

# COVID-19

## The Potential Impact on Airport Terminal Design





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# INTERNATIONAL DEPARTURES





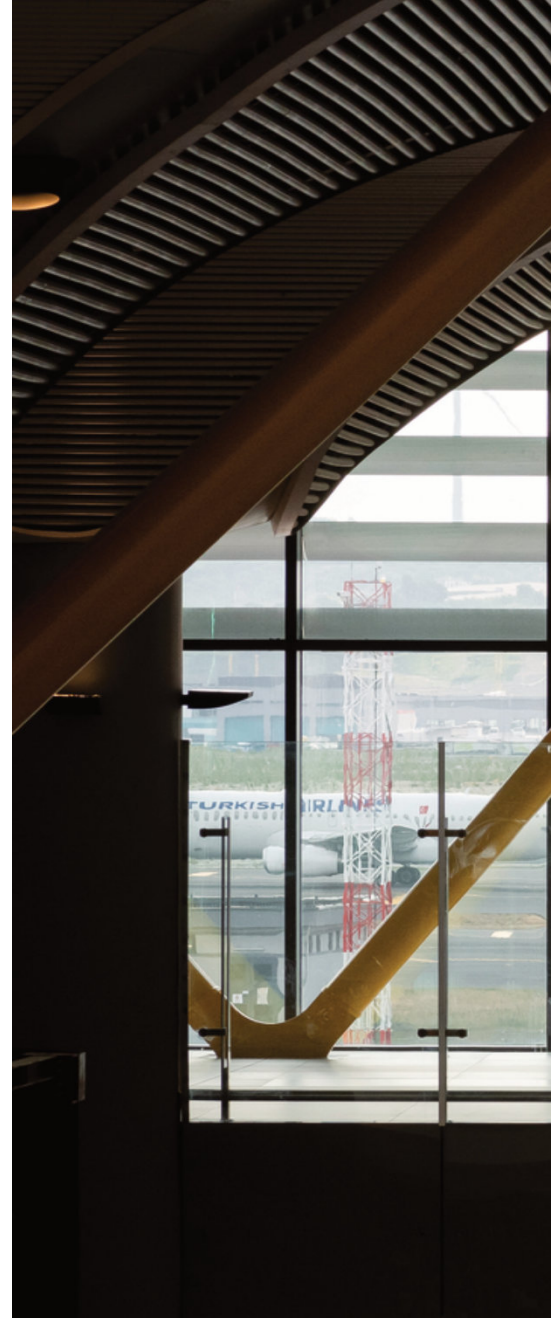
# 1.0 Disclaimer and Reference Documents

The following paper provides a menu of options on how to deal with the impact of the new health measures on airport processing facilities. However, it is not intended to provide any specific solution or guidance as this will depend on space availability and the layout of existing terminals.

Airport operators and investors are advised to employ a professional to analyse their facilities and ensure that all measures are compliant with the local health authority regulation and will not impact other statutory requirements including safety and security.

Reference Documents used in preparing this paper include:

- Operational considerations for managing COVID-19 cases or outbreak in aviation; interim guidance 18th March 2020 by WHO (World Health Organisation).
- ICAO Annex 9 and Annex 14 – (Guidance Document- Facilitation Manual and Model National Air Transport Facilitation Programme).
- ATA - Guidance for Cabin Operations During and Post Pandemic; Edition 1- 22 April 2020.
- ACI (Airports Council International) Airport Operational Practice- Examples for Managing COVID-19 2020.
- IATA , ADRM (Airport Development Reference Manual) 11th Edition.
- Airports web sites including Heathrow, Changi, Istanbul and Sydney.







## 2.0 Introduction

The impact of COVID-19 on the Aviation Industry has been unprecedented, ACI (Airport Council International) has reported that air travel is down by 95% from a year ago as a result of the travel ban and lockdowns in many countries. ACI has also estimated that passenger numbers for 2020 could drop by 40% representing a significant decline in revenue for airlines and airports across the world. So the question is “What can airports and airlines do to rebuild confidence in air travel?”.

Governments are facing many challenging issues and are trying very hard to contain the pandemic by introducing lockdowns and curfews. These measures were introduced in response to World Health Organisation (WHO) call to reduce human interaction and limit transmission of the contagion. The effect of this seems to have worked in many countries including China, where lockdown and travel restrictions within the country are being eased to get the economy back on track.

screening, staff protection, public awareness, sanitation and cleansing amongst other measures that have been implemented. It also considers alternative ways of addressing the impact of social distancing on terminal planning and operation raising a number of suggestions that may become the new norm. This may result in new guidelines being drawn up to determine the shape of future terminals.



## 3.0 Objectives



Major airports need to remain open during the lockdown in order to maintain essential medical and other cargo supplies. Currently in many countries, these airports are providing restricted repatriation and humanitarian flights.

It is becoming very clear that some form of restriction and social distancing are likely to remain in place until a vaccine or medical cure for COVID-19 becomes widely available to the general public.

As there is a gradual lifting of restrictions and easing of the lockdown, it is crucial for airports to look at ways to regain the trust of the travelling public, and provide safer environments for both in providing a safer working environment for its staff and passengers. This is no different to the security measures implemented after September 11 attacks in 2001, which became the new norm. Airports will have to comply with the local Health Authority and Civil Aviation Authority rules and regulations, which may differ between countries.

We have already seen a bounce back in domestic flights in China, with a significant increase in daily passenger numbers after the easing of the travel ban within the country. However, this initial jump in passenger numbers has now eased and has yet to reach the same level as prior to the pandemic. While this may provide encouraging signs for the aviation industry of a potential road map to recovery, it may only be achieved if there is a collaborative approach between airport operators and airlines in providing a safe working environment for staff and safe and healthy environments for the passengers, together with ensuring the safety of the public at large including all stakeholders who are involved in the aviation industry.

Airport operators and airlines will need to assess the impact of the new health and safety measures on their operating capacity and customer experience and comfort including:

- A potential reduction to the aircraft load factor, which may be limited to two thirds of its total number of seats to maintain social distancing.
- A potential increase in turnaround time for aircrafts and Stand utilisation time to allow time for the disinfecting and deep cleansing of aircraft between journeys.
- A potential reduction in the processing capacity of the terminal, as a result of decommissioning some lanes and a reducing passenger numbers in queuing zones as a result of social distancing.
- A potential increase in passenger journey time within the terminal due to the introduction of new health screening measures.
- A general reduction in space capacity of circulation and waiting areas.
- The potential need to create new isolation zones and quarantine areas.
- The potential increase in processing time and complexities associated with transferring passengers.
- The potential requirement to wear protective personal equipment (PPE) such as masks and gloves on arrival to the terminal to minimise the risk of contamination.

Whilst the rules governing the new health and safety measures may vary between countries, they share a common objective in providing a healthier environment, ensuring the safety of staff, passengers and the public.

This paper looks at the impacts these measures will have on terminal planning and throughput, and highlights a number of solutions that have already been implemented in some airports. It proposes alternatives that may help to minimise the impact on passenger capacity, whilst continuing to improve passenger comfort and confidence. As well as addressing lessons learnt, and how this pandemic may drive and accelerate innovation in future airport development.



## 4.0 Short Term Impact on Terminal Planning

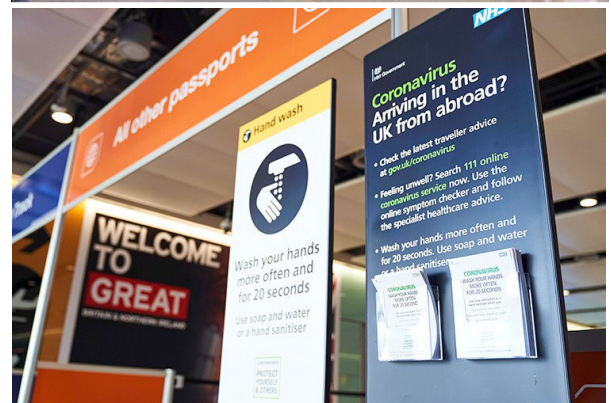
Airlines and airport operators are looking at the regulators for guidelines as to how travel can resume while COVID-19 remains a risk. Short term temporary measures to restore public confidence are therefore crucial and these will probably vary between countries dependent upon the safety requirements called for by the health authority and the Civil Aviation Authority. Airlines may add further measures as directed by the country they are flying to. Variations in the temporary measures may also be driven by the type of airport (international, domestic or charter).

Several airports continue their operations with reduced capacity and have put in place some measures in consultation with their local health authority. Istanbul Airport Operator for example introduced new health screening and social distancing measures. However, these measures may not be sufficient in dealing with this pandemic, and may not meet WHO and other International guidelines, which are necessary to restore the confidence of passengers and staff. There is therefore a need to have further in-depth research and evidenced based guidelines, that the regulatory bodies should introduce for all airports.



Heathrow airport, like many other European airports scaled down its operation given the reduced demand and are now using a single runway serving Terminals 2 and 5 only. Heathrow airport put in place several measures to maintain social distancing including 50% reduction to the operation of some processors, placing clear segregation screens along passenger queuing areas and also between staff and public as seen in the images above.

What is interesting to note between different airports is the measure for the social distancing where Istanbul airport calls for 1 meter, Sydney airport calls for 1.5 meters and Heathrow Airport calls for 2.0 meters as seen in the following images.



It should also be noted that communicating information to the public is as important as implementing these guidelines/instructions.

Common reporting standards used at Heathrow airport include:

- Social distancing voice messages and clear signage.
- Social distancing messaging on check in screens.
- Pre- boarding announcements regarding social distancing.
- Reconfiguring immigration queues to observe every other lane closed as well as FIDS displayed.
- Floor stickers when queuing.
- Social distancing signs displayed in car parks and outside of the terminal.
- Call for social distancing in rest rooms.



## 4.1 Staff Safety

Staff safety is extremely important and this must be ensured by the provision of adequate protective equipment in addition to other health screening, social distancing and the provision of a safe working environment where staff are shielded from potential exposure to the virus.

Staff safety measures may include:

- Health screening at entry to the terminal.
- Social distancing within their work environment and at passenger processing areas.
- Provision of segregation with clear screen to passenger facing staff (manual check-in, immigration, security and customs).
- Increase automation to reduce passenger facing activities.
- Provision of PPE and sanitizers.

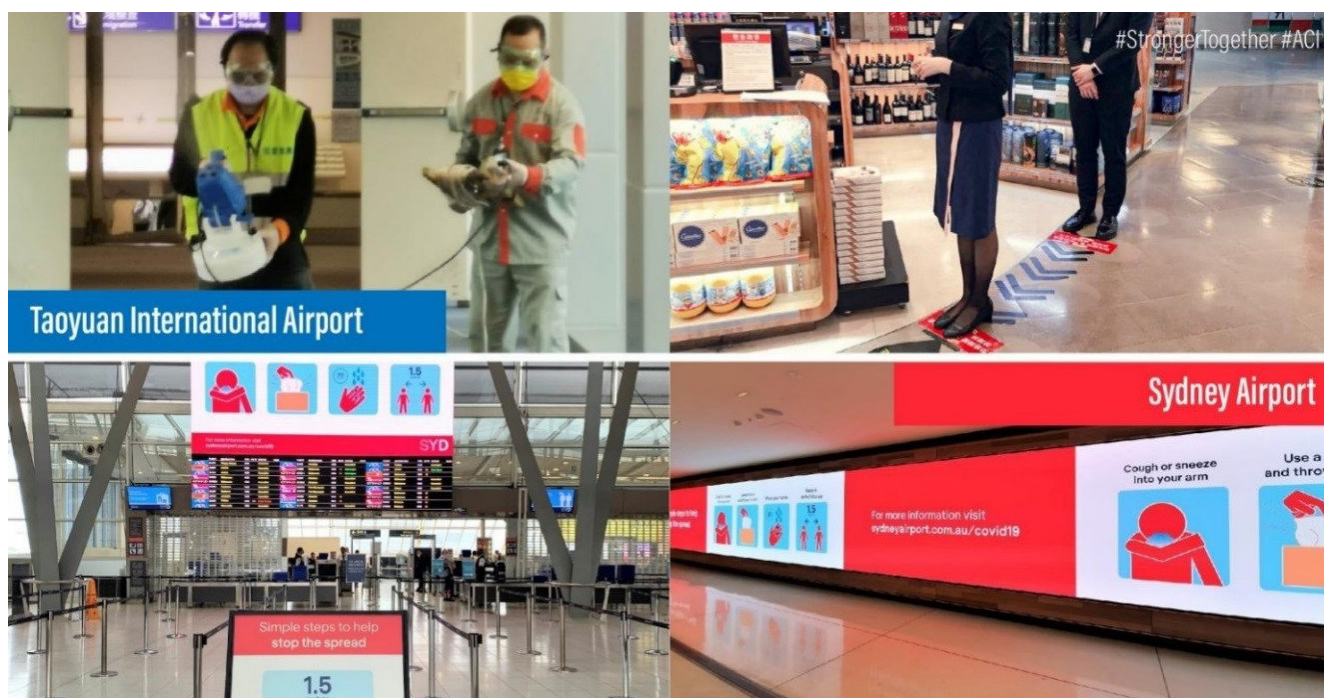
The ACI Document issued earlier this year; *Airport Operational Practice - Example for managing COVID-19* provides good examples and guidance notes to airports on staff training and induction, staff health checks, screening and wellbeing. It also provides operational suggestions on staggering shifts, conducting passenger security checks and maintaining social distancing within staff working areas. Together with advisory notes on cleaning and disinfecting staff facilities.

## 4.2 Passenger Safety

Passenger safety has always been an airport priority. However COVID-19 opens a new dimension that requires the adaptation of airport strategies, placing greater emphases on health to gain passenger confidence.

Passenger safety measures may include a number of new interventions as well as adjustments to the existing processing areas such as:

- Health screening at landside and airside entry points of the terminal for departing and arriving passengers respectively.
- Limitation on carry-on luggage to laptop and hand bag only.
- Wearing of face masks and potentially gloves within the terminal, the aircraft or both.
- Social distancing in all areas of the terminal.
- Segregated seating areas.
- Isolation and quarantine communication and public awareness including voice messaging and signs.
- Cleaning and disinfection of surfaces .
- Environmental control measures to public spaces.
- Provide additional information counters for health related queries/advice .





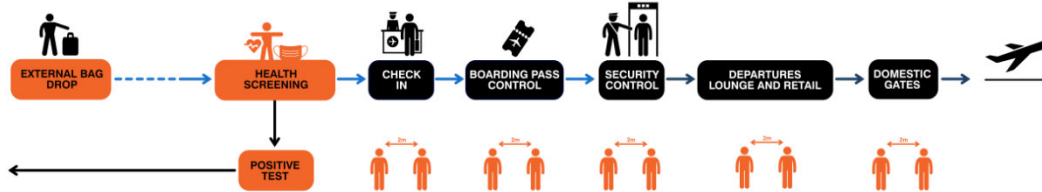
## 4.2.1 Passenger Flows

In order for us to understand the impact of the new passenger safety measures on the terminal planning and processing facilities it is best to reflect these new measures on the following passenger flows.

### Departing Passenger Flow - Domestic



Before COVID-19

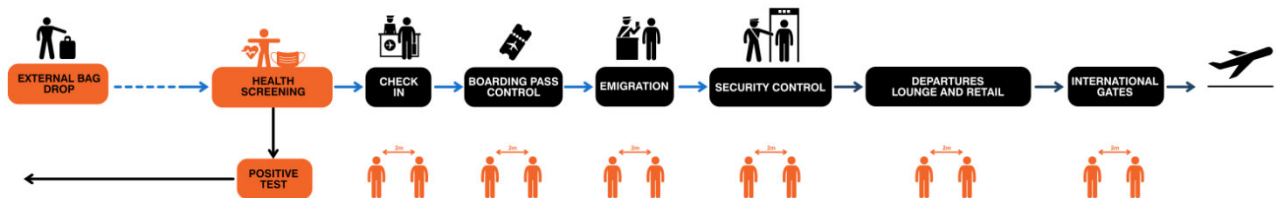


After COVID-19

### Departing Passenger Flow - International



Before COVID-19



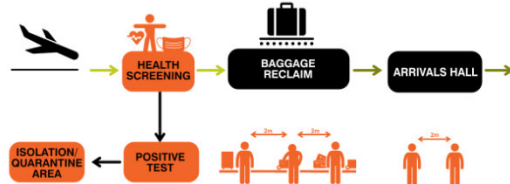
After COVID-19



## Arrivals Passenger Flow - Domestic



Before COVID-19

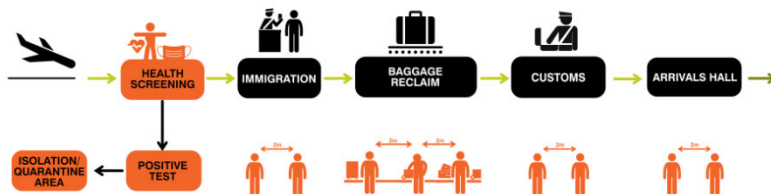


After COVID-19

## Arrivals Passenger Flow - International



Before COVID-19



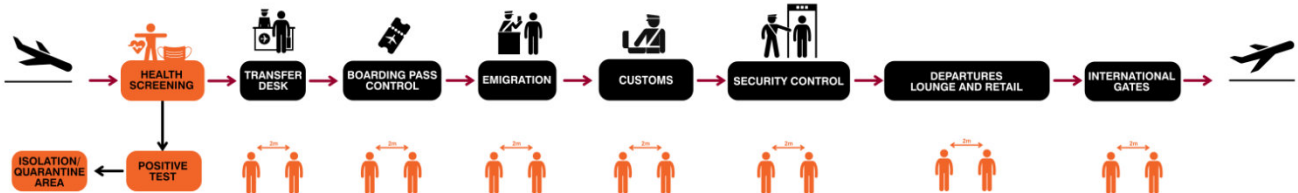
After COVID-19



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*Before COVID-19*



*After COVID-19*



*Before COVID-19*



*After COVID-19*



## 4.2.2 Passenger Processors, Capacity Assessments & Throughput

The previous diagrams clearly illustrate that social distancing will impact all processing facilities resulting in reduced processing numbers and throughput of the terminal. However there could be an alternative whereby the number of processing facilities are maintained by providing adequate screening between them and for the queuing public as illustrated in the diagrams shown on pages 14 to 23 inclusive.

The following floor marking can be used to assist passengers in maintaining the required social distancing to other fellow passengers within the queuing zone.

The following is an example passenger information poster and sign:

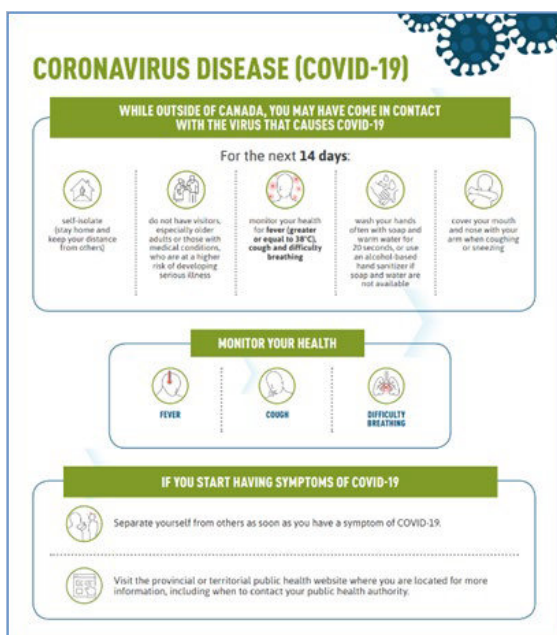


Diagram source: ACI security Advisory Bulletin

Any intervention to an existing terminal processing layout is likely to have a direct impact on queuing areas and processing times.

Several considerations should be taken into account in order to assess the impact of the new social distancing on the existing processing facilities using variants on static and dynamic models as explained below.

The main input bases for this simulations are:

- Demand
- Process time
- Design Peak Period
- Maximum queuing time
- Space per person

As noted above a variation of time and space may need to be taken into consideration to assess the impact on processing facility numbers, queuing area requirements and capacity peaks

- The impact on processing time may depend on potential additional procedures such as: Time required to disinfect processing facilities periodically during operational hours, additional health documentation from passengers, etc...
- The impact on queuing areas will be directly linked to social distancing requirements and space provided for each passenger.
- This should be compliant with local / international policies that can vary depending on the country, city and/or airport requirements.
- Capacity peaks may or may not be impacted depending on the measures applied.

**It is recommended that airports use experienced professionals to assist them in defining the likely impact of any of the measures they decide to implement**



## (4.2.2) Queuing Capacity Reduction

The following queuing reduction capacity formula should not be taken as an absolute measure of the terminal throughput. There are several other factors and mitigation that can be considered in assessing the ultimate impact on terminal processing capacity including:

1. As social distancing measures vary between countries, so will the impact this would have on the capacity assessment. The capacity assessments included in this paper relate to the UK's recommendation of a 2 meter separation between people.
2. The reduction in the capacity assessment for a queuing area does not have a direct impact on the throughput of a particular processing facility. Detailed analyses will be required to ascertain the outcome of a given solution.
3. Measures that can be used to mitigate the impact of social distancing/ reduction in queuing capacity include:
  - Increase queuing areas if space available within circulation zone.
  - Encourage people to use automated or remote facilities including remote bag check-in for example.
  - Spread the peak demand through slot management where possible.
  - Increase number of processing desks per flight to speed up throughput.
  - Other solutions that vary from one terminal to the other where buffer zones/ underutilised areas can be used to increase queuing areas and processing numbers.
  - Limit terminal entry to passengers only.
  - Provision of UV sanitation and contactless security procedures.



### Percentage of queuing reduction due to social distancing

### Calculation sample:

\*hypothetical assumptions used calculation sample

$A_p$	=	Existing space provided per passenger for queuing (m <sup>2</sup> per pax)	Input
$S_d$	=	Social distance required (m <sup>2</sup> per pax)	Input
$P_s$	=	Percentage of existing queuing space lost	Input
$P_q$	=	Percentage of existing space remaining for queuing	Input
$PC_r$	=	Percentage of capacity reduced for queuing	Output

$$PC_r = P_s + P_q * \left(1 - \frac{A_p}{S_d}\right)$$

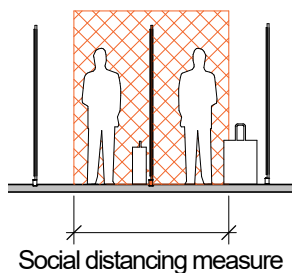
$A_p$	=	Existing space provided per passenger for queuing (m <sup>2</sup> per pax)	1.8m <sup>2</sup>
$S_d$	=	Social distance required (m <sup>2</sup> per pax)	3.0m <sup>2</sup>
$P_s$	=	Percentage of existing queuing space lost	30% = 0.3
$P_q$	=	Percentage of existing space remaining for queuing	70% = 0.7
$PC_r$	=	Percentage of capacity reduced for queuing	Output

$$PC_r = 0.3 + 0.7 * \left(1 - \frac{1.8}{3}\right)$$

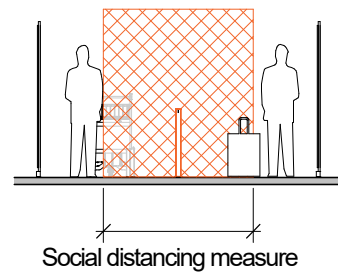
$$PC_r = 0.3 + 0.28$$

$$PC_r = 0.58 \text{ (58\%)}$$

### Passengers segregation sections



Screen at every lane



Screen every other lane



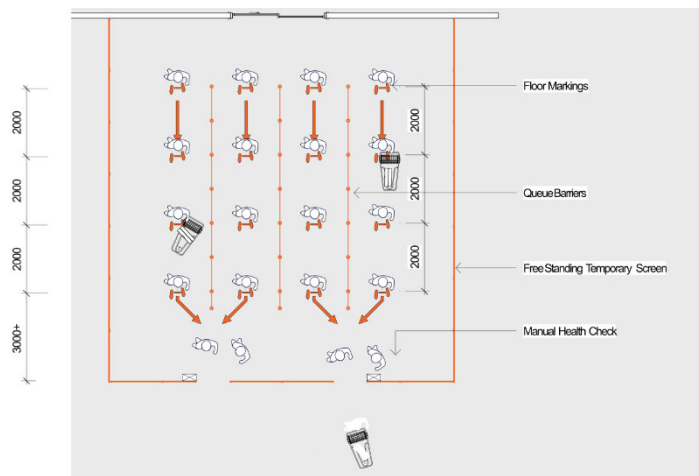
## (4.2.2) Entry Health Screening

Health screening on entry to the terminal may prove an efficient way of providing greater level of confidence for passengers and staff. The ability to provide this inside the terminal may be challenging in certain terminals and careful consideration is needed to ensure that a proper rejection lane is catered for. It should also be noted that this provision needs to be developed by a professional consultant to ensure that it will not affect the evacuation strategy of the terminal in case of an emergency.

### Multiple queues perpendicular to entrance façade

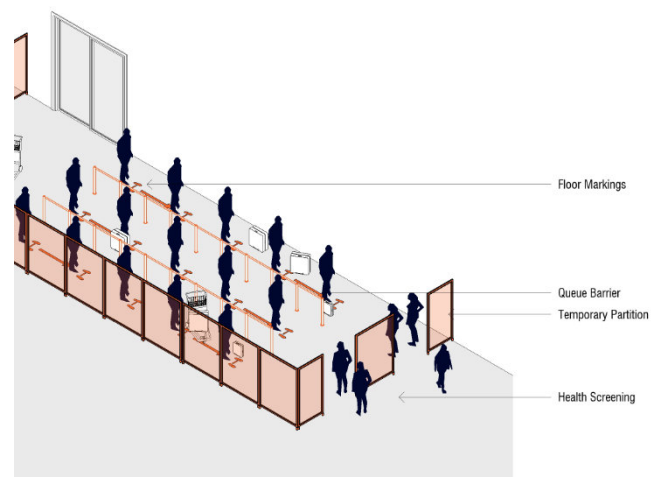
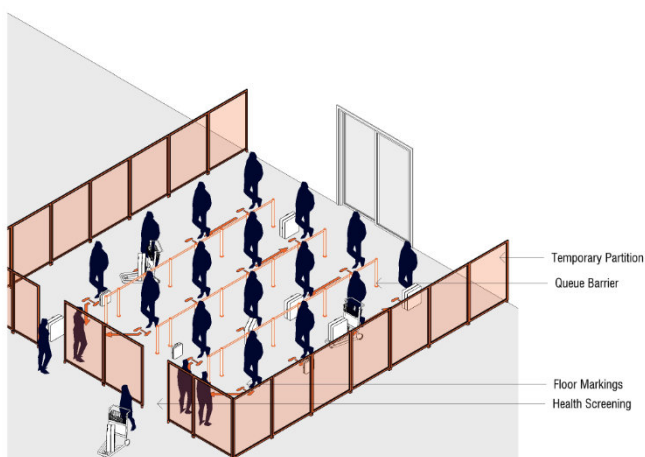
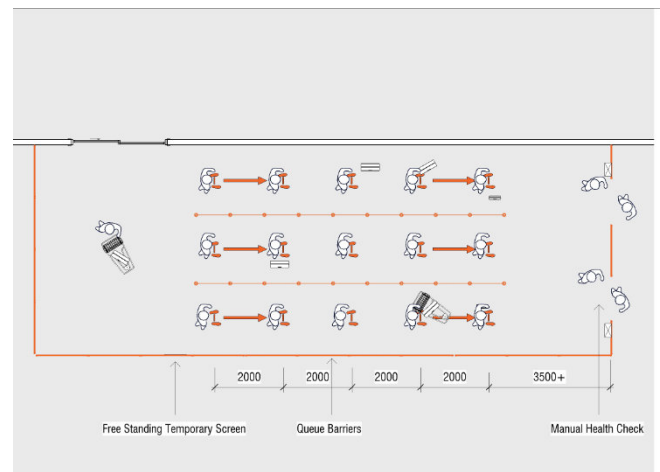
Multiple queues perpendicular to the facade may require deeper areas to queue passengers before they enter the terminal building.

Potentially greater impacts on internal circulations spaces for existing terminals.



### Multiple queues parallel to entrance façade

Parallel queues are potentially more flexible to minimise impacts on existing internal spaces.

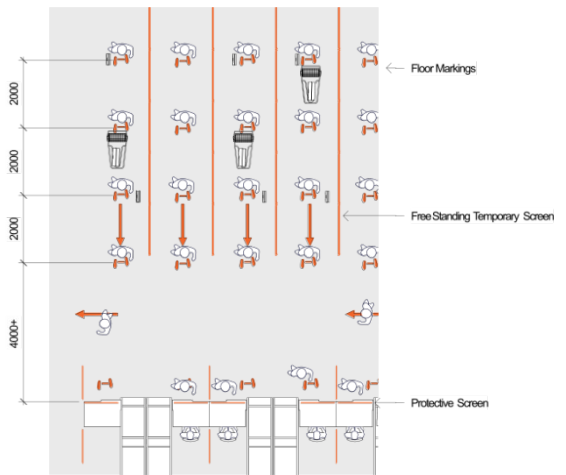


# Check-in

## Multiple queues - No lanes lost

**Additional area required between queues and front of desks to provide safe distances to exit sideways - screens provided for all lanes.**

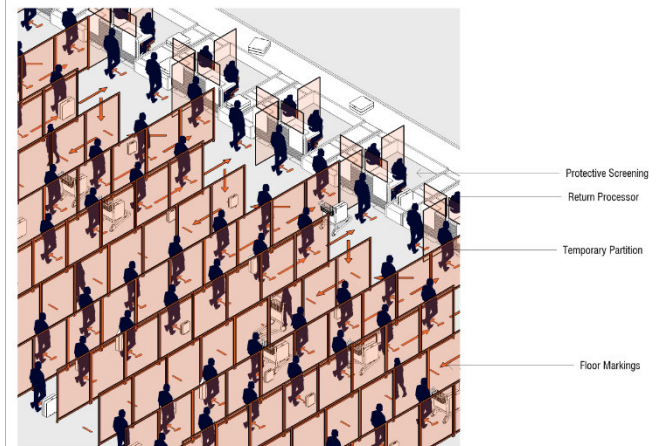
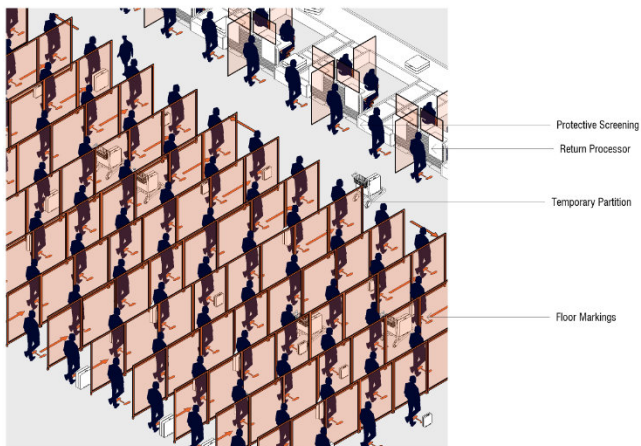
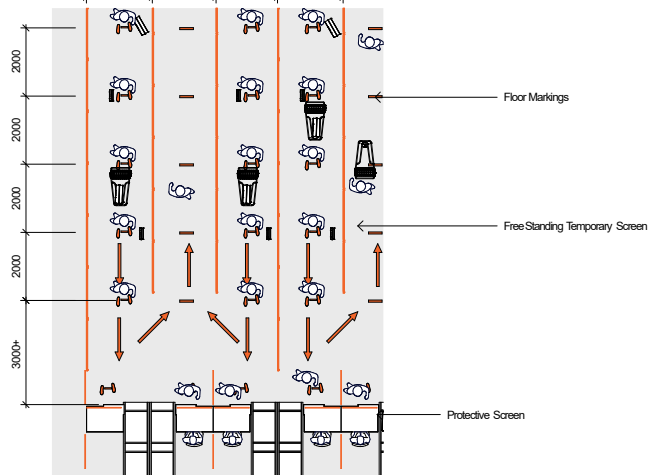
For this option the measures for social distancing and segregation may result in a 45% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



## Multiple queues - 1 lane lost every 2 queuing lanes

**Convert one queuing lane for exit only every 2 queuing - screens provided for all lanes.**

For this option the measures for social distancing and segregation may result in a 60% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



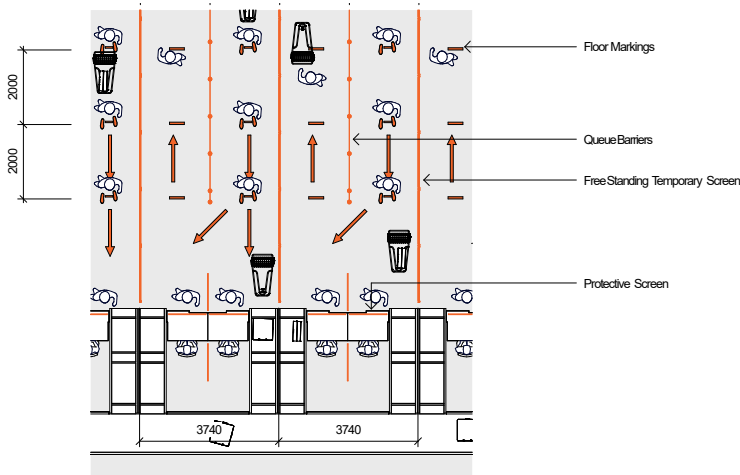


## (4.2.2) Check-in

### Multiple queues - 1 lane lost for each queuing lane

**Provide one exit lane for each queuing lane - tension barriers and screens every other lane.**

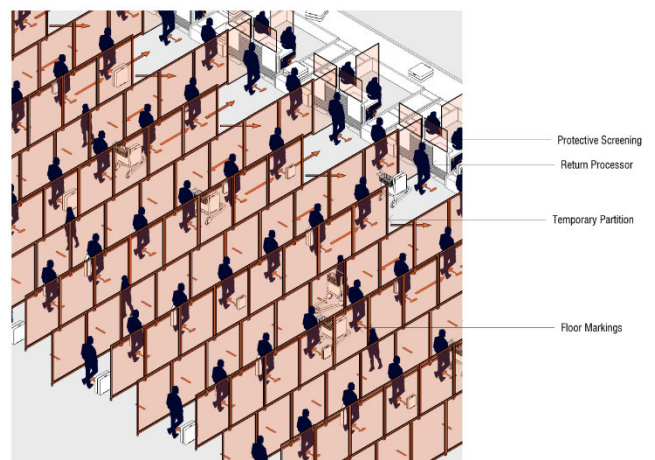
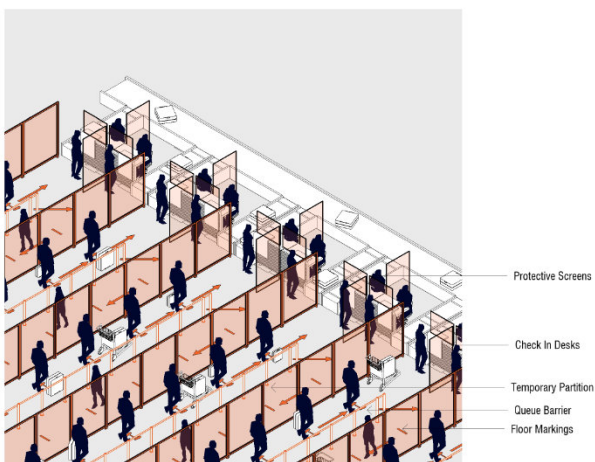
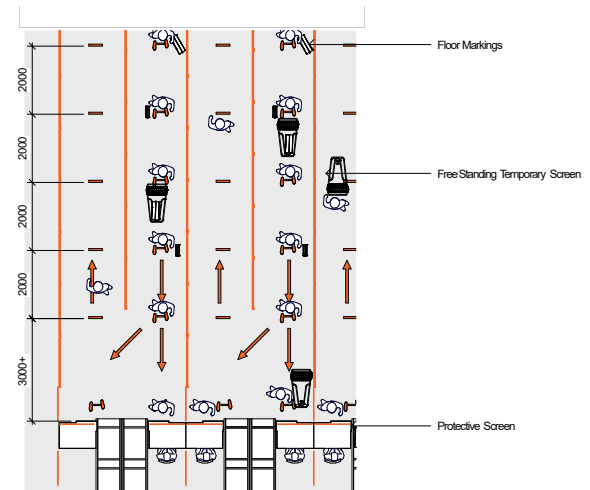
For this option the measures for social distancing and segregation may result in a 70% reduction of queuing passengers. This layout reduces dramatically the congestion for queuing areas but the impact on passenger numbers is greater and may not be viable.



### Multiple queues - 1 lane lost for each queuing lane

**Provide one exit lane for each queuing lane - screens for all lanes.**

Similar impacts to the previous layout, however this option provides even greater segregation between passenger due to the amount of screens provided.

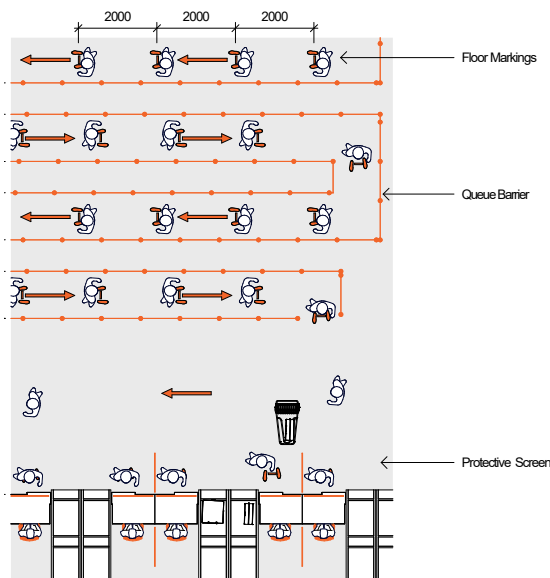


# Check-in

## Single queue

### Gap provided between lanes.

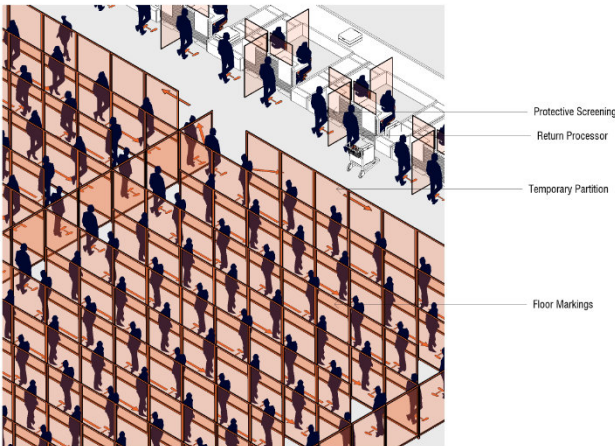
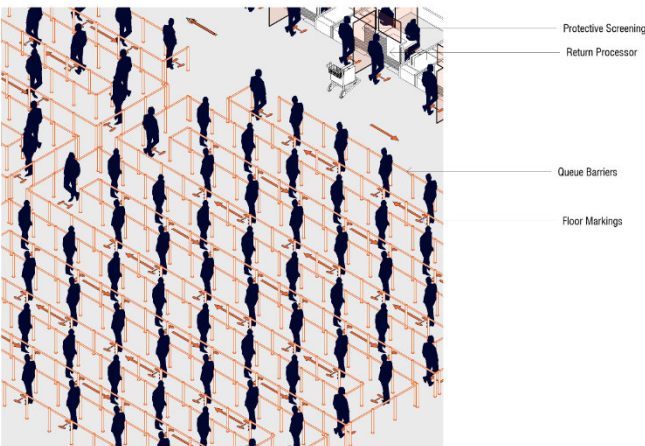
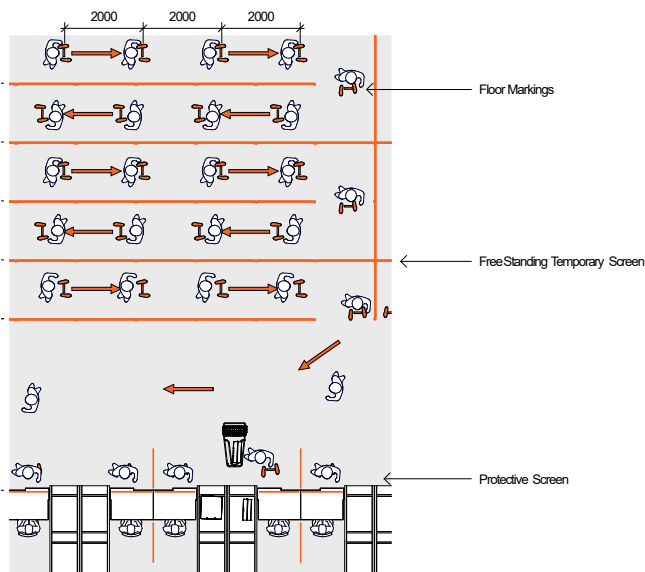
For this option the measures for social distancing and segregation may result in a 55% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



## Single queue

### Screens provided between lanes.

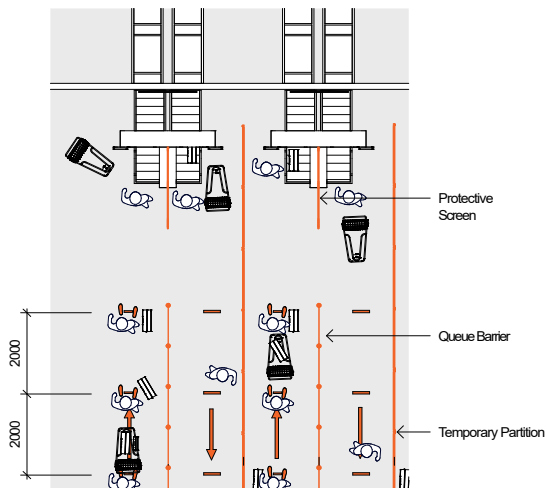
For this option the measures for social distancing and segregation may result in a 45% reduction passenger. If available, additional space can be provided to mitigate impact on queuing capacities.





## (4.2.2) Bag Drop

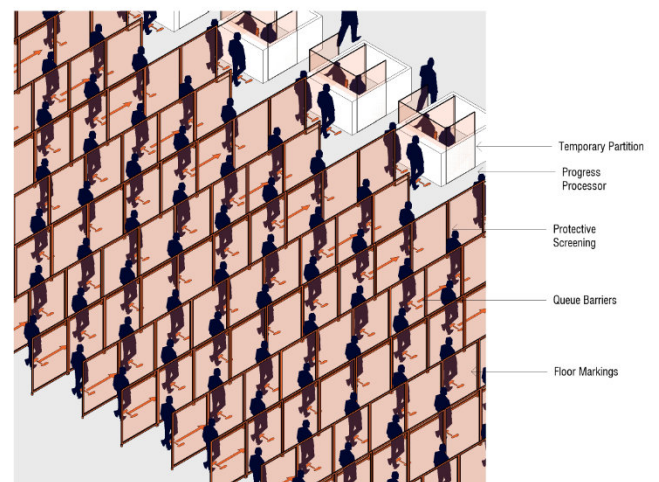
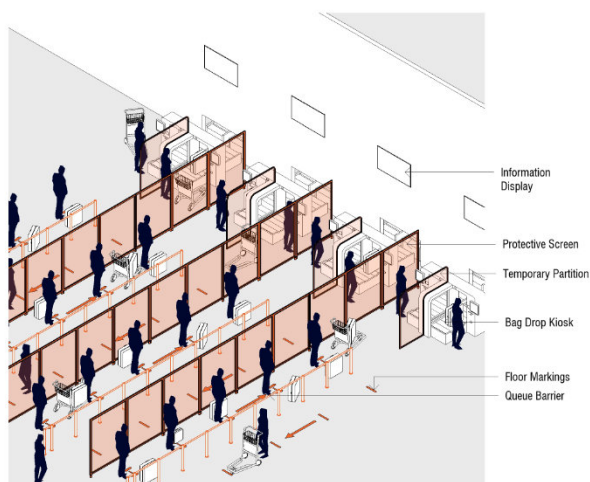
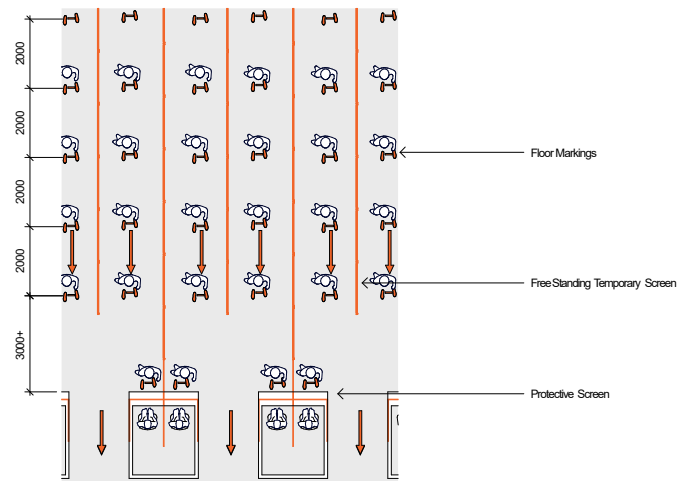
**Bag Drop layouts may use the same queuing systems provided for traditional check-in layouts.**



## Passport Check

### Multiple queues - Screens for all lanes

For this option the measures for social distancing and segregation may result in a 40% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.

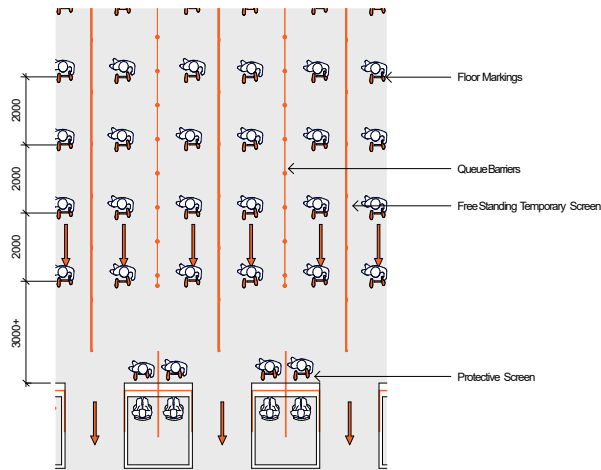


# Passport Check

## Multiple queues - Screens every other lane

### **Additional area required between queues.**

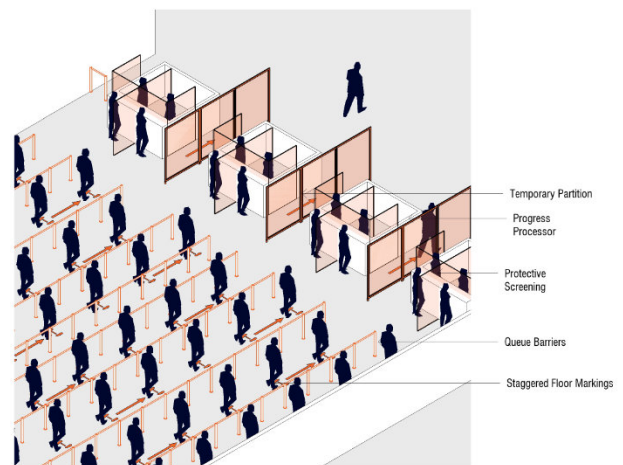
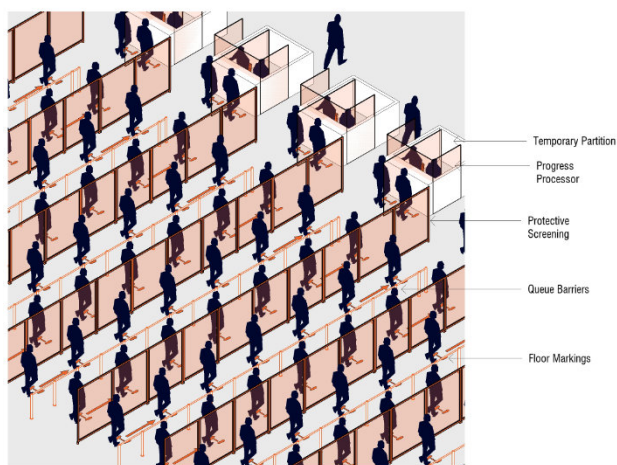
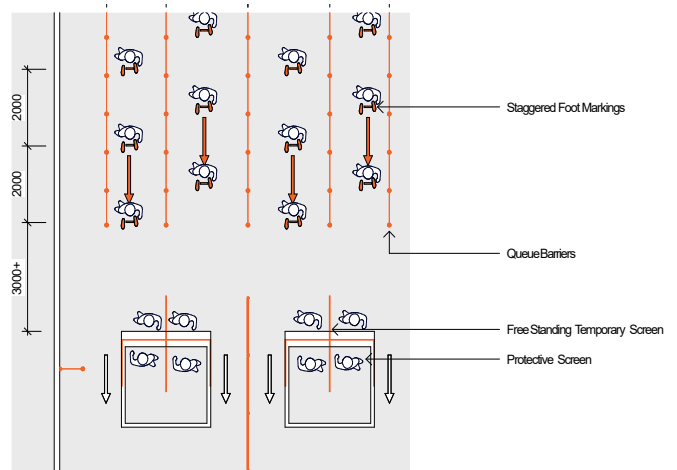
For this option the measures for social distancing and segregation may result in a 40% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



## Multiple queues - no screens

### **Wider lanes with tension barriers.**

For this option the measures for social distancing and segregation may result in a 50% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



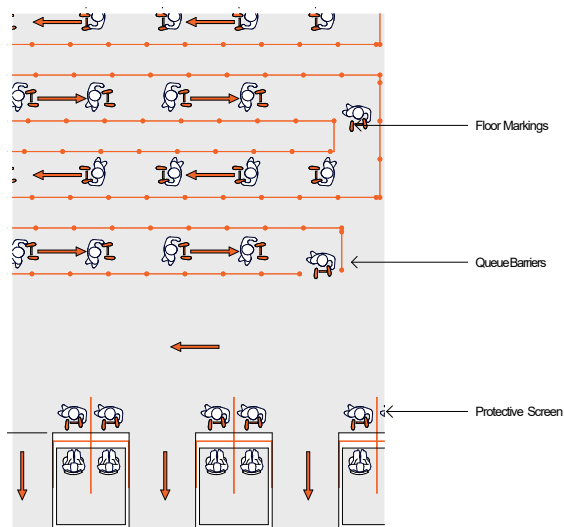


## (4.2.2) Passport Check

### Single queue - tension barriers

#### **Introduce gap between lanes.**

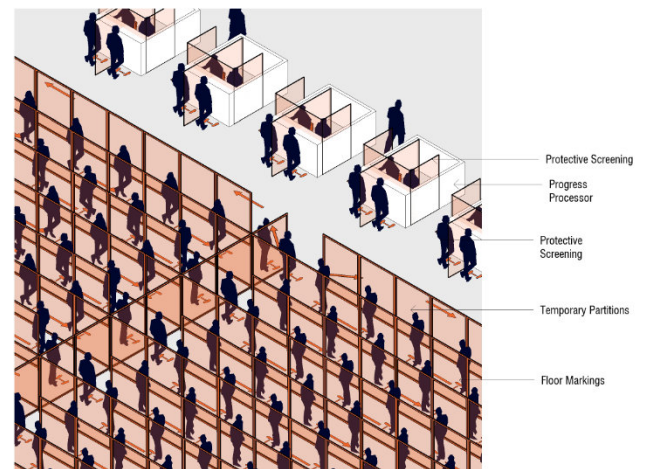
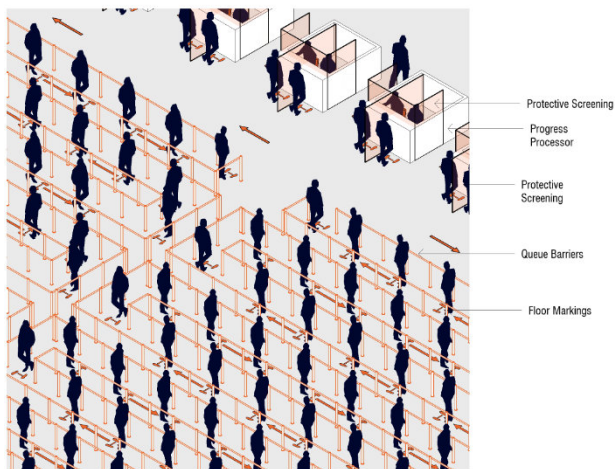
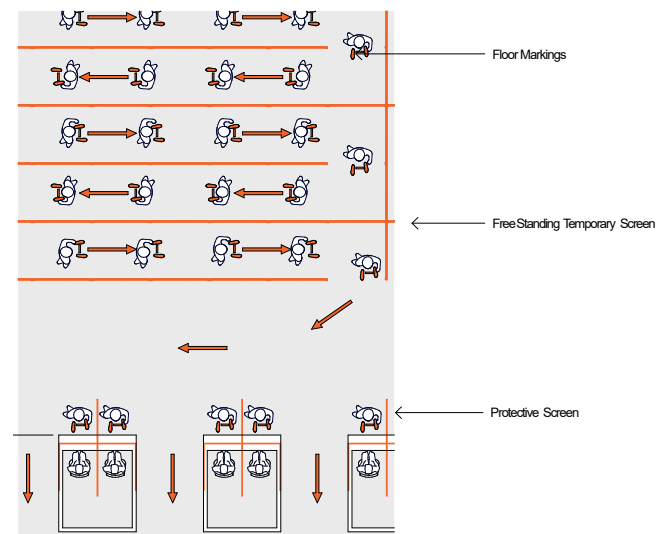
For this option the measures for social distancing and segregation may result in a 50% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



### Single queue - Screens

#### **Introduce segregating screens between lanes.**

For this option the measures for social distancing and segregation may result in a 40% reduction of queuing passengers. If available, additional space can be provided to mitigate impact on queuing capacities.



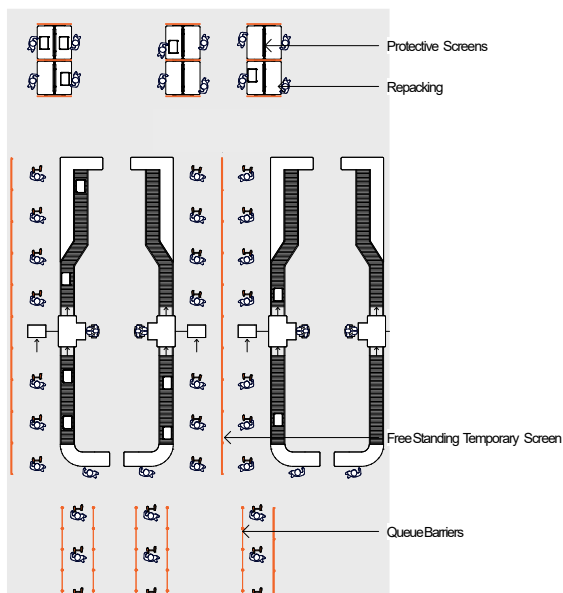
# Security Screening

## Multiple queues

### One passenger per lane dropping bag.

Two queues segregated by central screen. Throughput numbers may be affected, further detail would be required to assess impacts on processing capacity.

Queuing layout prior security can also be modified according to alternatives previously illustrated (multiple or single lanes).

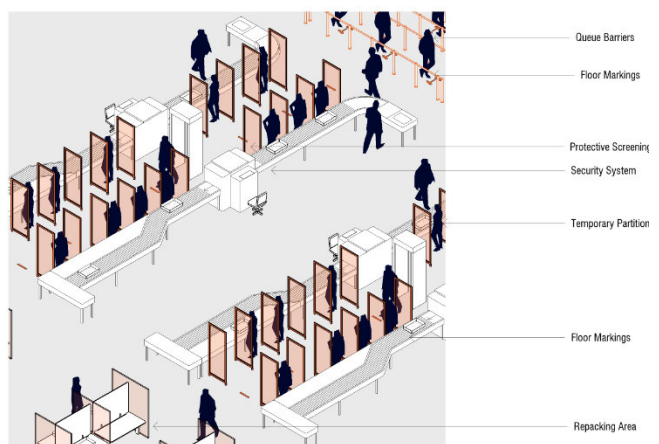
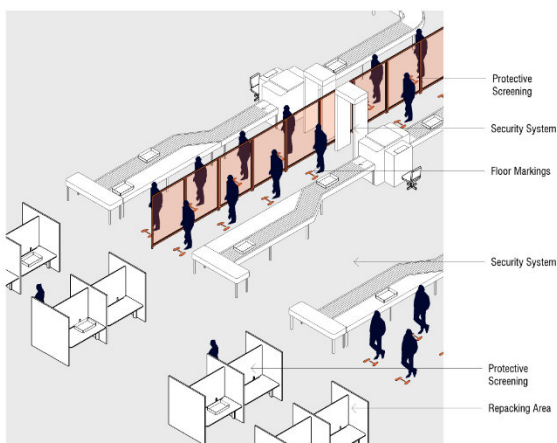
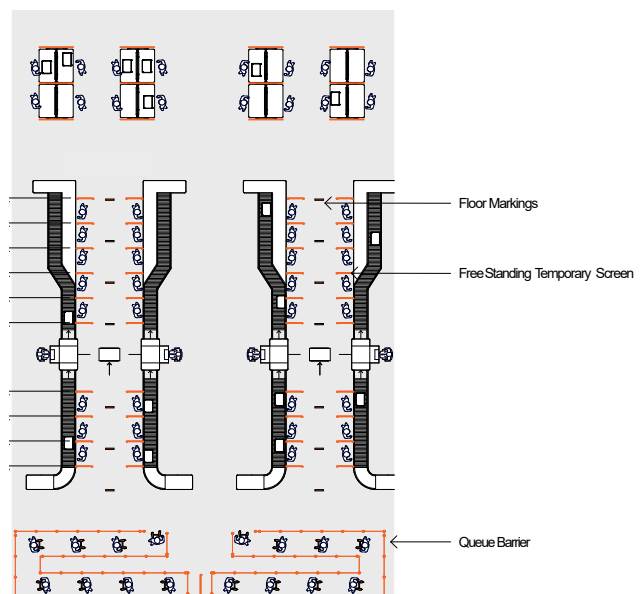


## Single queue

### Multiple passengers dropping bags.

One central queue and multiple passengers segregated by multiple screens. Throughput numbers may be affected, further detail would be required to assess impacts on processing capacity.

Queuing layout prior security can also be modified according to alternatives previously illustrated (multiple or single lanes).



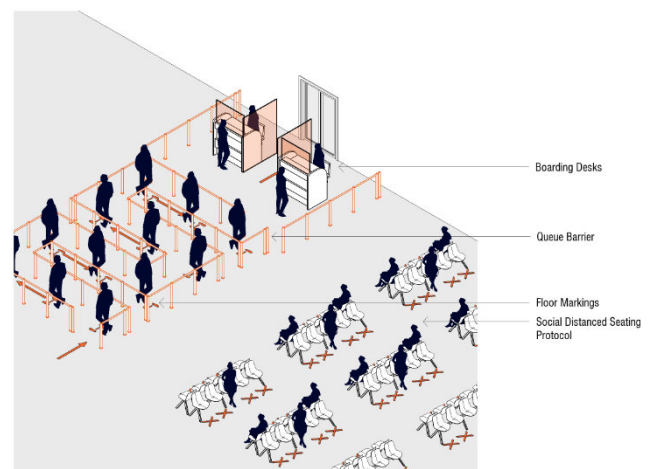
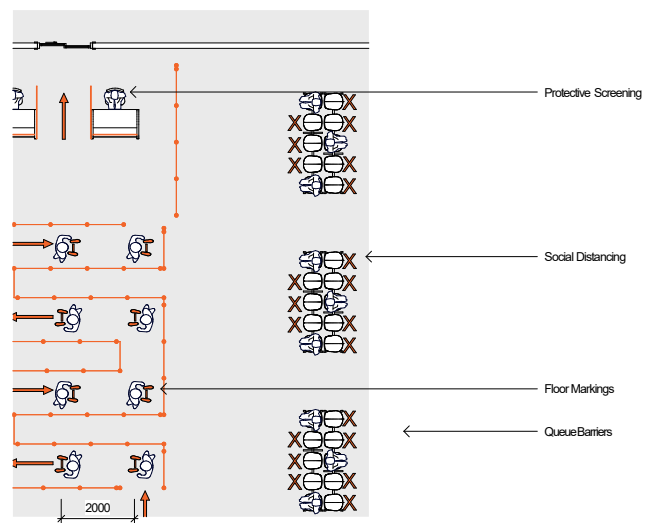




## (4.2.2) Boarding Gates

As per previous diagrams different queuing layouts can be applied to the boarding gates. The lounge space will need to be assessed independently to calculate space losses due to social distancing requirements.

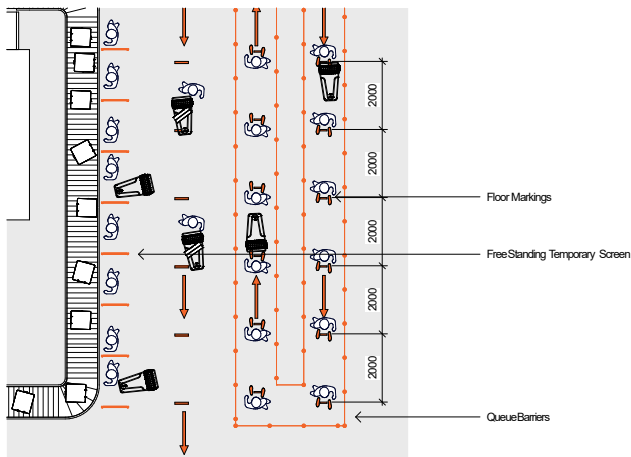
Note: Diagrams are for illustrative purposes. Further studies are required to mitigate the impact of social distancing on seating arrangements and waiting areas.



# Baggage Reclaim

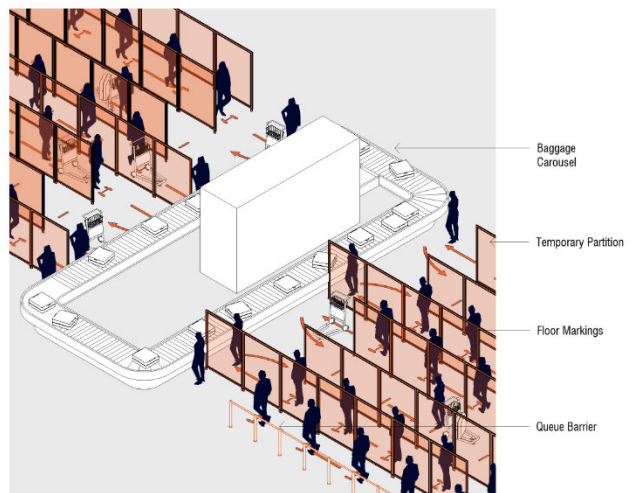
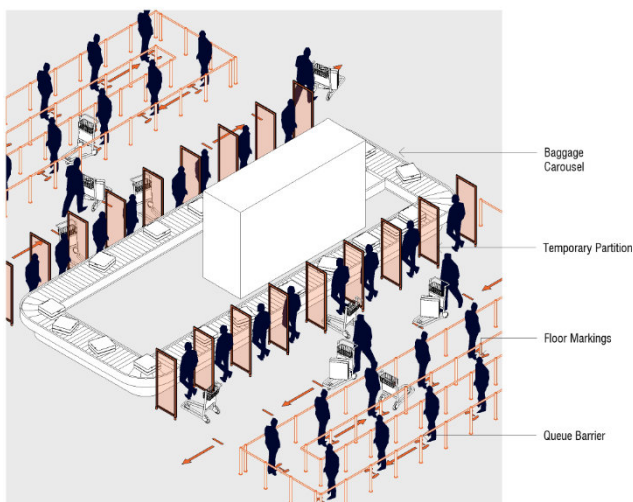
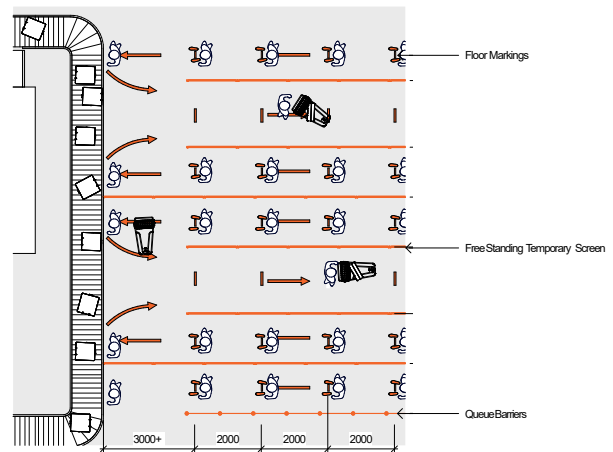
## Single Queue - Multiple bag pick ups

A single queue prior to enter a pick up area can provide a compact solution and still provide social distancing between queuing passengers: screens segregate passengers while they pick up bags.



## Multiple queues - Multiple bag pick ups

Multiple queues can provide a simplistic way to segregate passengers but can potentially have a bigger impact on the space available around the baggage reclaim belt.





## 4.2.3 Mitigating Measures

There are several measures that the airport operator may consider introducing to assist them in managing their facilities including:

- Limiting entry to the terminal to passengers only. This will reduce the number of terminal occupants allowing the operator to use some of the circulation areas for queuing zones; potentially increasing processing capacity.
- Providing masks and possibly gloves to all passengers at entry to the terminal.
- Self-checks prior to travel by asking passengers to ensure that they are healthy and have no symptoms.
- Limiting carry-on luggage to a lap top case and hand bag only. This could potentially speed up the security screening process.
- Increase the rate of natural ventilation. This should be carried out in consultation with the local health authority to ascertain its effectiveness.
- The use of robotic cleaning and sanitation systems.
- The potential introduction of remote baggage check-in 24 hours before a flight. Bag tags should be applied in a similar way to bag drops, however tags should be printed remotely and affixed to the bag at the time of collection by the airport or delivery agency. This will not remove the current bag drop but reduce processing time at airports.
- Provide or increase bag pick-up service where available.

## 4.3 Public Safety

Airport operators and airlines should assume greater responsibility and act as a filter to prevent the movement of infected people between cities. This can only be done through health checks to be introduced along the passenger journey through the airport where all at risk people are identified and correctly isolated. ICAO and IATA have clear guidelines and regulation in dealing with infectious disease or the discovery of an infected person on a flight. It should then follow that proper protocol is developed to provide clear guidelines and instructions to airport operator in dealing with future outbreaks.

The ACI Airport Operation Practice document provides a number of proposals for the safe operation of other stakeholders within the terminal including retail, food and beverage, goods delivery and waste removal. The main impact of these on the terminal planning is seen through social distancing which makes some of the retail shops difficult to operate in the short term. Alternative sales arrangements and layouts may need to be implemented to comply with the current rules.

There is also an impact on the capacity of food and beverage facilities as the spacing between seats must be increased to comply with social distancing requirements.



The IATA ADRM 11<sup>th</sup> edition provides LoS (Level of service) guidelines for each airport terminal facility/ subsystem.

The table provided in the manual is normally used to undertake capacity and LoS analyses. However under the current situation the guidelines may have to be adjusted to reflect space requirements needed for social distancing and reduce risks of potential contamination between passengers.

As per the IATA recommendation, appropriate LoS value should be established in consultation with all stakeholders including the airline community, airport management and other services providers.

Due to the current situation local and international health policies should be respected and implemented to gain the passengers confidence as soon as possible.

## 5.0 Modelling and Simulation - Digital Twin

Many airports use cast modelling or similar software to simulate passenger flows through the terminal in order to predict the potential impact of peak hourly flows on the processing facilities. This software will inform the operator if there will be a need to introduce certain measures to address peak/extra ordinary peak periods, which may result in having to introduce additional temporary processors to maintain passenger flows and ensure the level of service is unaffected.

Airport operators may wish to consider the creation of a Digital Twin of their terminal, a responsive system that connects physical and digital systems. This dynamic real-time view of the integrated systems of the building will enable the operator to quickly retrieve asset information for decision making, diagnose problems remotely and test proposed fixes before having to apply them to the physical component. It provides numerous possibilities to make real-time assessments in a replica world, devoid of risk but equally, significantly more dimensionally accurate; making humanoid avatars that can experience augmented 'physical' environments that feel 'sick' and have the potential to incubate dangerous or contagious places.

This digital hub platform will also offer further smart features. Precise measurement of indoor environment parameters such as temperature, humidity, indoor air quality and air contaminant levels are provided by a network of sensors and equipment gateways that will feed into a central data base that can monitor and adjust without any human intervention.

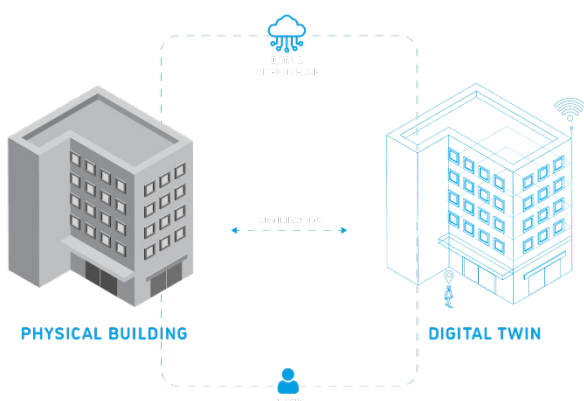
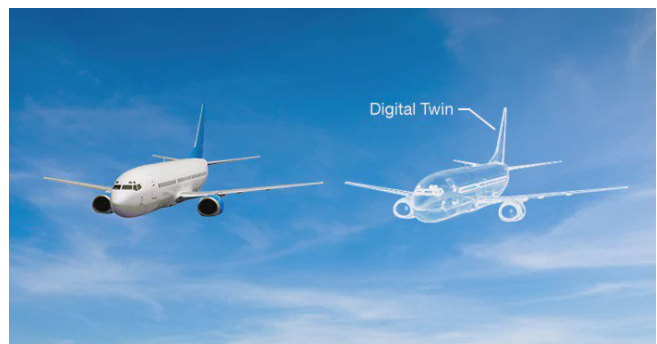
### How does it work:

- A Digital Twin is a virtual 3D model which integrates data from different sources.
- It is made available real time and can be visualised and analysed through a human-centric interface to make predictions.
- It can enable you to better facilitate your building asset at planning, design and operational stages.
- It can increase operational efficiency, allow for resource optimisation, improve asset management, deliver cost savings and improves productivity and safety.

### What are the benefits:

- Accurately represents what has been built and what will be handed over to the maintenance team.
- Is accessed, edited and shared accurately in real time.
- It can potentially reduce cost and create high ROI through extending the life of the asset through a 'predict and prevent' approach.
- Allows you to effectively and efficiently predict the usage of your asset, its operating and maintenance costs and future development.
- Enables you to optimise safety, efficiency and passenger, customer and staff experience, monitoring people flow and fire safety analysis.
- Stimulates terminal performance to adjust for increased passenger volumes.
- Ensures your building asset remains fit for purpose.
- Ability to train and upskill staff in house on the manipulation and maintenance of the data and the model.
- Allows you to test, monitor, simulate and plan for the future.

In summary the Digital Twin should enable the airport owner to save money through extending the life of the asset by using the predict and prevent maintenance. This will reduce the cost of the maintenance through planned preventative maintenance, thereby improving the passenger experience where it is linked to the performance of the asset.





## 6.0 Future Terminal Planning

It is hard to predict any long term measures and assess the impact caused by this global pandemic on the future built environment. This will undoubtedly require a significant amount of research and evaluation by various regulatory bodies to ensure the effectiveness of future provision. However, we can only assume that there will be greater scrutiny in providing a healthier environment and a future trend that balances commerce and critical health. What is clear is that the current crisis indicates that these two aspects are not in opposition, but are mutually inclusive.

Future planning guidelines defining size and form of future buildings, as well as the environmental aspects/ climatic conditions and behavioural issues are likely to be modified to ensure that future generations will not be faced with similar problem. We are likely to need to look at finishes specification choices in order to provide mitigation towards transmission of infections. There will also be greater incentives for automation, robotic and contactless operations where feasible, all in an effort to avoid a future global pandemic.

The potential impact of COVID-19/future viruses on the planning and design of future terminal may be embodied within the future publication of the CAA guidelines, ICAO regulation and IATA's ADRM. The range of issues that this may cover may include:

- Traffic forecast.
- Travel type.
- Change to capacity and facility calculations, aim to eliminate congestion and improve spacing and queuing.

### Processing facilities

- Discrete health screening, rethink people flow.
- Contactless operation.
- Baggage handling.
- Resilience.
- Quarantine.
- Materials – Nano technology.
- Detection.

### Other measures

- Contingency planning.
- Disinfection.
- Ventilation and day lighting.
- Public hygiene.
- Increase public awareness signs and PA.









## Contact Details

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