the Guideline of Quarantine Station (Guidelines COVID-19 Management No.5/2020 updated on 24 March 2020) whereby the establishment of a quarantine station is a requirement under Section 14 of the Prevention and Control of Infectious Disease Act 1988 (Act 342) (MOH, 2020). According to the Act, “The quarantine station is to be used for isolation or observation of any person who is infected or whom the Authorized Officer has reason to believe is infected to be removed to a quarantine station until the person can be discharged without posing any danger to the public” (2020). This involves the

cooperation of multiple agencies such as the District Health Office, District Welfare Department, Malaysian Royal Police, Army, Local Council and, PGA, and others. MAEPS as a PKRC at national level therefore complied with the guidelines as stated in Annex 32 Quarantine centre (<http://covid-19.moh.gov.my/garis-panduan/>, 2020). According to En Zaidi (2020), the management in this PKRC of MAEPS was strictly accomplished with 100% compliance among local companies to the guidelines stated in Annex 32. In terms of the details, the objectives of establishing a quarantine centre were to separate infected and potentially infected persons from healthy people. In addition, it aimed to control the movement of those infected to prevent the disease from spreading. MAEPS also fulfilled the pre-requisites for a gazette centre for quarantine as follows:

i. Space layout:

The distance between each bed must be at least 1 metre apart if shared space is inevitable. This cohorting procedure applies only to positive situations (MOH, 2020). MAEPS also complied with other prerequisites such as providing a room for PPE and clinical examinations. The beds provided were made by a local company that assembled and painted them at MAEPS within four days of the establishment of the PKRC. They had to ensure that the beds followed the MOH requirements with no edgy surfaces and no fabric used as material for the mattress and pillow covers. In terms of amenities and facilities, the MAEPS convention hall was already provided with toilets, some of which had to be renovated to become bathrooms with specifications that considered safety and health.

ii. Security and safety:

In addition, MAEPS was monitored under the National Security Council to ensure requirements for quarantine premises were met. Safety was overseen by Polis Diraja Malaysia (PDRM), the Army, and RELA. There were two sharpshooters or snipers located at the tower near to Hall A, MAEPS, to cover the boundary of the premises which were also protected by barbed wire fences. Additionally, the security and safety aspects were emphasised and assisted by Angkatan Tentera Malaysia (ATM) and PDRM, such as the spatial organisation focusing on the openings and the building perimeter, including the coordination of keys and

tagging. Selection of the material for the PKRC also had to conform to health and safety factors.

iii. Cleanliness

There were two types of cleanliness that needed to be provided: clinical waste for which the District Health Office was responsible and general cleanliness and general waste for which the Local Council was responsible.

iv. Food:

The food supply had to pass tests for nutrition and potential poison three times before being distributed to the patients and those on the frontline under the supervision of the District Health Office. The District Welfare Department was responsible for the food supply.

v. Staff duty:

The Incidence Commander coordinated the staff on duty throughout the MAEPS as it became a PKRC.

vi. Linen:

The concession extended from the hospital services managed the linen and clinical waste at MAEPS.

vii. Water supply:

The Work Department was responsible for supplying water to the quarantine centre.

The National Disaster Management Agency (NADMA) provided the Guidelines Entry and Quarantine Process Person under Surveillance (PUS) Arriving from Abroad (24 July 2020). This was due to the spread of COVID-19 by foreigners entering Malaysia and was stated under Act 1988 (Act 342) Section 15 (1), beginning on 24 July 2020. Figure 2 presents the quarantine procedure that started on 24 July 2020 upon arrival in Malaysia. The quarantine period could be as long as 14 days or any other period stipulated by the MOH.

NADMA MALAYSIA  
Quarantine Procedure Starting July 24th, 2020

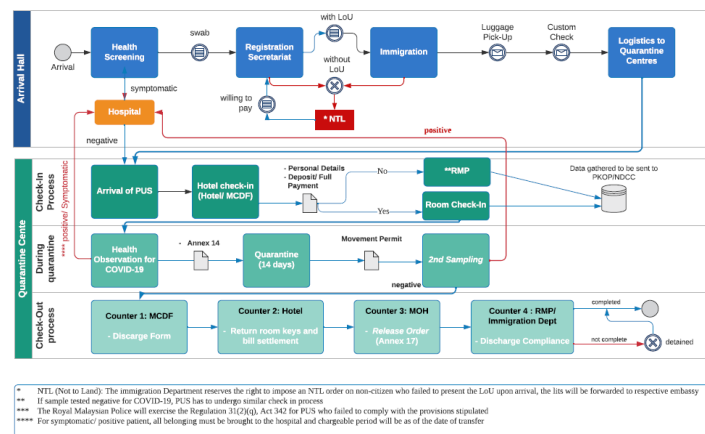
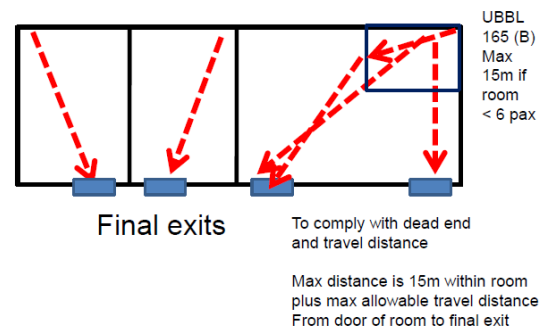


Figure 2. Quarantine Procedure Starting July 24<sup>th</sup>, 2020 (NADMA, 2020)

This follows the requirement stated in *UBBL 133 Final Exit*, *UBBL 166 Alternative exits*, *UBBL 171 Horizontal exit* and *UBBL 133, UBBL 169 Exit route*. As elaborated in *UBBL 165*, the travel distance in the designated area should be reachable, as shown in Figure 3. The width of the openings to Hall A and Hall C fulfilled the requirements of all stated emergency exits and travel distance, albeit with strict security reinforcements. MAEPS also had to comply with access to fire devices such as fire trucks, pumping appliances for extended ladders, turntables, and hydraulic platforms as required by the Fire Fighter Department.



Evacuation : multiple areas

Figure 3. UBBL 165 showing the Travel Distance for Evacuation for Multiple Areas in MAEPS PKRC (NADMA, 2020)

The security system was also assisted by CCTV, a public announcement system, and wireless intercom. The MAEPS, as a PKRC, was provided with free high speed Wi-Fi access contributed by Telecom Malaysia (TM) to ease the health recording and registration system in this PKRC (Rafidah, 2020).

The involvement and contributions of multiple agencies following the transformation of MAEPS to a PKRC is summarised in Figure 4. All agencies stated in Figure 4 were provided with expertise in significant areas, resulting in the tremendous solution and successful spatial organisation and circulation of Hall A and Hall C in MAEPS as a PKRC. Although this was the first time some of the agencies had worked together, they managed to cooperate

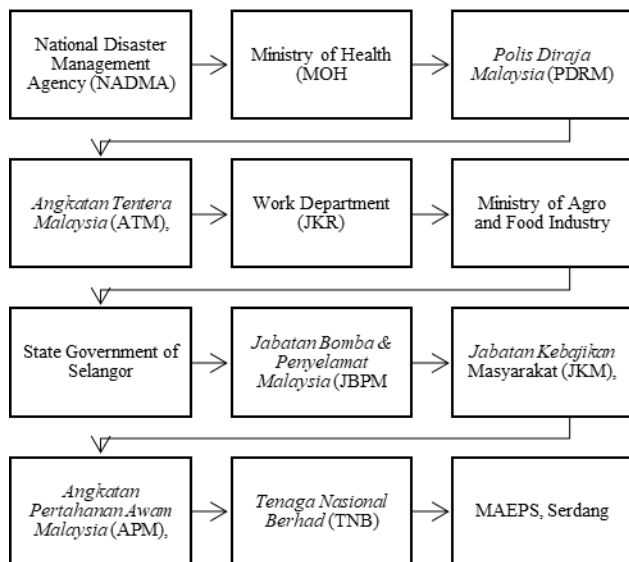


Figure 4. Work Flow showing the Contributions and Execution of Agencies involved in the Transformation of MAEPS to PKRC (Mardi Corp., 2020)

The local companies that contributed to establishing MAEPS as the first Malaysian PKRC within four days are listed in Table 1:

Table 1. List of Local Vendors for PKRC MAEPS (Mardi Corp., 2020)

No.	Vendor	Services/Supplies
1.	Qube Integrated Malaysia Sdn Bhd	Shell scheme (Hall A)
2.	Q Caterers	Catering services
3.	Vantage Five Sdn Bhd A	Ward, shell scheme- Hall A
4.	Fuzi Dream Furniture Industries Sdn. Bhd.	Bed, mattress, pillow, cabinet- Hall A
5.	JMP Production Sdn Bhd	AV system
6.	Binsabi Sdn Bhd	Tentages

7.	Abar Global Solution	Mechanical support
8.	Advanced Profinity Sdn Bhd	Bed, mattress, pillow, cabinet- Hall C
9.	Hartamas Ceria Sdn Bhd	Tentages
10.	Neutral Hightech	IT services
11.	View Green Enterprise	Cleaning services
12.	Kejuruteraan RI	Electrical support
13.	Cemong Computer	Supply IT hardware
14.	Eqool Enviro Sdn Bhd	Supply Air Cooler
15.	Senheng Electric (Kl) Sdn Bhd	Electrical appliances
16.	TOI Services Sdn Bhd	Portable toilets
17.	AJAY Tailoring	Uniform (for frontliners)
18.	Locker & Lock Sdn. Bhd.	Locker
19.	Flora Pest Control	Vector control
20.	RadiFems Sdn Bhd	Biological/ clinical waste

#### IV DISCUSSION

As shown in Figure 5, the spacious Hall A of MAEPS indicates the multi-purpose area that can be convert into any desired spaces. MAEPS was built by a well-known builder, UEM Builders Berhad, with a columnless interior supported with cables from the exterior for roofing. Figure 6 depicts the architecture of Hall A of MAEPS and Figure 7 displays the interior of Hall A.



Figure 5. Hall A, MAEPS from the Exterior (Mardi Corp., 2020)

The columnless spacious area in Hall A contributed to the fast transformation of this space into PKRC.

Figure 6 depicts the plan layout of Hall A before the transformation.



Figure 4. Plan Layout of Hall A, MAEPS, before the Transformation to PKRC ([www.maeps.com.my/exhibition-halls/hall-a](http://www.maeps.com.my/exhibition-halls/hall-a), 2020)

Ensuring the hall was columnless meant numerous compartments could be assigned in this hall during the transformation. NADMA and all agencies faced minimal challenges in organising the spatial zoning and circulation. Figure 5 depicts the plan layout of Hall A, MAEPS, after the transformation to PKRC. Hall A is a fully air-conditioned space with a height clearance of up to 9 metres, with 3 sectional wings converted to a gym and a rest area for PUS.

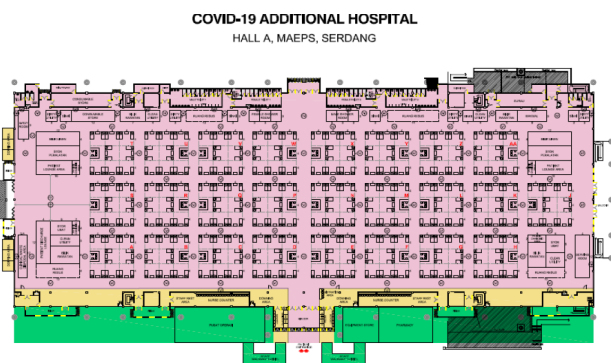


Figure 5. Plan Layout of Hall A, MAEPS, after the Transformation to PKRC (Mardi Corp., 2020)

According to Encik Zaidi, the other halls in MAEPS that were also converted to PKRC were Hall C, which was dedicated to those on the frontline with a capacity of 200 beds, and Hall DG with a capacity of 300 beds. Figure 6 displays the plan layout of Hall C before the transformation while Figure 7 depicts the plan layout of Hall C after the transformation. However, following the opening of MAEPS as a PKRC, Hall DG was not used as both Hall A and Hall C managed to accommodate the numbers of PUS in this centre. Both Hall A and Hall C were segregated with a specific zone, namely a Green Zone, for treatment and services, a Yellow Zone for the offices of those on the frontline and a

surveillance area, and a Red Zone allocated for beds for the PUS and patients. Figure 8 depicts Hall DG during the planning of the conversion to PKRC (Mardi Corp., 2020).

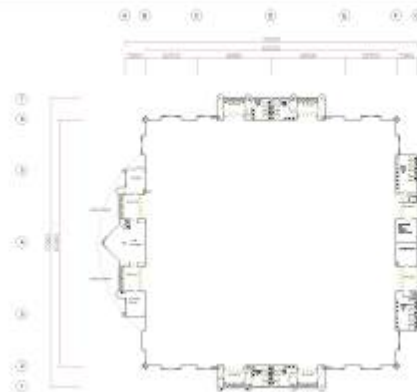


Figure 6. Plan Layout of Hall C, MAEPS, before the Transformation to PKRC (Mardi Corp., 2020)

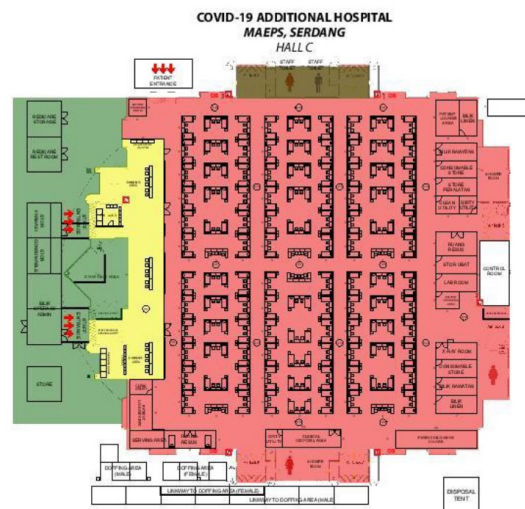


Figure 7. Plan Layout of Hall C, MAEPS, after the Transformation to PKRC (Mardi Corp., 2020)

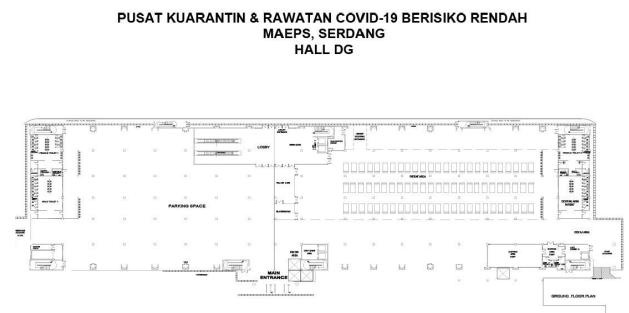


Figure 8. Plan Layout of Hall DG, MAEPS, after the Transformation to PKRC (Mardi Corp., 2020)

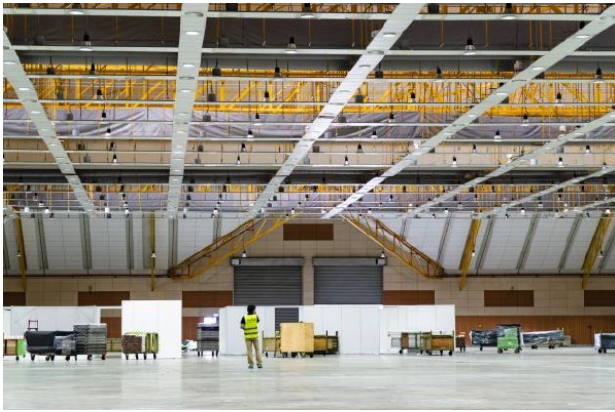


Figure 11. Spacious Interior Hall A, MAEPS, before the Transformation to PKRC (Mardi Corp., 2020)

Compliance with the guidelines, laws and regulations regarding the special implementation of material spaces along with the facilities achieved the planned objectives. Figure 12 demonstrates that the measurements complied with the MOH guidelines as the compartment panels are 10 feet in height and the distance between the beds exceeded 1 metre.

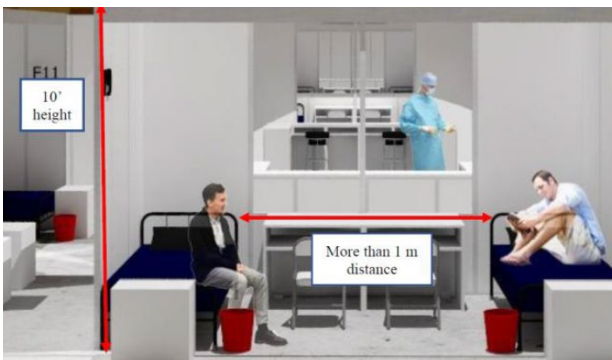


Figure 12. The Compartment Space for PUS in the PKRC (Author, 2020)

The activities inside Hall A were under the surveillance of those on the frontline with a high consideration for safety from any potential infection diseases. The circulation and spatial organisation of the Red Zone allocated for the Person Under Surveillance (PUS) complied with infection protection standards by ensuring the correct distance and height of all compartments. COVID-19 is believed to spread by water-droplets and is not an airborne spreader. Figure 13 depicts the work of fitting the compartments by the contractors during the transformation of Hall A to PKRC within four days. The compartment allows the PUS to not only be monitored but also to have the privacy required for them to rest and sleep. Figure 14 depicts the example proportion in the cubicles of Hall A.

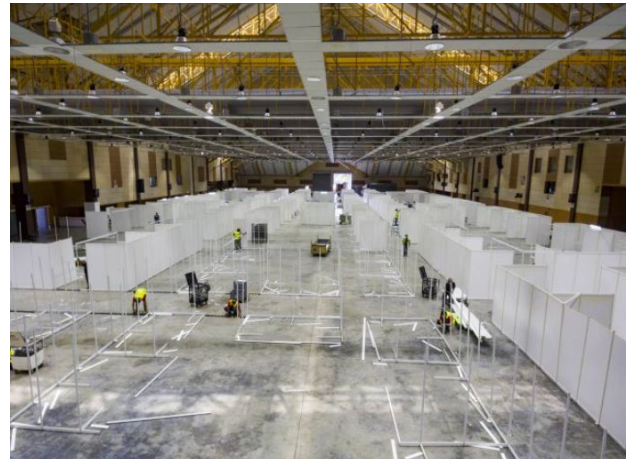


Figure 13. The Process of Fitting the Compartments to transform Hall A to PKRC (Mardi Corp., 2020)

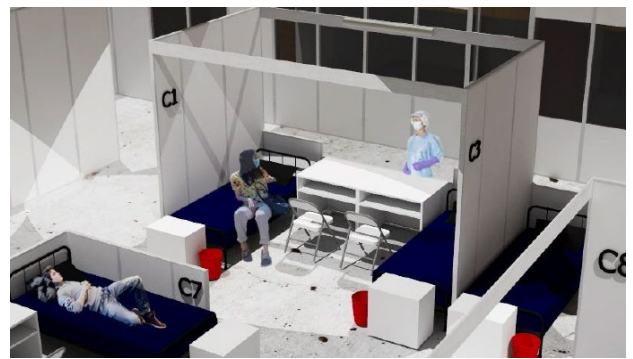


Figure 14. Activities in Hall A as PKRC (Author, 2020)

In this Red Zone, PKRC also accommodated a lounge area for the PUS. Figure 15 depicts example activities in the lounge area.

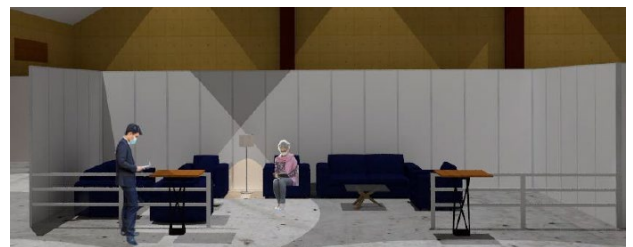


Figure 15. The Lounge Area for PUS in Hall A, PKRC (Author, 2020)

The Yellow Zone was dedicated to a registration counter and also a surveillance area for those on the frontline. Figure 16 depicts the compartment for the surveillance counter that complied with standard measurements to avoid direct contact with PUS.



Figure 16. The Image Surveillance Counter in the Yellow Zone (Author, 2020)

Hall C was specifically dedicated to those on the frontline. It comprised a meeting area, resting area, lounge, a counselling area, and more as most staff were unable to return home. Figure 17 displays the resting area.



Figure 17. Beds for those on the frontline at Hall C (Mardi Corp., 2020)

## V CONCLUSION

The transformation of Hall A, MAEPS, to the first Low Risk COVID-19 Quarantine and Treatment Centre in Malaysia was supported by a spacious columnless design that substantially eased the work of transformation which meant that it was completed in a short period of time. Only four days were needed to set up the space by a selection of local agencies and experts working in collaboration. The findings of this study enhance our understanding of how a multi-functional space with a wise design can be successfully and easily transformed into the ideal spaces needed through the construction of a solid supported system. Procedures and health policy were complied with during the space conversion, and the first Low Risk COVID-19 Quarantine and Treatment Centre, MAEPS, can be a benchmark for guidelines to develop a fast and effective Low Risk COVID-19 Quarantine and Treatment Centre in the future.

## ACKNOWLEDGMENTS

The authors acknowledge the Research, Innovation and Commercialisation Center (RMIC), Universiti Malaysia Kelantan for supporting this project under the UMK Covid-19 Special Grant (UMK-C19SG) R/C19/A1200/00554A/003/2020/00775). Authors also acknowledge the CEO, and all officers in Mardi Corp. for assisting the project in achieving its objectives and making its contribution.

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