GUIDELINE

FOR THE SAFE RETURN TO THE WORKPLACE

NOVEMBER 2020

GREEN BUILDING COUNCIL SOUTH AFRICA

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WE NEED A SAFE RETURN TO THE WORKPLACE

The current COVID-19 pandemic required many companies to lock down their buildings and implement a work from home (WFH) practice. Whilst the strict lockdown period has ended, the COVID-19 pandemic is not over yet and it is expected to remain for the foreseeable future.

The easing of the initial restriction rules imposed by Government will now result in staff returning to workplaces and it is therefore imperative that organisations examine their facilities and the associated management policies and practices and implement interventions to return staff safely to the workplace.

Commercial buildings are not typically designed to standards to minimise the spread of infectious disease to the extent of hospitals that are built for this purpose. However, there are various measures that can be implemented to reduce the risk of transmission.

In response to this need, the Green Building Council South Africa (GBCSA) and Zutari, through a joint partnership, have developed a technical checklist to act as a guide for building owners and workplaces to ensure they are healthy and safe for the return of their occupants.

While it is unknown how long the current pandemic will affect our working conditions we encourage employees and employers to return to the workplace but do so safely, with the focus on staff safety. These guidelines detail interventions considered best practices for protection of building occupants from viral spread and infections.

Whilst informed by the current public health pandemic, it is intended for long term consideration, prioritising the health and safety of building users in a post-covid world. It focuses on management of the buildings and staff specifically around pathogen risks and includes management policies, plans and protocols as well as technical recommendations on building services such as indoor air quality, water sanitation, contact surfaces and cleaning protocols. It additionally offers recommendations to encourage personal behavior around cleanliness, distancing and reduction of sharing.

This forms part of the GBCSA's green recovery plan, to rebuild our economy and built environment with sustainable solutions that prioritise healthy spaces for people and give meaning to our organisational mission of inspiring a built environment in which both people and planet thrive.

"Because green buildings are typically also healthy buildings, they prepare organisations for the immediate and long term focus on health and safety. They enable society to meet the needs of today's challenges. Prioritizing health and safety is going to be important in a post-COVID world, and we hope that this technical guide allows the building sector to pragmatically limit risks"

Lisa Reynolds, GBCSA, CEO

Zutari's technical experience shows that many existing older buildings are fitted with air ventilation systems that are not compliant with current regulations, hence indoor air quality in such buildings is likely to be inferior in comparison to the newer buildings. However, the intention with these guidelines is to identify the best practice across the various building types, and installations, and to assist the building owners and operators in achieving performance as close as possible to the best practice.

WHO IS IT FOR?

The guidelines are intended primarily for existing buildings, to empower building owners, landlords and tenants as well as office managers with a practical checklist for the safe return of people to the workplace. It spans soft services as well as technical requirements, where facility managers will need to be involved. For some of the more technical requirements additional experts (such as mechanical engineers, commissioning agents & BMS specialists, for example) may need to be involved. Property developers and professional teams designing new buildings or upgrading existing buildings could also make use of these guidelines.

It is the responsibility of the organization encouraging staff to return to work to ensure due processes and protocols are followed for the safety of their employees.

The following stakeholders will find this guide useful and be responsible for its implementation, as appropriate to the level of control associated with actioning the best practice recommendation:

Building Owner

Facilities Manager

Tenancy Office Manager

Building Occupant

HOW DOES IT WORK?

This is a guide that is available for free of use. It has been designed so that building owners, facilities managers, tenancy office managers and building occupants can use it as a starting point to understand the range of essential options that should be considered when implementing the return to the workplace, with safety as the key priority. It provides an overview framework and checklist that identifies infection control strategies at various levels of decision making and responsibility.

This provides an effective, contextually appropriate and robust guide for the South African commercial and retail sector, through the lens of green building priorities such as indoor air quality, staff wellbeing and resource management.

The guidelines are setup in a structure similar to the Green Star rating tools with various interventions (credits) grouped under a number of applicable categories. A short aim description, and a background is provided for each initiative. The guide puts forward a recommended best practice standard as well as an enhanced performance for each initiative (where applicable) that needs to be put in place, furthermore interventions are arranged for prioritization by being labelled as "essential" or "recommended".

BEST PRACTISE RECOMMENDATIONS refers to initiatives, often extending beyond legal requirements, that should be implemented to effectively mitigate against a certain infection spread risk.

ENHANCED PERFORMANCE refers to initiatives that extend beyond the efficacy of minimum legal requirements and the best practise recommendations. These initiative typically will require specialist input and would be associated

with higher costs of implementation and technical know-how.

Initiatives are prioritised by either being "recommended" or "essential".

RECOMMENDED: we advise you to address this initiative but it is not essential that you address it.

ESSENTIAL: you must address this initiative, it is essential for building and staff safety.

This is not a rating tool that can generate a certified green building status by the GBCSA. The GBCSA would wish develop this further into a health or wellbeing type of rating if sponsorship becomes available.

Please contact the Head of Technical at the GBCSA for further engagement around such an opportunity.

This guide can qualify for an innovation point in any of the New Build, Existing Building Performance and Interiors Green Star tools. This is achieved if the project discloses which initiatives were pursued. This is done by pubic disclosure of the overview summary sheet in an accessible location to all building users. This is for the purposes of rewarding and promoting transparency for building occupants, noting the claim "transparency is the new green".

Alternatively, project teams can use applicable initiatives within the **GBCSA COVID-10 Innovation Challenge,** where the onus is on team is demonstrate that the magnitude of the impact is innovative. These are evaluated on case-by-case basis by the GBCSA.

We would appreciate constructive feedback in order to update the guide and its usefulness for our members.

THE SAFE RETURN TO WORKPLACE - A ROADMAP

① **PREPARE THE BUILDING AND THE RELATED OPERATIONS BY ASSESSING THEM AGAINST THE CRITERIA IN THE CHECKLIST AND IMPLEMENTING INTERVENTIONS WHERE NECESSARY**

② **PREPARE THE WORKFORCE WITH THE RELEVANT MANAGEMENT RELATED INITIATIVES**

③ **OCCUPY THE BUILDING**
- Control access & follow due protocol
- Maintain physical distancing
- Reduce touch points and increase cleaning

④ **ONGOING COMMUNICATIONS FOR CONFIDENCE**

⑤ **ONGOING MANAGEMENT & MAINTENANCE OF THE BUILDING**

CATEGORY

INITIATIVE NO.	E/R	INITIATIVE NAME	INITIATIVE AIM	BACKGROUND	BEST PRACTICE	ENHANCED PERFORMANCE	REFFS

Initiatives are prioritised by either being recommended" or "essential".

RECOMMENDED: we advise you to address this initiative but it is not essential that you address it.

ESSENTIAL: you must address this initiative, it is essential for building and staff safety.
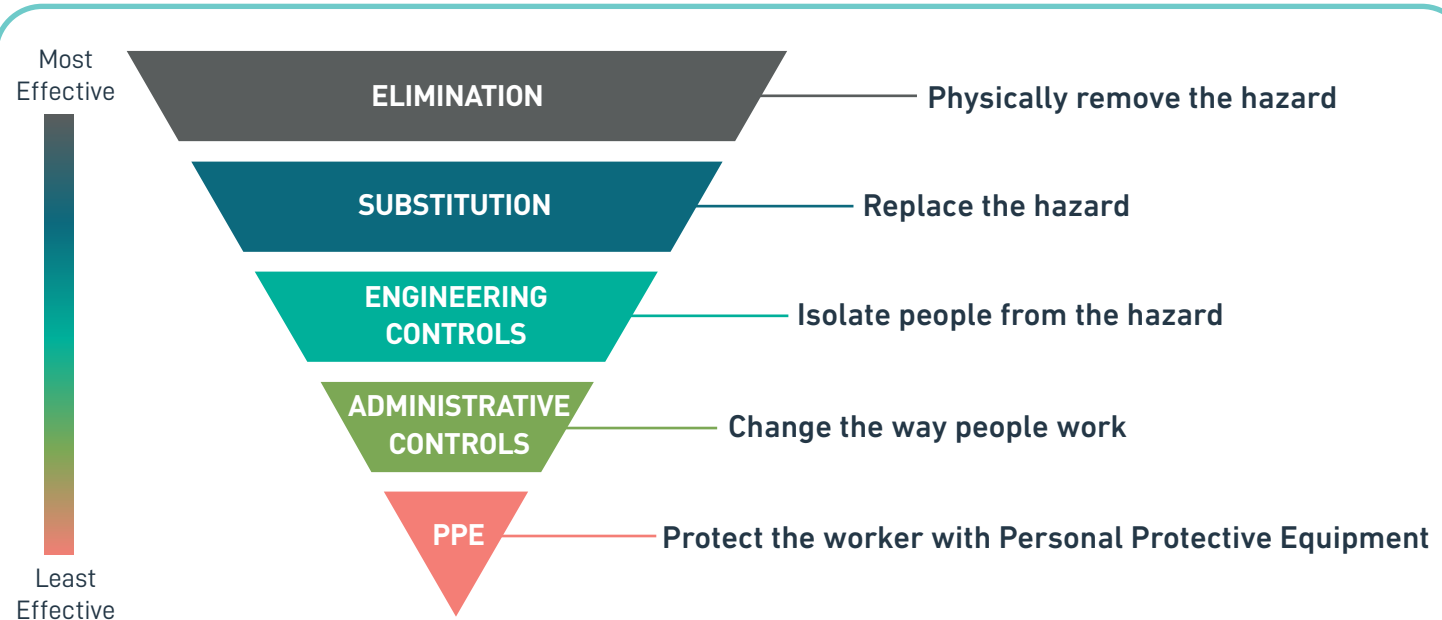
Additional Information

Refers to initiatives, often extending beyond legal requirements that should be implemented to effectively mitigate against a certain infection spread risk.

Refers to initiatives that extend beyond the efficacy of minimum legal requirements and the best practise recommendations.

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CATEGORIES, ROLES & RESPONSIBILTIES

The technical guide has been developed by considering the point of control within a building along with the effectiveness of the foresaid control. The guide differentiates between three key scales, or levels, of control:

1. Technical & engineering controls associated with the building design and building systems.
2. Management controls of people and building use.
3. Personal agency and choice associated with individual behavior.

ELIMINATION	Physically remove the hazard
SUBSTITUTION	Replace the hazard
ENGINEERING CONTROLS	Isolate people from the hazard
ADMINISTRATIVE CONTROLS	Change the way people work
PPE	Protect the worker with Personal Protective Equipment

Most Effective → Least Effective

ELIMINATION AND SUBSTITUTION
(not addresses in this checklist)

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process. If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard.

ENGINEERING CONTROLS
(Indoor Air Quality & Safe Water systems categories)

Engineering controls are favored over administrative and personal protective equipment (PPE) for controlling existing worker exposures in the workplace because they are designed to remove the hazard at the source, before it comes in contact with the worker. Well-designed

engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The initial cost of engineering controls can be higher than the cost of administrative controls or PPE, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings.

ADMINISTRATIVE CONTROLS AND PPE
(management, design & personal behaviour categories)

Administrative controls and PPE are frequently used with existing processes where hazards are not particularly well controlled. Administrative controls and PPE programs may be relatively inexpensive to establish but, over the long term, can be very costly to sustain. These methods for protecting workers have also proven to be less effective than other measures, requiring significant effort by the affected workers.

Ref: https://www.cdc.gov/niosh/topics/hierarchy/default.html accessed 2020.10.28 11:26am

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These levels have been translated into five categories, each with several initiatives.

The categories are:

The 5 categories have been collated around the point of control within the building in mind.

The majority of the management initiatives are designed to be dealt with by an office manager although support or input from a facilities manager or commissioning agent will need to be given on the more technical initiatives.

The initiatives in the personal behaviour category are items where the point of control is associated with the individual employee, although this must be supported by measures management must put in place.

The initiatives in the technical control aspects related to indoor air quality and safe water systems will need to be addressed by the building owner and facilities manager and require technical understanding and input.

The initiatives under the design category largely focus on elements that require design input such as screens between work stations and demarcation of building zones, to be addressed by the tenancy office manager and facilities manager.

5 CATEGORIES
45 INITIATIVES

MANAGEMENT
This category addresses policies, plans and protocols required for effective ongoing management of buildings. Most of the checkpoints can be achieved by a building, office and or HR manager on behalf of the workplace and workforce.

DESIGN FOR SAFETY
The initiatives in this category address design elements that need to be considered to assist in the reduction of spreading the virus through physical barriers and separation of zones and safety around deliveries.

PERSONAL BEHAVIOUR
This category addresses items of personal hygiene and behaviour that can assist in mitigating risk of infection and reduce the spread of viruses. Agency is given to the individual to practice good hygiene, physical distancing and appropriate wearing of PPE.

SAFE
RETURN TO WORK

TECHNICAL CONTROLS – SAFE WATER SYSTEMS
This category address engineering controls that relate to water and wet services within a building. The credits address safe reuse of water, management of potable water systems and water traps reticulation to reduce the risk of infection.

TECHNICAL CONTROLS – INDOOR AIR QUALITY
This category address engineering controls that contribute and support good indoor air quality. The credits address HVAC and related building services such as air flows, filters and monitoring of indoor air quality and will require input from a facilities manager and in some cases a mechanical engineer.

WHY IS IT USEFUL FOR YOU?

The return to office is overwhelming with various legal requirements, technical preparations and management of staff and stresses. This checklist not only aims to give you an indication of all the items you should be considering for the safe return to workplace but seeks to offer what is considered best practice.

The checklist should be seen as an opportunity to ensure your building is performing optimally and is healthy, with a focus on staff wellness and safety. We hope it will aid you in systematically addressing each item that needs consideration as well as prioritization of the essential versus recommended requirements to ensure building readiness and the safe return of employees to work.

BENEFITS OF GOOD INDOOR AIR QUALITY

Maintaining good indoor air quality should be a major concern to businesses, building managers, tenants and employees because it can impact the health, comfort, wellbeing and productivity of employees.

The levels of indoor air pollutants are often 2 to 5 times higher than outdoor levels, this elevated exposure can cause severe illness. In developed parts of the world, the proportion of time spent indoors can be as high as 80% to 90% and while many factors contribute to a good indoor environment and occupant comfort, providing fresh clean air and a well ventilated building are key considerations in creating a safe return to the workplace.

Research conducted by Harvard University in 2014 addressed the impact and effects of indoor air quality on building occupants cognitive functioning. In a comparative simulated room study different floors were set up with different indoor air qualities. The findings were that improved air quality positively affected the employee's ability to plan, prepare, strategize and apply information in strategic decision making. The researchers established that the improvement in indoor air quality had a significant impact and the best results were achieved when improving ventilation and reducing the hazardous chemical and carbon dioxide levels.

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For six days in November 2014, while participants performed their normal work, researchers exposed them to various simulated building conditions: conventional conditions with relatively high concentrations of volatile organic compounds (VOCs), such as those emitted from common materials in offices; green conditions with low VOC concentrations; green conditions with enhanced ventilation (dubbed "green+"); and conditions with artificially elevated levels of CO2, independent of ventilation. At the end of each day, they conducted cognitive testing on the participants.

They found that cognitive performance scores for the participants who worked in the green+ environments were, on average, double those of participants who worked in conventional environments; scores for those working in green environments were 61% higher.

Measuring nine cognitive function domains, researchers found that the largest improvements occurred in the areas of:

Crisis Response
(97% higher scores in green conditions and 131% higher in green+)

Strategy
(183% and 288% higher)

Information Usage
(172% and 299% higher)

In addition, when researchers looked at the effect of CO_2—not normally thought of as a direct indoor pollutant—they found that, for seven of the nine cognitive functions tested, average scores decreased as CO_2 levels increased to levels commonly observed in many indoor environments.

Harvard study results: https://www.hsph.harvard.edu/news/press-releases/green-office-environments-linked-with-higher-cognitive-function-scores/

BACKGROUND TO DEVELOPMENT OF THIS TECHNICAL GUIDE

This guide has been developed by the GBCSA in collaboration with Zutari. Zutari provided green building and mechanical engineering expertise, based on extensive experience in designing, constructing and operating green, healthy buildings for wellbeing while GBCSA supported with management and behaviour inputs.

Technical expertise for development of the guidelines drawn from Zutari included:

Mechanical Services

Healthcare Facilities

Wet Services

Health and Safety Team

Sustainability

The GBCSA and Zutari worked together to produce something that is more technically robust than what is currently available on the market, as well as being user friendly.

This guide has been peer reviewed by experienced industry professionals, notably with the following expertise: green building and sustainability; and mechanical engineering.

During guidelines development, Covid-19 related publications by global and local organisations were reviewed and incorporated. These include amongst others:

- World Health Organisation (WHO);
- American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE);
- Representatives of European Heating, Ventilation and Air Conditioning Associations (REHVA);
- Chartered Institute of Building Services Engineers (CIBSE);
- International Well Building Institute (IWBI).

TECHNICAL GUIDE

COVID-19 (SARS – COV-2) INFECTION ROUTES

When considering mitigation strategies, it is important to understand how infections such as COVID-19 spread. Based on most likely transmission routes identified, the risk associated with the following should to be addressed when using this checklist:

Person to person via macro droplets
Transmission via macro droplets occurs when within close proximity of an infected person.
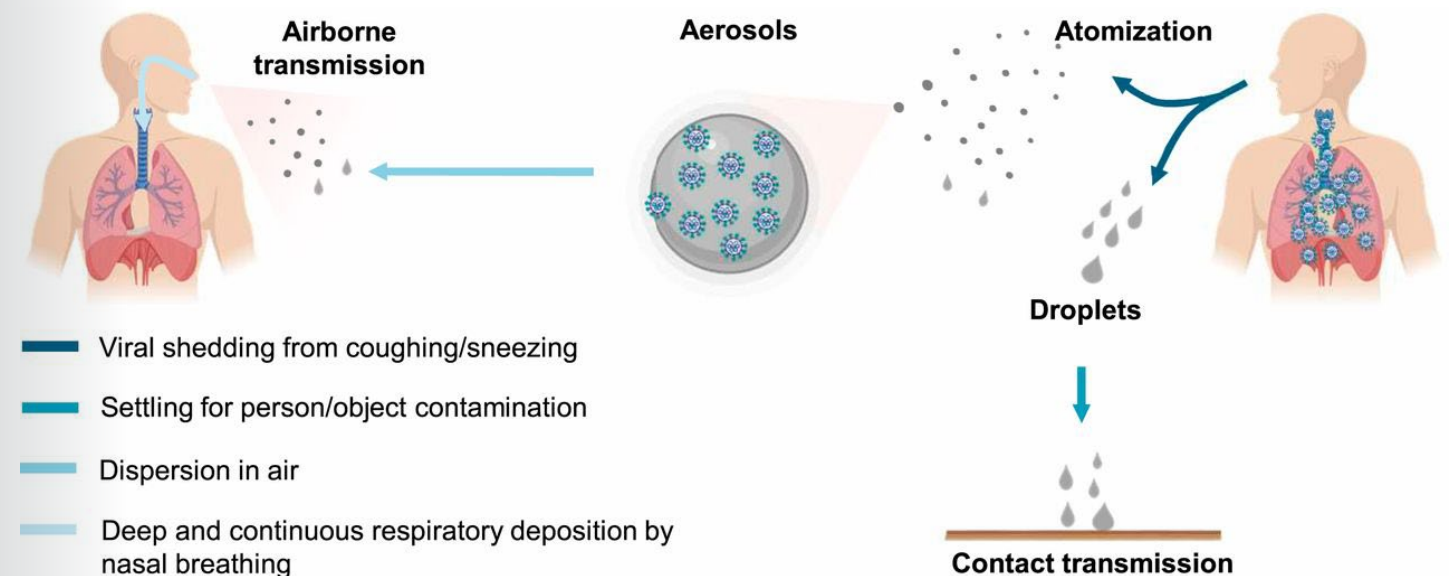
Airborne transmission
Airborne transmission is defined by WHO as the spread of an infectious agent caused by the dissemination of droplet nuclei (aerosols) that remain infectious when suspended in air over long distances and time.

Fomite transmission
This occurs when large infected droplets are deposited on close by surfaces such as tables, desks, chairs. When persons are in contact with these surfaces, and subsequently touch their mouths, noses or eyes, they may also become infected.

Faecal oral transmission
Occur through aerosol generation when toilets are flushed.

The figure below depicts the main possible transmission routes for Covid-19 virus.

Airborne transmission · **Aerosols** · **Atomization** · **Droplets**

— Viral shedding from coughing/sneezing
— Settling for person/object contamination
— Dispersion in air
— Deep and continuous respiratory deposition by nasal breathing

Contact transmission

Virus-containing macro droplets (>5 μm) and micro droplets or aerosols (<5 μm) are expelled in the air when people cough, sneeze, even when they speak or sing. Direct and airborne transmissions occur in short range and extended distance respectively.

Image Ref: (ref: (Renyi Zhang, View ORCID Profile Yixin Li, Annie L. Zhang, View ORCID Profile Yuan Wang, and Mario J. Molina PNAS June 30, 2020 117 (26) 14857-14863; first published June 11, 2020 https://doi.org/10.1073/p-nas.2009637117))

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Transmission via macro droplets occurs when within close proximity of an infected person. To control this type of transmission, physical distancing between people is recommended. The distancing requirements of different countries varies greatly and typically range from one to two meters. South Africa's OSH requirements recommend social distancing of minimum 1.5m.

The European Heating, Ventilation and Air Conditioning Association (REHVA) issued an updated Covid-19 guidance document. This document addresses transmission routes, which includes small droplets that remain suspended in the air and 2-3 days on room surfaces at common indoor conditions. The virus particles stay airborne and can travel long distances carried by airflows in the rooms or in the extract air ducts of ventilation systems. The findings implies that keeping 1-2 m distance from infected

persons might not be enough and increasing the ventilation is useful because of removal of more particles.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) also issued statements during the COVID pandemic. The heating, ventilating, and air-conditioning (HVAC) systems of many hospitals and most types of buildings are typically designed in accordance with standards and guidelines published by ASHRAE.

"Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures.", and "Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air."

MANAGANENT: OVERVIEW OF INITIATIVES

In order to manage a healthy building effectively, it is recommended that:

1 A **healthy building assessment audit** is conducted. The purpose of this is to provide an understanding of the current status of the building and its related services and address the preparedness of management and staff to handle health related risks. It serves as a gap analysis of your building's status in relation to desired outcomes and requirements of this checklist.

2 An **Infection Mitigation Plan** is developed and put in place. This address 3 main areas of risk and creates a mitigation and support plan. Identify the risks related to:

- Staff risks & ways of supporting staff
- Spatial risks (areas where people are in close proximity and physical distancing is not possible i.e transport & high contact areas)
- Work process related risks

3 **Building zoning separation & demarcation** is implemented. One must operate the building in separated zones with limited densities to minimise cross contamination and maintain physical distancing.

4 **Re-Commissioning performance** verification and maintenance is conducted to ensure critical services relating to building occupant health are operating as intended. Filter maintenance is key to ensure that outdoor airflow rates are not compromised.

5 The **Building Management System (BMS)** will allow easy change over between infection control and normal operational settings of critical systems.

6 **Communicating training & raising awareness** Raise awareness through targeted campaigns, user friendly guides and training.

7 **Access control** is addresses to create dedicated points of entry (POE) into a building in order to control access. It additionally puts in place due protocol for recording of all people entering and using the building for tracking and tracing purposes. This includes staff and items that may be delivered to the workplace.

8 A **hygiene and cleaning plan** is developed, indicating how cleaning and hygiene services are procured and the standards to which they must adhere, providing employees with a safe workspace, especially on critical areas such as biometrics, doorknobs etc.

9 **Back up management of energy** to ensure efficient and sufficient capacity to meet the buildings airflow needs. This includes periods of load shedding.

10 **Waste Management** procedures that protect personnel dealing with waste against infection are supported.

11 Make **Mental Health Support** services and resources available to encourage resilient mental health during after emergencies. Ensure that discrimination does not occur.

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PERSONAL BEHAVIOUR: AN OVERVIEW OF THE INITIATIVES

Individuals are encouraged to:

1 Aim to **keep distance between yourself and all other people** at min 1.8m at all times to limit exposure to potentially infected persons.

2 **Regular and proper hand washing** with soap and water. Do this after being in touch with high contact surfaces and entering / exiting communal areas.

3 **Practice good personal hygiene** habits particularly around ablutions, waste & food preparation.

4 Limit or avoid assembly of people and reduce sharing of equipment.

5 Wear appropriate PPE to reduce the intensity of exposure to the infection as well as reduce the risk of spreading a disease.

INDOOR AIR QUALITY: AN OVERVIEW OF THE INITIATIVES

In order to maintain good thermal comfort and safe indoor air quality it is recommended that building owners:

1 Address **building ventilation rates** to ensure sufficient ventilation or outdoor air supply rates are provided to minimise a build-up of pathogens or contaminants suspended in the air.

2 Create and **control and times of operation for the air flow systems** to optimally control airflow rates to the building relating to its occupancy profile.

3 Ensure that **outdoor air distribution** is effectively distributed throughout the building and is positively supplied to each occupied zone.

4 Effectively manage **relief and return air paths** to limit potentially contaminated air being displaced, by outdoor air, to an adjacent zone and allowing it to easily exit the building.

5 Manage **space air distribution effectiveness** by minimising stagnation and optimising displacement of potentially contaminated air while still minimising draft.

6 Monitoring and feedback mechanism of spaces via **CO_2 monitoring** will highlight potentially compromised air quality due to insufficient outdoor air supply resulting in CO_2 build up.

7 Although overall air **quality monitoring** does not correlate directly with pathogen loading in the air, it will contribute to improving the indoor environment, and therefore the occupants immune system and overall wellbeing.

8 Address **filtration of outdoor air** to remove airborne contaminants and improve the overall quality of the outdoor air that enters the building.

9 Install, clean or add adequate filters to assist in the filtering of reticulated air via the **return air filtration.**

10 Monitor drops in the **filtration pressure or airflow** to ensure maintenance is carried out timeously and sufficient airflow rates are maintained.

11 Reduce re-circulation of potentially contaminated air by ensuring the position of discharge **exhaust and vent stack systems** is located far away from any intakes of any kind.

12 Minimize the risk of potentially contaminated air from high risk areas such as ablutions spreading to occupied spaces by ensuring adequate and effective **toilet ventilation systems,** air extraction and exhaust positioning.

13 As an alternative to filtration, viruses could be deactivated by means of **UVC lights.** UVC lights can be installed in various location such as room or ceiling mounted or within the air distribution systems.

14 **Room air purifiers** clean recirculated air through its filters. These can capture virus particles if fitted with HEPA filters or other approved system. These units are typically effective for a small zone only.

15 Reduce indoor air pollutants by limiting the amount of carpets installed in the buildings and applying carpet cleaning techniques to prevent pollutants from becoming airborne during **vacuum cleaning.**

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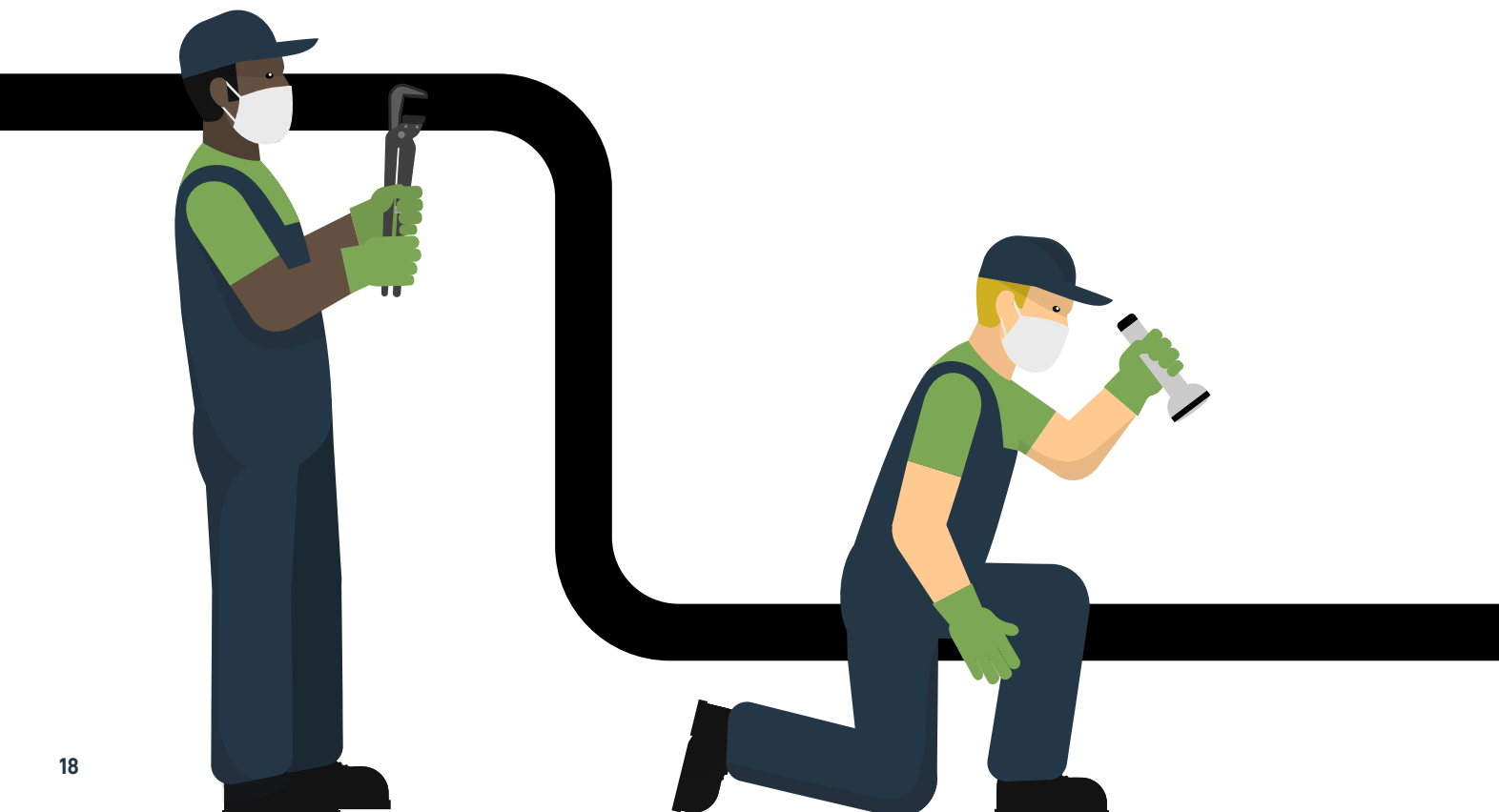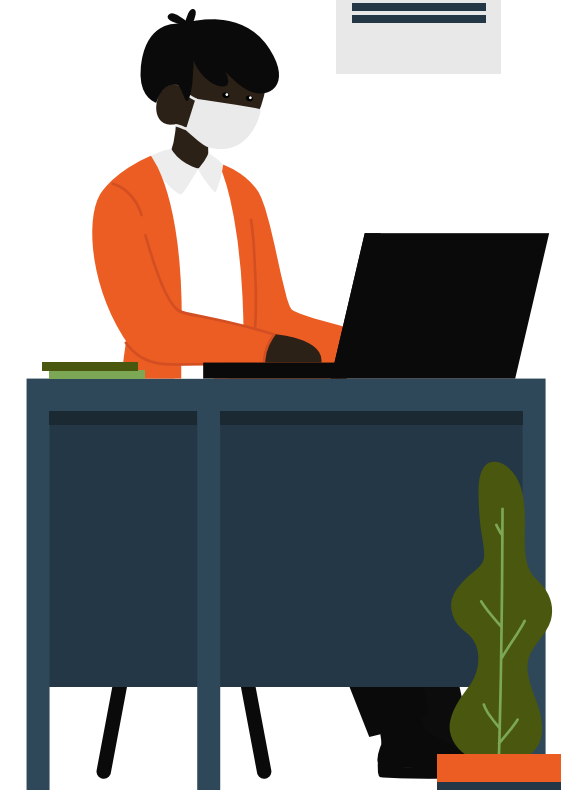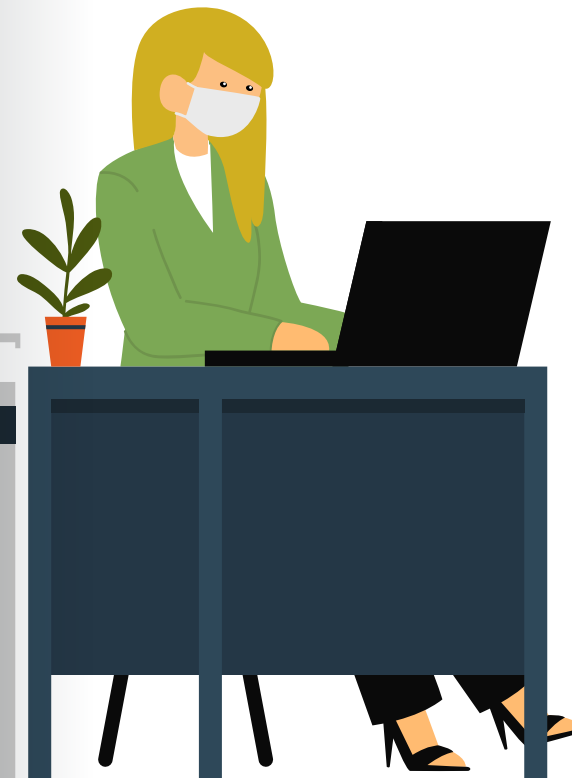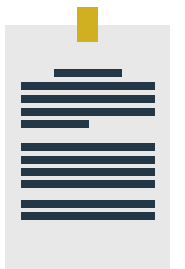# SAFE WATER SYSTEMS: AN OVERVIEW OF THE INITIATIVES

In order to maintain safe water and sanitation to building occupants building owners should address:

1 Ensure that the **sewer systems and waste water traps** are in good working order and are not a source of infection by checking they have water, seals are intact and there are no cracked pipes.

2 Ensure the **potable water** is quality controlled after a period of the building being inactive during lockdown. All water systems including tanks, geysers, pipes, cooling towers etc could support growth of pathogens including legionella, especially during times of limited use.

3 Minimise the risk of spread of contamination from **reused or harvested water** for non-potable use.

4 Promote hydration through providing access to high quality **drinking water** throughout the building.

5 Make sure appropriate **hand washing & sanitising facilities** are available at key points throughout the building. Hand washing is one of the primary defences against the spread of infection.

6 Make sure soap is available via **non-contact soap dispensers** for hand washing in ablution areas. Soap is essential to deactivate or remove pathogens from hands.

7 Consider replacing air-hand driers with paper towels for **hand drying** purposes. Air hand driers can increase the spread of airborne viruses.

8 Minimise contact with potentially infected surfaces via automation of **toilet and urinal flush mechanisms.**

DESIGN FOR SAFETY: AN OVERVIEW OF THE INITIATIVES

Employers need to consider the following design elements to contribute to a safe return to work.

1 Aim to separate individual workstations and receptions desks via **partitions and screens.**

2 Minimize and control entry of the virus via introducing **walk off & disinfectant mats** at key entrance and exit points.

3 Ensure availability of sensor or foot operated **hand sanitisers** at key positions throughout the building.

4 Aim to design out **high contact surfaces** over time with no touch items or voice activated controls. Make use of materials that are easier to clean and wipe regularly.

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GENERAL REFERENCES TO SHARE

SOUTH AFRICA
- https://www.sapoa.org.za/media/5776/responsible-reopening-commercial-real-estate-re-entry.pdf
- https://www.sapoa.org.za/covid-19-resource-centre/
- https://www.gov.za/covid-19/resources/regulations-and-guidelines-coronavirus-covid-19
- https://sacoronavirus.co.za/
- https://www.return2work.co.za/
- https://www.gov.za/covid-19/companies-and-employees/safety-workplace

GLOBAL
- https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality
- https://www.epa.gov/indoor-air-quality-iaq/office-building-occupants-guide-indoor-air-quality
- https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf
- https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-covid19-infographic-.pdf
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- https://www.hsph.harvard.edu/news/press-releases/green-office-environments-linked-with-higher-cognitive-function-scores/
- https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html

USGBC LEED Safety First Pilot Credits
- https://www.gbci.org/usgbc-releases-new-leed-guidance-address-covid-19-and-support-buildings-reopening-strategies

WELL Health - Safety Rating
- https://www.wellcertified.com/health-safety

ASHREA COVID Guidance
- https://www.ashrae.org/technical-resources/resources
- https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html

SAFE RETURN TO WORKPLACE CHECKLIST

November 2020

Welcome to the Safe return to office Checklist Matrix.

This document has been developed by the Green Building Council South Africa and Zutari to support the safe return to the workplace. The matrix below should be read in conjunction with the framework document and can be used as a checklist for building owners, office managers and facility managers to facilitate and manage the safe return of employees to the workplace.

There are 5 Categories and 45 Initiatives. Each category has been collated around the point of control within the building in mind.
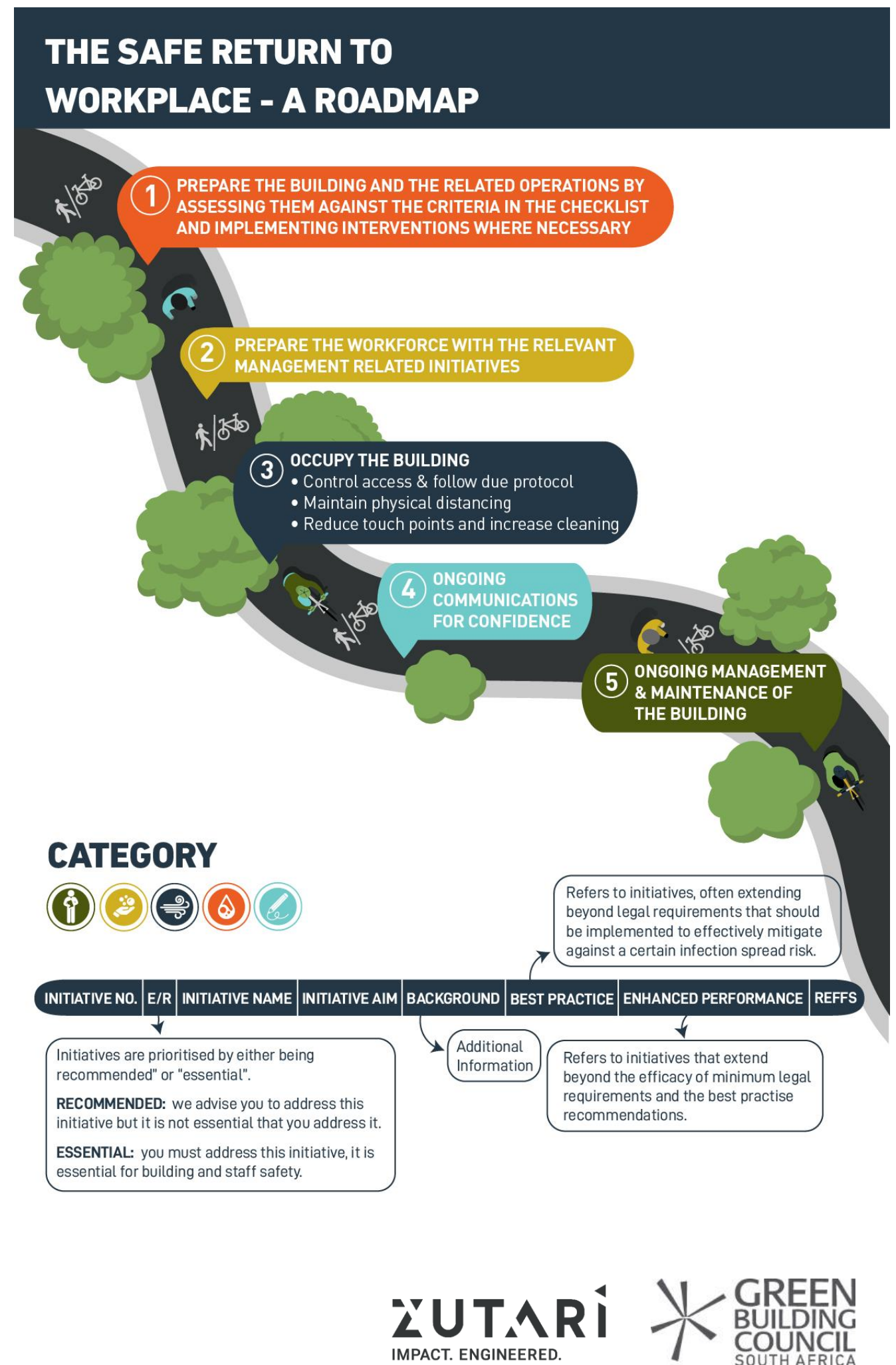
- The majority of the **management initiatives** are designed to be dealt with by an office manager although support or input from a facilities manager or commissioning agent will need to be given on the more technical initiatives.

- The initiatives in the personal behaviour category are items where the point of control is associated with the individual employee, although this must be supported by measures management must put in place.

- The initiatives in the technical control aspects related to i**ndoor air quality** and **safe water systems** will need to be addressed by the building owner and facilities manager and require technical understanding and input.

- The initiatives under the design category largely focus on elements that require design input such as screens between work stations and demarcation of building zones, to be addressed by the tenancy office manager and facilities manager.

This is not a rating tool that can generate a certified green building status by the GBCSA but initiatives can be used as innovation credits as part of the GBCSA COVID-19 Innovation challenge. The GBCSA would wish develop this further into a health or wellbeing type of rating if sponsorship becomes available. Please contact the Head of Technical at the GBCSA for further engagement around such an opportunity.

DISCLAIMERS & ASSUMPTIONS

- The intent of the checklist is to act as a guide for the safe return to the workplace. It has not been prepared to prevent infection, the purpose of it is to be used as a preventative measure. Neither the GBCSA nor Zutari can and will be held responsible for individuals contracting any infectious disease.
- The guide has been developed based on the known information and existing standards at the time.
- We acknowledge that our collective understanding of how COVID-19 and similar infections spread, as well as the effectiveness of mitigation methodologies, is consistently evolving, and we would look to update this guide periodically as updated information becomes available.
- We have also assumed that users of this guide comply with the most up to date legislative requirements as promulgated and gazetted by government.
- To the extent permittable by law, Zutari and the GBCSA disclaim all warranties, express or implied with specific reference to Covid 19 infection. Even though Zutari and the GBCSA exercised the reasonable level of skill, care and diligence in compiling the recommendations, no warranty is provided that occupants of the relevant buildings shall not contract the Covid 19 virus. Zutari and the GBCSA shall be indemnified by anyone using the guidelines against any damages, claims or costs that may be incurred by anyone using the guidelines due to any occupant of the building contracting Covid 19.

THE SAFE RETURN TO WORKPLACE - A ROADMAP

1. PREPARE THE BUILDING AND THE RELATED OPERATIONS BY ASSESSING THEM AGAINST THE CRITERIA IN THE CHECKLIST AND IMPLEMENTING INTERVENTIONS WHERE NECESSARY

2. PREPARE THE WORKFORCE WITH THE RELEVANT MANAGEMENT RELATED INITIATIVES

3. OCCUPY THE BUILDING
   - Control access & follow due protocol
   - Maintain physical distancing
   - Reduce touch points and increase cleaning

4. ONGOING COMMUNICATIONS FOR CONFIDENCE

5. ONGOING MANAGEMENT & MAINTENANCE OF THE BUILDING

CATEGORY

Refers to initiatives, often extending beyond legal requirements that should be implemented to effectively mitigate against a certain infection spread risk.

INITIATIVE NO.	E/R	INITIATIVE NAME	INITIATIVE AIM	BACKGROUND	BEST PRACTICE	ENHANCED PERFORMANCE	REFFS

Initiatives are prioritised by either being recommended" or "essential".

RECOMMENDED: we advise you to address this initiative but it is not essential that you address it.

ESSENTIAL: you must address this initiative, it is essential for building and staff safety.

Additional Information

Refers to initiatives that extend beyond the efficacy of minimum legal requirements and the best practise recommendations.

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1. MANAGEMENT CATEGORY

CREDIT No.	ESSENTIAL/ RECOMMENDED	CREDIT NAME	CREDIT AIM	BACKGROUND INFORMATION	BEST PRACTICE RECOMMENDATIONS	REFERENCE / FURTHER READING
MANH-01	E	**Building health assessment - Audit**	To understand the current status of building services and preparedness of management and staff to handle health related risks. It includes an audit of critical building services to identify inadequacies and it serves as a gap analysis of your building's status in relation to desired outcomes and requirements of this checklist.	The first step towards developing any COVID-19 response strategy involves getting a high level understanding of one's building, particularly the building services that deliver fresh air and water and the different areas of control. The outcomes of the assessment should inform subsequent plans outlining the protective measures in place for the phased return of employees. The assessment and plans should be done in consultation with at least an employee representative. This is a formal assessment by a qualified technical service provider who assesses the status of the building services i.e. FM and related disciplines. The assessment needs to go beyond the applicable health and safety and relevant compliance inspections of mechanical, electrical, ventilation and fire/emergency systems and also include a review of risks for pathogen control over and above legislated requirements.	A high level building health assessment has been conducted in order to gain understanding of the current status of the building, its services and associated areas of management. This assessment is used as a base to address the remainder of the items in the checklist in order to understand what will be required to bring the building to be safely reoccupied by employees. The information included in the audit should include: - Checking the building for rodents, mould and stagnant water - An outline of current policies, plans and procedures and an understanding of changing these to meet legislative requirements. - A staff and HR document that includes risk to staff; high risk staff; staff representatives and committees - An understanding of the buildings current air supply, control areas and distribution to various rooms. I.e. where are units located and who manages them? - An understanding of the current indoor air quality if possible (via sensors) - An understanding of positioning, functioning and latest servicing of wet services (Cold water storage tanks and pumps; internal hot and cold water supply; drainage reticulation; waterless toilets and	CDC website on building water systems Mold in buildings SA Gov companies & employee safety at the workplace SA employment & labour terms – disaster risk management regulations ASHRAE building readiness SA Gov Dept. of Health walk through COVID-19 risk assessment SA Gov guidelines & relief Consolidated COVID-19 Direction on Health and Safety in the Workplace in terms of Regulation 4(10) of the National Disaster Regulations NICD – Return to work

					urinals and irrigation systems) and ablutions. - Location and operation of toilet extract systems; - location and operation of lift ventilation systems; - Filtration systems; - Location of domestic water supply and domestic hot water systems. - An understanding of the waste and associated service providers - An understanding of the emergency items (fire, emergency lighting, escape routes, fire hydrants etc.) - An understanding of the buildings energy supply and distribution of power (sub metered areas; solar PV's; battery, essential power items etc.) - An understanding of the buildings use profile in essentials and full capacity mode - A specific understanding and investigation into canteens and food preparation areas and what is required to meet desired requirements Ideally this is performed on an annual basis.	Return2Work - Roadmap
MANH-02	E	**Infection Mitigation Plan**	Aims to put in place an infection mitigation plan that addresses 3 main aspects; namely • staff risks and support • spatial risks (areas where people are in close proximity to others and high contact areas) • work process related risks.	Infection mitigation plans are developed to reduce the risks of pathogens spreading in a building. The applicable legal and regulatory requirements promulgated by the different department (COGTA, DoH, DoL, etc.) for Covid-19 must be included as a minimum. An assessment of the risks of the physical office space (see building zoning) needs to have been conducted as well as the risks associated with work related processes.	An infection mitigation plan has been developed and put in place. The plan covers **1. staff risks and support:** - Put in place relevant compliance officers and committees and supply training (see education and awareness credit) - Protocol to be developed around reporting of infection incidents. Address the preparedness of management and staff to handle health related and infection risks in the work place as well as how to effectively respond to and recover from incidents of infection in the workplace. - Identify vulnerable & high risk staff and engage with them directly to develop a plan that works for both employer & employee - Put in place support for healthy lifestyles and individuals to build good immunity	WC Government: Individual Risk Assessment Checklist for COVID-19 for At-Risk Staff Groups CDC return to office Dept. Health: Direction on health & safety in the workplace SA Gov: When staff test positive SA Gov companies & employee safety at the workplace Reporting cases

					(access to fresh clean drinking water, fresh air, healthy food, exercise encouragement) - Understand risks to staff associated with transport and travel to and from work - Identify work from home / core hours or in/out office days to keep density low and ensure physical distancing - Identify teams and rosters for phased in working hours and arrange access accordingly - Management and executive staff to be trained and ensure training for staff - Management and executives to schedule regular check ins with staff **2. spatial risks** - Identify areas or spaces that are high risk for infection due to either high contact point or areas that physical distancing will not be possible (Surface contact risks: includes workplace surfaces, doorknobs, lights switches, railings, elevator buttons, shared workstations and shared tools) **3. Work process related risks.** - identify personal interactions required while performing job functions - Identifying key building and process related risks (cleaning and waste removal) and create appropriate responses. - Equipment contact risks: includes any interaction with equipment necessary to perform one's job function, such as electronic devices, stationery supplies, and any industry-specific equipment.	Western Cape Gov: FAQ's on how to prevent and manage COVID-19 infections in the workplace CDC- FAQ people with higher risks McKinsey reopening safely – sample practices & risks https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-small-business.html
MANH-03	E	**Building zones and separation in order to maintain physical distancing**	Identify the various building zones to minimise unnecessary occupant movement. Organise the workplace to maintain physical distance between people of min 1.8 meters	Clearly dividing the premises into buildings or different zones and limit unnecessary occupant movement. This aids in reducing cross contamination and allows easier management of different building zones.	A plan is to be prepared and implemented to limit unnecessary movement between different zones of the building where possible and applicable; - Movement between campus style buildings can be prevented entirely; - Use separate entrances and lifts and staircases to serve separate zones within the building; - Identify zones that are served by separate air-conditioning or ventilation systems and aim to operate these as separate zones; - Restrict or avoid movement between different floors;	WHO: Considerations for public health and social measures in the workplace in the context of COVID-19 CDC – Social Distancing

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- Restrict or avoid movement between different functional areas, e.g. finance, procurement, etc.
- Reduce use of lifts and escalators by encouraging use of stairs
- Demarcated common areas and common facilities such as ablutions and pause areas/ kitchenettes are to be dedicated for exclusive use by occupants from a particular zone at different times.

Management to put in place below items to ensure physical distancing of min 1.8 meters by:

- Manage the entry of staff into the building via specific entry points. Close other potential entry points without compromising fire evacuation routes
- Erecting barriers and demarcate different identified floor areas to allow for effective distancing
- Reduce the density of people in the building by implementing shift or split-team arrangements to meet physical distancing requirements.
- Reduce the need for physical meetings with clients and staff by enabling online platforms and teleconferencing facilities.
- Stagger working hours to reduce congregation of employees at common spaces such as entrances or exits.
- Where possible, establish physical barriers between co-workers using strip curtains, plastic barriers, or similar materials to create impermeable dividers or partitions.
- Demarcate or limit access to all common areas including lifts lobbies and toilets where employees are likely to congregate and interact, such as break rooms, and in entrance/exit areas.
- Allow for distanced queuing where necessary.
- Consider making foot-traffic single direction in narrow or confined areas in the transit station to encourage single-line movement at a 1.8m distance.

					- Use visual cues such as floor decals, coloured tape, and signs to remind workers to maintain physical distances including at their workstation and in break areas.	
MANH-04	E	**Awareness, Education and Training**	Provide targeted training workshops awareness campaigns and users guide for all building occupants (employees, visitors and service providers) around building use and operations in an easy to understand or non-technical language with regular updates and improvements or additions noted in document control. This needs to be accompanied by related signage and awareness campaigns.

Develop a safe return to workplace building user's guide to put in writing the guidance for building use and operations for occupants. This must be in an easy to understand and non-technical language with regular updates and improvements or additions noted in document control. It should form part of new staff inductions | While awareness seeks to focus staff on the issues and risks associated with the safe return to the workplace, specifically developed training will offer practical skills to staff as what to do, how to do it and how often.

The aim of awareness and training is to develop internal capacity about the technical and procedural and emotional impacts of spreading and contracting an infectious disease.

During emergencies, stakeholder engagement and communication is critical to instilling confidence, improving coordination and supporting actions that can help protect safety. Regular, clear communication about the emergency preparedness and response strategies being utilized by an owner or operator of a space to support people's health and safety, as well as how stakeholders can build awareness of what to do during an emergency event, provides critical information that supports the health and well-being of all occupants.

Through providing good communication, organizations can support occupant health literacy, which refers to a person's cognitive and social ability to access, interpret and understand basic health information, as well as the ability to act on that understanding to maintain health.

The safe return to workplace users guide acts as an instruction manual for a building and covers all aspects users may interface with. | Opportunities for training have been identified and implemented for all staff, as appropriate to the scale and function of the organisation.

Give specific focus on training of management and executives who take on most responsibility in organisations, and therefore training targeted at them is essential as well as the KPIs for them to ensure that their teams receive any required training.

Education material to include:
- Information about the disease: knowledge of the risks, routes of transmission, symptoms to watch for.
- What to do if you or a family member are sick, where to get help, stress management
- Diagrams and information on the correct use of masks and other PPE, washing of hands and physical distancing etc.
- An understanding of the building zones and how these will work
- An understanding of the implications of the reduced number of people allowed at any one time (per sqm), i.e. Shift work, teams and rosters.
- how to deal with service providers and visitors and
- What to do to properly manage incidents of infection within the workplaces.
- Cleanliness & hygiene practices
It also includes sensitivity training and protection of staff against unfair discriminations or victimisation.

Updates to training when the buildings health guide or any building health related improvements are done.

To note:
- Keep records of trained staff. | Coping with mental health: SA Coronavirus page

WHO free training

Dept. of Health knowledge hub training materials

Lung institute training material

CDC - Handwashing Saves Lives

CDC How to Select, Wear, and Clean Your Mask

CDC – How it spreads

CDC - Symptoms & testing

CDC – Communications toolkit |

					- Put in place a support for questions and plans for ongoing training. Consider using technology, such as apps, active wall displays etc. for ongoing awareness. Ensure the safe return to workplace building users guide (BUG) is readily available to all staff. The BUG should provide basic information of the building and associated services related to general occupant health and functioning under pandemic conditions. The BUG and associated training is part of induction of new staff member's induction process. Awareness and education aligns with BUG	

MANH-05	E	**Access Control**	The aim of this credit is to create dedicated points of entry (POE) into a building in order to control access. It additionally puts in place due protocol for recording of all people entering and using the building for tracking and tracing purposes. This includes staff and items that may be delivered to the workplace.	Daily visitor and staff records are to be kept for reference and tracking purposes.	Clearly identify access points into the building and close off other potential entry points without compromising fire evacuation routes. Manage and control the entry of staff via dedicated entry points, allowing for physically distanced queuing. Address staggered work hours to control amount of people arriving at work at any given time.
					
					Put in place walk off mats at POE (see design credit D-03)
					
					Implement a procedure for access registration and checking of temperature of all persons entering the building, at all open entrances.
					  - Daily visitor and staff records are to be kept for reference and tracking purposes.
					  - Temperature readings to be taken of all persons entering offices.
					  - Rosters and time slots to be created for staff to comply with maximum densities.
					  - Identify teams and rosters for phased in working hours and arrange access accordingly
					  - Put in place access protocol and signage around staff, visitors and contractors entering the office. I.e. no masks no entry, placement of hand sanitisers at doors.
					Maintain records and manage effectively.
						CDC contact tracing
						
						CDC – Office buildings

					For regular visitors or large institutions it is recommended that as much of this is done electronically and captured in a central data base to ensure that management of an incident can be most effective.	

MANH-06	E	**Hygiene and Cleaning Plan**	Prepare a plan indicating cleanliness and hygiene procedures and protocols around the building, employee and workplace to ensure a clean and sanitised workplace.	**Cleaning removes germs**, dirt, and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.
				
				Disinfecting kills germs on surfaces or objects. Disinfecting works by using chemicals to kill germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.
				
				Sanitizing lowers the number of germs on surfaces or objects to a safe level, as judged by public health standards or requirements. This process **works by either cleaning or disinfecting** surfaces or objects to lower the risk of spreading infection.
					A hygiene and cleaning plan has been developed covering:
					- Responsibility
					- Cleaning product choice and procurement
					- Cleaning and disinfections procedures of the different zones
					  o cleaning of individual spaces (i.e. workstations)
					  o cleaning of communal spaces (i.e. meeting rooms and movement areas)
					  o cleaning of high contact surfaces (i.e. door handles; ablutions, lobbies and lifts, handrails)
					  o Food preparation areas.
					- Training and protections of cleaning personnel
					- Cleaning staff have been trained in the protocols and have been warned of the risks.
					- PPE equipment is issued to the cleaning staff.
					- Address how often PPE should be cleaned.
					- Rosters are kept of cleaned areas.
					- Prepare each work station and employee with mask, sanitiser and personal tissues
					- Engagement with cleaning service providers
					- Staff handwashing & sanitising stations
					  o Soap and sanitising liquid are to be made available and to be non-contact type and are well located and easy to operate (via foot pedal or sensor).
					  o Provide hand sanitisers at all entry / exit points and all communal and high risk areas as identified by the building separation and zoning plan
					  o Additionally all staff issued with personal alcohol based hand sanitisers and staff use them often and after touching high risk areas.
						WELL Health -Safety Rating
						
						LEED Safety First pilot credits
						
						CDC - Reopening Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes
						
						CDC – FAQ on cleaning & disinfecting
						
						Practical Manual for Implementation of the National Infection Prevention and Control Strategic Framework – March 2020
						
						CDC – Guide to cleaning

					- o Provide associated signage at well located points. - Personal Hygiene - o Install automated toilet lids where possible - o Toilet bins to be non-contact type and have lids. Have dedicated bins for tissues - o Additionally staff to be equipped with personal tissues - Food preparation considerations - o Provide training on proper handwashing, particularly to younger workers. - o Address barriers to worker handwashing, including sink accessibility, time pressure, and lack of training. - o Revise food preparation steps to lower the number of needed handwashing This includes training of relevant cleaning staff as well as records of cleaning timetables and responsible staff members.	
MANH-07	R	BMS (Building Management System) Status	Implement a strategy that will allow easy change over between infection control and normal operational settings of critical systems.	Systems modifications made to mitigate infection control could have negative impact on the buildings' energy and thermal comfort performance.	1. Buildings without an automated BMS Record any changes made to the building systems settings, e.g. damper positions, fan speeds, etc., before and after implementing infection mitigation control measures. This will allow reverting back to previously determined optimal performance when the pandemic abates. It will also allow easy re-implementation of infection control measures should there be a future pandemic. A detailed schedule to be drawn up of all changes made and labelled on drawings to allow for future reversing of actions. 2. Buildings with an automated BMS Where modifications are programmed in a BMS or controllers, separate modes should be implemented that will allow the building operator to easily change over from infection control mode to a normal control mode, or vice versa.	National Infection Prevention & Control Framework – March 2020 Practical Manual for Implementation of the National Infection Prevention and Control Strategic Framework – March 2020 Better Places for People – Protect & Improve occupant health

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MANH-08	E	**Backup energy for essential services**	Essential air systems to remain operational during load shedding or any other instances when power cuts occur.	Energy management is important to maintain ventilation rates as well as business continuity and adequate lighting.	Regularly tested and maintained generator on site with automatic start-up, connected to all airflow systems. Generator fuel capacity to allow operations for a minimum of 4 hours. Develop a policy for the building's operation in the event of a long term power cut or when generator back up is no longer available. The building should be evacuated if ventilation systems are disrupted and where code compliant opening windows are not available.	
MANH-09	R	**Waste Management**	The aim of this credit is to provide a clear understanding of office waste management. It addresses all aspects of waste from staff, cleaning of bins and communication with waste suppliers as well as disposal of PPE, food waste and personal tissues	Unsound management of this waste could cause unforeseen "knock-on" effects on human health and the environment. The safe handling, and final disposal of this waste is therefore a vital element in an effective emergency response.	Develop a waste plan that - Ensures correct PPE for people dealing with waste - Identifies & demarcates waste areas with separated bins identified for food waste / composting (in enclosed bin), recycling, landfill, personal waste / infected waste. - Dedicated bins for tissues - Require the frequent disinfection of waste areas and bins - Issue guidelines for employees on separating and disposing of infectious waste - Ideally infectious waste should be double bagged - Provide guidance and training on COVID-19 safety measures to waste collection and sorting agencies and monitor compliance	UNEP Guide to waste management WHO Water, sanitation, hygiene, and waste management for SARS-CoV-2
MANH-10	E	**Mental Health and staff wellness**	This credit aims to offer support for staff as well as ways to encourage staff wellness around building immunity and maintaining good mental health.	Change and uncertainty breeds anxiety and managers need to support staff through showing vulnerability, supporting and modelling healthy behaviour as well as building connectivity through formal and informal check-ins. Health is a state of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity. However, mental health remains neglected in our societies and our work places, and unfortunately, disorders like anxiety and depression often go undetected for months or years. Unlike physical illnesses, mental health issues are more challenging to pinpoint and can have a serious impact on an individual's performance.	HR and Management to create bespoke response to staff wellness and mental health that may include: • scheduling regular catch ups between staff members and encouraging staff to stay in touch • providing opportunities for staff to share how things are going for them and how they are feeling • providing opportunity for physical exercise to encourage physical health • encouraging staff to take regular breaks and recognising when staff are feeling isolated and disconnected • building awareness and sharing resources around mental health, the benefits of	https://www.workplacestrategiesformentalhealth.com/managing-workplace-issues/supportive-performance-management https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/stress-coping/index.html https://howrightnow.org/ https://www.cipla.co.za/mental-health/free-mental-health-resources-in-south-africa/

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				According to the Centers for Disease Control and Prevention, about 80% of adults with depression reported at least some difficulty with work, home, or social activities because of their depression symptoms. Even though mental health can often be a taboo topic, especially in the workplace, it appears that employees want their employer to champion mental health and well-being. According to a survey of office workers in July 2018 from Peldon Rose: • 72% of employees want employers to champion mental health and well-being. • Nearly three-quarters of workers say they want their employers to champion mental health and well-being in the workplace. This is rated as more important than equality (48%), sustainability (38%) and diversity (31%). • This is the case for all generations, who prioritize mental health and well-being above all other causes - Gen Z (76%), Millennials (73%), Gen X (75%), Baby Boomer (56%). This is a large body of work and the response will need to be tailored by the HR manager and management staff.	healthy eating , physical activity and good hydration • building good relationships and resilient avenues for communication • sharing relevant personal stories to encourage others to share and breed better connection • Providing opportunity for anonymous or discreet channels of communication. • Building trust and ensuring confidential information remains confidential • Allow staff autonomy	https://worldgbc.org/principl e-4-facilitate-positive-behaviour-and-health http://www.bco.org.uk/Healt hWellbeing/WellnessMatters .aspx https://www.cdc.gov/physica lactivity/data/index.html?CD C_AA_refVal=https%3A%2F% 2Fwww.cdc.gov%2Fphysicala ctivity%2Fdata%2Ffacts.htm https://www.cdc.gov/physica lactivity/activepeoplehealthy nation/join-active-people-healthy-nation/organizations.html https://www.forbes.com/site s/alankohll/2018/11/27/how -to-create-a-workplace-that-supports-mental-health/?sh=4e75413ddda7 https://worldgbc.org/principl e-5-social-value https://www.cdc.gov/corona virus/2019-ncov/hcp/managing-workplace-fatigue.html
MANH-11	E	**Re-commissioning**	Ensure critical services relating to building occupant health are operating as intended by re-commissioning all critical systems and services	Commissioning performance verification Start with commissioning of critical services and develop a maintenance plan **Maintenance of critical systems** Critical services relating to building occupant health are to be maintained on a planned schedule to ensure they remain operational **Filter maintenance** Filters are to be maintained to ensure that outdoor	**Commissioning performance verification** Identify all critical services within the building, e.g.: - Ventilation or outdoor air supply systems; - Associated air-conditioning systems where responsible for outdoor air distribution; - Toilet extract systems; - Lift ventilation systems; - Filtration systems; - Domestic water and domestic hot water systems. Determine the performance requirements of these	Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020

airflow rates are not compromised.
Filter cleaning specified at schedule intervals with relevant infection control measures and disposal of used filters. A clear filter cleaning methodology and cleaning regime in place. A strategy and plan for Protection of maintenance staff during potentially contaminated filter cleaning.

Occupancy and building use
Building services and systems must be designed for the current building's use
Services and critical systems are designed to support a specific building use and occupancy, which may change over time.
In many instances the occupancy density has been increased in recent years. This may render critical systems to be inadequate.
Ventilation systems designed to regulations prior to SANS 10400-O: 2011 had lower outdoor airflow design rates, based on occupancy density only. These buildings are at higher risk of undersupplying outdoor air where occupancies have increased.

systems as per the original design or as per the modified recommendations of this health assessment;
Carry out measurements to verify that the systems are operating in accordance with the performance requirements.
Rectify where necessary.

Maintenance of critical systems
Prepare a schedule of all critical systems identified above.
Ensure, on a daily basis, that these systems are operational before occupation takes place and remain operational during all occupied hours.
It is recommended that records are kept.

Filter maintenance
Clogged filters can reduce the airflow rates and therefore the performance of the air distribution systems.
Prepare a schedule and a maintenance plan for all filters within the building. The maintenance plan should identify the acceptable pressure drop and replacement frequencies of the filters. Flow rates should preferably be maximised, but not drop below the minimum rates required by the design intent or as identified in this health assessment. Records of all checks and replacements should be kept.
Filters should be treated as if they contain active pathogens and must be handled with care while wearing suitable PPE. PPE as a minimum should include respiratory protection, goggles and gloves. Filter should be disposed of in a sealed bag. Filter maintenance should be carried out with fans turned off.

Occupancy and building use
A review of the critical systems for infection control (refer to above) should be carried out to determine if they are adequate to support the current occupancy and building use.

2. INDIVIDUAL BEHAVIOUR CATEGORY

CREDIT NO.	ESSENTIAL/ RECOMMENDED	CREDIT NAME	AIM OF CREDIT	BACKGROUND INFORMATION	BEST PRACTICE RECOMMENDATIONS	REFERENCE / FURTHER READING
IND BEH 0- 01	E	**Physical distancing**	Aim to keep distance between yourself and all other people at min 1.8m at all times (esp. when indoors) to limit exposure to potentially infected persons	Physical distancing is one of the most important and effective aspects of reducing the spread of airborne viruses. When considering how to do business one must prepare the work space for physical distancing which will affect the movement and placement of people. Special attention needs to be given to access points, communal areas and queue management. The COVID-19 virus primarily spreads when one person breathes in droplets that are produced when an infected person coughs or sneezes. Social distancing refers to actions taken to stop or slow down the spread of a contagious disease. For an individual, it refers to maintaining enough distance (1.8m or more) between yourself and another person to avoid getting infected or infecting someone else. The CDC had defined a close contact as someone who spent 15 or more consecutive minutes within 1.8m of someone with COVID-19 over a 24hr period.	Individuals to exercise physical distancing of in 1.8m by: • Avoiding physical contact with other persons (i.e. hugging, touching, shaking hands) • Avoiding crowds, social or work related gatherings. • Making use of online platforms and working from home • Adhering to management demarcated areas, zones and times • Staying at home if you are sick • hold essential meetings outside in the open air if possible • avoid non-essential travel	WHO: Considerations for public health and social measures in the workplace in the context of COVID-19 CDC – Social Distancing CDC - How to Protect Yourself & Others SA Gov – Social distancing explained SA Coronavirus – What is social distancing SA Health – what is social physical distancing Social distancing graphic poster

IND BEH 0- 02	E	**Hand washing and hand sanitising**	Regular and proper hand washing with soap and water. Sanitise your hands after being in touch with high contact surfaces and entering / exiting communal areas.	Hands are the main pathways of germ transmission. Hand hygiene is therefore an important measure to avoid the transmission of harmful germs and prevent associated infections. Hands must be washed in accordance with recommendations by the WHO, with soap and hot water for at least 20seconds to deactivate the virus. Wash hands after going to the bathroom; before eating; after blowing your nose, coughing, or sneezing; and after handling anything that's come from outside your home.	Individuals to exercise hand washing and/or sanitizing with water for at least 20seconds to deactivate the virus. Wash hands after going to the bathroom; before eating; after blowing your nose, coughing, or sneezing; and after handling delivery items. If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 70% alcohol, covering all surfaces of your hands and rubbing them together until they feel dry. Always wash hands with soap and water if hands are visibly dirty. Avoid touching your face, nose, eyes and mouth.	WHO Handwashing poster WHO - Clean hands protect against infection CDC's handwashing website https://www.cdc.gov/handwashing/hand-sanitizer-use.html

IND BEH 0- 03	R	**Personal Hygiene Awareness recommendations**	Practice good personal hygiene habits particularly around ablutions, waste & food preparation	Hygiene is important in the workplace because it contributes to a healthy workforce. A healthy workforce is happier and more productive. A healthy workplace also means workers take less sick leave.
				
				People spread germs in countless ways, from sneezing without a tissue to leaving coffee cups unwashed on a desk. Shared facilities and equipment also hold the potential for high levels of harmful bacteria.
				
				When personal hygiene habits go unchecked, they can have serious implications on business operations. A more severe consequence than staff getting sick and taking time off to recover is staff keep coming in to work and infect even more staff members, putting all employees and the organisation at risk.
				
				Research also shows that poor standards of hygiene reduce people's ability to focus on their work, and trigger a negative mind-set, affecting productivity and morale.
					Individuals personal hygiene practices
					
					o WC's lid must be closed before flushing to avoid droplets that may contain the virus becoming airborne and landing on surfaces.
					o Make use of personal tissues for coughing sneezing etc.
					o Dispose of tissues in provided bins
					o Those preparing food
					    o to wash hands more regularly
					    o Wipe down surfaces between meal preparations
						CDC – Hygiene etiquette
						
						CDC – Hygiene in foodservices
						
						HBR - The Case for Finally Cleaning Your Desk
						
						WHO - Water, sanitation, hygiene, and waste management for COVID-19
						
						CDC – Coughing & sneezing etiquette

IND BEH 0- 04	R	**Limit sharing of personal equipment**	Limit or avoid assembly of people and reduce sharing of equipment	Sharing of equipment, devices and food are opportunities for spreading diseases and should be avoided. Additional supporting measures such as work from home (WFH) and online meetings will further enhance the effectiveness of this credit.	Individuals practices: o Stay at home if you are sick o Complete the required isolation period if you have tested positive for a high risk contagious disease	CDC - Considerations for Events and Gatherings CDC - Personal and Social Activities

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| | | | | | | o Avoid sharing equipment (laptops, keyboards, phones, headphones)
o Avoid sharing of food
o Reduce need for physical meetings via online platforms & only gather when necessary
o Adhere to physical distancing when in a crowd, communal space or shared transport | SA Gov - guidelines for quarantine and isolation in relation to covid-19 exposure and infection |
| IND BEH 0- 05 | E | **Wearing of PPE** | | Wear appropriate PPE to reduce the intensity of exposure to the infection as well as reduce the risk of spreading a disease. Wearing an appropriate face mask is essential. | Face masks combined with other preventive measures, such as frequent hand-washing and social distancing, help slow the spread of the virus. Both pre-symptomatic and asymptomatic transmission are possible, with studies showing that that viral loads peak in the days before symptoms begin and speaking is enough to expel virus-carrying droplets.

If you are infected with the coronavirus and do not know it, a mask is very good at keeping your respiratory droplets and particles from infecting others. A mask can also be somewhat effective in preventing germs from getting into your nose and mouth that come from another person's respiratory droplets. | Individual to wear a mask with the below guidelines:
o Clean your hands before you put your mask on, as well as before and after you take it off.
o Cover both your nose and mouth.
o Fit snugly but comfortably against the sides of the face.
o Be secured with ties or ear loops.
o Have multiple layers of fabric.
　o A mask with a valve is not protecting others, only yourself.
　o Govt regulations indicates it must a cotton mask of at least 3 layers, or medical grade.
　o Staff in a high risk environment must wear a N95 mask/respirator and goggles (as the droplets can infect through eye contact).
o Allow for unrestricted breathing.
o Able to be laundered and machine dried without damage or shape changes.
o Cover your nose and mouth with your elbow when you have to cough or sneeze
Staff preparing food should wear hairnets
Cleaning staff to wear gloves & masks | WHO - when-and-how-to-use-masks

CDC – Using PPE

Masks – what you need to know

CDC – DIY cloth face masks

The following user friendly infographic resources are available:
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks

https://coronavirus.westerncape.gov.za/files/atoms/files/COVID-19%20_mask-use_English_2020-09-25.pdf |

3. INDOOR AIR QUALITY CATEGORY

CREDIT No.	ESSENTIAL/ RECOMMENDED	CREDIT NAME	AIM OF CREDIT	BACKGROUND INFORMATION	RECOMMENDED BEST PRACTICE	ENHANCED PERFORMANCE	REFERENCE / FURTHER READING
IAQ-01	E	Ventilation Rates	To ensure sufficient ventilation or outdoor air supply rates are provided to minimise a build-up of pathogens or contaminants suspended in the air.	Ventilation or outdoor air supply is one of the primary methods to control air-borne suspended pathogens through dilution or displacement from the occupied space. The higher the outdoor air supply rate, the more effective it will be for infection control. However this may be limited by the current design of the Heating, Ventilation and Air-conditioning (HVAC) systems, e.g. it may not be capable of delivering increased outdoor airflow rates or it may not be able to maintain thermal conditions should the outdoor air supply rates be increased. For infection control, it will be better to compromise on thermal conditions rather than ventilation. Higher outdoor airflow rates will also impact humidity control where fitted. For infection control, it will be better to compromise on humidity control rather than ventilation. It should be noted that increased ventilation rates will result in increased energy consumption. The current regulations, SANS 10400-O: 2011 require compliance with two metrics, i.e. a flow rate per person or air changes per hour for outdoor air supply. Flow rates	It is recommended that HVAC systems are set to operate at maximum possible outdoor airflow rates, full outdoor air where possible, even if this results in some thermal discomfort. Occupants should be informed and monitored where thermal and humidity conditions will be compromised. The building should be monitored for mould growth where higher humidity levels will occur. As a minimum, outdoor air should be supplied exceeding SANS-10400-O 2011 by 33% where one point is achieved under Green Star Ieq-1 Credit. New buildings shall be designed to deliver outdoor airflow rates without compromising thermal comfort. Windows should be opened, especially when higher levels of mechanical ventilation is not available.	Outdoor air should be supplied exceeding SANS-10400-O 2011 by 66% where two points are achieved under Green Star Ieq-1 Credit. New buildings shall be designed to deliver outdoor airflow rates without compromising thermal comfort. To further enhance the performance, operate the systems to supply full outdoor air with a minimum of 6 air changes per hour.	Centres for Disease Control and Prevention (CDC); Guidelines for Environmental Infection Control in Health-Care Facilities, 2019; Available at: www.cdc.gov/infectioncontrol/guidelines/environmental/index.html; Accessed on: 9 Oct 2020 American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Indoor Air Quality Guide. Best Practices for Design, Construction and Commissioning (2009). ISBN978-1-933742-59-5American Society

required are relatively high e.g. for general office 7.5 l/s per person, or two air changes per hour of outdoor air is required, whichever is greater. Outdoor air supply per person correlates with the number of occupants, whereas two air changes per hour does not correlate with the number of occupants. Two outdoor air changes will typically require much higher outdoor airflow rates, unless the spaces have very high densities. Outdoor air supply in buildings is used to achieve the following: 1. Provide outdoor air to occupants and to control CO_2 levels for normal breathing purposes. Internally produced CO_2 correlates with the number of occupants. 2. Controlling the indoor air quality by diluting or displacing other contaminants or pathogens produced internally. These do not correlate with the number of occupants. However, the probability that someone has an infectious disease that can produce pathogens increases as the occupancy increases. A single infected person can release substantial amounts of pathogens into the air when they cough or sneeze. 3. Maintain pressure relationships and airflow directions between clean and potentially contaminated spaces. This does not correlate with the number of indoor occupants. 4. Indoor temperature control when outside conditions are favourable. Demand control or outdoor air supply rates based on CO_2 levels or occupancy numbers must NOT to be used during times when infection control is the priority. Demand control will result in providing insufficient ventilation for infection control, or provide a false sense of security when CO_2 levels are measured to be low. The outdoor air must always be supplied at maximum possible rates regardless of occupancy levels.

of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Building Readiness (Update: 19 Aug 2020). www.ashrae.org/covid19Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/fileadmin/user_upload/REHVA_COVID-19_guidance_document_V3_03082020.pdf. Accessed on: 9 Oct 2020The Chartered Institution of Building Services Engineers (CIBSE); Covid-19 Ventilation Guidance V3 (15 July 2020); www.cibse.orgGreen Building Council of South Africa (GBCSA); Technical Manual Green Star SA Office Design and As-Built v1.1 (2014); www.gbcsa.orgSouth African Bureau of Standards (SABS); SANS10400-O (2011); www.sabs.co.za

| IAQ-02 | E | Air systems control and times of operation | To ensure that control is in place to schedule air systems times of operation and to optimally control airflow rates. | A control methodology should be in place to enable the continuous operation of the ventilation systems when the building is occupied and for extended operational times. Contaminants are to be flushed after occupation. Any contaminants that could be released from filters after a possible impulse generated at start-up should also be flushed out. Early start up will dilute contaminants released by building materials.

Air conditioning systems aid with the distribution of outdoor and filtered air and it is necessary to ensure that air stagnation is minimised. AC systems are to be operational during occupied hours.

AC systems are normally fitted with return air filters which in most cases are not capable of effectively arresting pathogens such as viruses. However, depending on the effectiveness of the filter, a percentage of viruses will be captured. Pulses could be generated during stop / start of AC systems which can release viruses into the supply air stream.

In variable air volume (VAV) systems, outdoor air is distributed as part of the air-conditioning systems. These systems will control flow rates to spaces based on thermal conditions rather than outdoor air supply rates. | Introduce a control strategy whereby the outdoor air and air-conditioning systems start 3 hours before and operate 3 hours after building occupancy.

It is recommended that these systems be controlled by an automated 7 day programmable timer or should be BMS controlled, since it will not be practical to manually start and stop the systems for the extended operational times.

Air conditioning air systems should not stop and re-start during times of occupation.

For VAV systems, the control should be configured to ensure minimum outdoor airflow rates to all spaces are maintained as per I-01.

Supplying untreated outdoor air in areas with elevated humidity (e.g. coastal areas) can lead to condensation on building surfaces. To prevent condensation, the air conditioning systems should be interlocked to start at the same time as the outdoor air systems. | Outdoor air supply is to be controlled by variable speed drives. Automated control by controllers or BMS based on filter pressure drop or airflow measurement to maintain outdoor air supply rates.

Control the air systems to operate 24/7 at reduced airflow rates during times when the building is not occupied. | Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/fileadmin/user_upload/REHVA_COVID-19_guidance_document_V3_03082020.pdf. Accessed on: 9 Oct 2020

Reference to micro droplets being suspended for 3 hours in the air: American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); ASHRAE Journal Volume 62, No.5; Covid-19 Building Operations, ASHRAE Guidance (May 2020). www.ashrae.org |

| IAQ-03 | E | **Outdoor air distribution** | To ensure that outdoor air is effectively distributed throughout the building and is positively supplied to each occupied zone. | It is common for buildings to be designed without a proper outdoor air distribution system, e.g.: In many buildings outdoor air is supplied into ceiling voids or a centralised area to minimise the cost of duct installations. The supplied outdoor air will exit the building through the path of least resistance. It could flow via any opening in the ceiling such as a return air or smoke extract grille, through an open door or to a toilet extract system and will therefore not reach remote areas on the floor plate.

Another example would be for outdoor air to be supplied from one side into a plantroom and return air from another side. If the plantroom is fitted with multiple air handling units (AHU), this will result in some AHUs being starved of outdoor air. | A system must be installed that will guarantee that outdoor air is properly distributed and reaches all parts of the building. It is very difficult to achieve with systems other than positively sealed galvanised ducting.

Where ceiling voids or floor plenums are used for outdoor air distribution, the system should be capable of being balanced, i.e. measurement of outdoor airflow rates to each zone or space. It is recommended that the return air be physically separated from the outdoor air, unless it can be ascertained that the outdoor air will be delivered to the intended zone.

Outdoor air must be distributed inside plantrooms which have multiple air handling units with ducting or similar to ensure that the outdoor air is correctly distributed to each unit. | NA | American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Indoor Air Quality Guide. Best Practices for Design, Construction and Commissioning (2009). ISBN978-1-933742-59-5 |
| IAQ-04 | E | **Relief and return air paths** | To allow potentially contaminated air that is displaced by outdoor air to easily exit the building while minimising the air being displaced to adjacent zones. | Relief air refers to the air that needs to be displaced from the building or a space due to excess outdoor air being supplied into the building or the space.

Return air refers to air that forms part of the air-conditioning system which has to be returned from the supply to an AHU or a FCU in a recirculation system.

To achieve high outdoor air supply rates into a building or space, a mechanism of relieving the air to the outside is necessary. Many buildings rely on poorly sealed construction, which may not be adequate and result in over-pressurisation, chocked airflows, or displacement of potentially contaminated air from one space to the | The building should be fitted with mechanisms to easily relieve all outdoor air being supplied.

Each space should have a relief and return air path to minimise potentially contaminated air from being displaced into adjacent spaces.

Relief and return air grilles should be evenly distributed and balanced in open plan areas.

Opening windows will assist with relieving air from the building.

It is recommended that an experienced professional be | Mechanical systems (fan assisted) should be installed to positively exhaust potentially contaminated air from the building and each space. This will prevent potentially contaminated displaced air from exiting the building via the path of least resistance, e.g. through open doors from one space to the next. | American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Indoor Air Quality Guide. Best Practices for Design, Construction and Commissioning (2009). ISBN978-1-933742-59-5 |

				next. Spaces with incorrectly positioned return air paths will also result in air being displaced from one contaminated space into another. In many instances air is being relieved or returned from one end of an open plan space also resulting in potentially contaminated air being displaced from one side to the other. Unless specifically designed for this purpose, normal air-conditioning return air systems do not positively relieve outdoor air being supplied into a building.	consulted to review the air movement throughout the building.		
IAQ-05	E	**Space air distribution effectiveness**	Effective space air distribution to minimise stagnation, optimise displacement of potentially contaminated air while still minimising drafts.	Poor air distribution will result in formation of stagnant areas and therefore build-up of contaminants in that area. Outdoor air should be properly distributed throughout the space to displace contaminants via the shortest possible route. This should be considered in conjunction with the relief air strategy. An optimal solution would be a displacement system where clean air is introduced at low level via a displacement grilles, which evenly distributes the air along the floor. The air is then displaced directly upwards, removing contaminants via the shortest route to ceiling mounted grilles. Overhead systems could also minimise stagnation, but consideration should be given to remove the air as close as possible from where it was introduced. Sufficient airflow is required to ensure effective distribution of outdoor air. Outdoor air flow rates are typically not sufficient to achieve proper air distribution. Airflow generated by air conditioning systems are therefore used to aid with the distribution of outdoor air	Air should be introduced into the space with appropriately designed air distribution outlets such as diffusers that will minimise stagnation without creating drafts. Relieve and return air grilles should be fitted as per I-04. It is recommended that the outdoor air be distributed in conjunction with the air conditioning system providing at least 6 air changes per hour.	Underfloor system with displacement floor grilles, not mixing grilles, displacing contaminants to ceiling mounted extract / relief air grilles via the shortest route.	American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Indoor Air Quality Guide. Best Practices for Design, Construction and Commissioning (2009). ISBN978-1-933742-59-5 Centers for Disease Control and Prevention (CDC); Guidelines for Environmental Infection Control in Health-Care Facilities, 2019; Available at: www.cdc.gov/infectioncontrol/guidelines/environmental/index.html; Accessed on: 9 Oct 2020

				and to minimise stagnation. Systems creating drafts could spread pathogens from an infected occupant over extended distances.			
IAQ-06	R	**CO2 monitoring**	Monitoring and feedback mechanism of spaces with potentially compromised air quality due to insufficient outdoor air supply resulting in CO2 build up.	As described in I-01, controlling the outdoor air based on CO2 levels can result in undersupply of outdoor air especially during reduced occupancy. Buildings fitted with CO2 monitoring and control could therefore be at risk. This risk can be reduced by changing the CO2 set points to control at 400ppm. This will result in maximising outdoor air supply, which in turn will impact the air-conditioning and heating systems' ability to maintain thermal comfort. For infection control, it will be better to compromise on thermal conditions rather than ventilation. CO2 monitoring could be a good feedback system that will highlight areas in real time where ventilation systems are not effective. This is especially important in high risk areas, i.e. small enclosed spaces where people congregate, such as meeting rooms.	Demand-controlled systems, which varies the outdoor air supply based on demand or CO2 levels should not be used during times where there is a risk of infection. Adjust set point to 400ppm in buildings where outdoor air supply is controlled based on CO2 levels. Monitor thermal conditions as this will likely impact thermal comfort. Install CO2 monitoring sensors in all critical areas and where there could be a CO2 build-up. Connect sensors to a BMS or an alarm system to alert occupants of increased CO2 levels. Return Air from every zone / System is actively monitored for CO2 levels	Every Space is actively monitored for CO2 levels (Max 100 square meter zones plus meeting rooms separately monitored)	Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/filea dmin/user_upload/R EHVA_COVID-19_guidance_docum ent_V3_03082020.p df. Accessed on: 9 Oct 2020
IAQ-07	R	**Air quality monitoring**	Monitoring of indoor air quality to ensure general occupant wellbeing	Air quality monitoring does not correlate directly with pathogen loading in the air. However it will contribute to improving the indoor environment, and therefore the occupant's immune system and overall wellbeing. Air pollutants that negatively affect the quality of indoor environment include: - PM2.5 and/or PM10; - Total VOCs; - Formaldehyde; - CO; - Ozone. The effect of these pollutants on building occupants has been well researched over the last decades. The research shows	The levels of the following substances are to be tested annually and confirmed to be within acceptable limits. - PM2.5 (less than 15ug/m3) - PM10 (less than 50ug/m3) - Formaldehyde (less than 27 ppb) - Total VOCs (less than 500ug/m3) - CO (less than 9ppm) - Ozone (less than 51 ppb)	NA	U.S. Environmental Protection Agency. Indoor Air Pollution: An Introduction for Health Professionals. https://www.epa.go v/indoor-air-quality-iaq/indoor-air-pollution-introductionhealth-professionals. U.S. Green Building Council. LEED BD+C: New Construction | v4 - LEED v4. Reference. Accessed

				positive correlation between increased level of these pollutants and risk levels of cardiovascular and respiratory diseases as well as various cases of cancer. As a result of increased level of particulate matter, CO and CO2, VOCs and formaldehyde, occupants have reported headaches, eye, nose and throat irritation, which may develop into more serious conditions such as asthma and cancer. For that reason, it is important that the quality of indoor air be examined annually to minimise risk of pollutant accumulation which in turn compromises the general health of occupants.			January 25, 2018. California Department of Public Health. Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, V1.1. 2010.
IAQ-08	R	Outdoor air filtration	Filtration to improve the quality of the outdoor air by removing airborne contaminants	Outdoor air should not be a source of occupant generated pathogens, unless recirculation from exhaust systems occur or intakes are poorly located next to outdoor areas within close proximity where people can congregate. It is therefore not required to install high performance outdoor air filtration to control pathogen loading in the air. Operating the building for infection control will require the building to be operated at maximum outdoor airflow rates. This could result in an increase of externally generated contaminants being introduced into the building, which could negatively impact the immune system of occupants.	To control externally generated contaminants, the following minimal levels of filtration are recommended: Two stage filtration First stage G4 Second stage F7	NA	BRENT STEPHENS, PH.D., ASSOCIATE MEMBER ASHRAE; TERRY BRENNAN, MEMBER ASHRAE; LEW HARRIMAN, FELLOW ASHRAE; Selecting Ventilation Air Filters to Reduce PM2.5 Of Outdoor Origin Available at: http://www.conforlab.com.br/wp-content/uploads/2016/10/2016Sep_012-021_HarrimanFiltersToReducePM2.5.pdf; Accessed on: 16 Sept 2020
IAQ-09	E	Return air filtration	Filtration to improve the quality of the recirculated air by removing airborne contaminants	HEPA filters would be required in order to completely remove viruses from the air. However, due to high pressure drops, high energy consumption and high maintenance cost, it is not a practical solution to install HEPA filters in a commercial environment. Most existing buildings are fitted with low end filters such as G4 type or worse. Due to space limitation and fan capacities retrofitting of higher performance filters	Reasonably high performance filters will be required to substantially reduce the viral loading in the air. Therefore to use filtration as a strategy for infection control, two-stage filtration as follows is recommended as best practice: First stage G4 Second stage F8	NA	American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Building Readiness (Update: 19 Aug 2020). www.ashrae.org/covid19

				are not easily implementable. The viral loading in the air can be reduced by installing higher performance filters.	Further increasing the filtration performance have diminishing benefit and other strategies to further reduce the viral load should rather be considered.		Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/filea dmin/user_upload/R EHVA_COVID-19_guidance_docum ent_V3_03082020.p df. Accessed on: 9 Oct 2020

The Chartered Institution of Building Services Engineers (CIBSE); Covid-19 Ventilation Guidance V3 (15 July 2020); www.cibse.org |
| IAQ-10 | E | **Filtration pressure drop or airflow monitoring** | Monitoring of pressure drop over filters to ensure maintenance is carried out timeously and sufficient airflow rates are maintained. | Dirty filters will reduce the amount of outdoor air being supplied into the building. | Manual gauges should be installed to provide measurements of pressure drops over filters. The pressure drops must be correlated to the acceptable airflow rates to ensure filter maintenance is carried out when required. This should be determined during commissioning or re-commissioning of systems. | Implement an automated system such as BMS monitoring of filter pressure drop in real time. Alarms should be generated to alert maintenance staff to replace filters before acceptable pressure drops limits are exceeded. Airflow monitoring could be installed where possible as an alternative to pressure monitoring. Care should be taken and performance verification of flow rate sensors must be carried out since the accuracy of air flow monitoring is difficult to achieve. | |

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| IAQ-11 | E | Exhaust and vent stack systems discharge location | Position exhaust air discharge (including relief air) and relief vent stacks in locations to minimise re-circulation of potentially contaminated air into outdoor intakes of any kind. | Internally generated contaminants are typically removed from contaminated spaces such as bathrooms via dedicated exhaust systems. Care should be taken that air from these systems is re-introduced into the building via outdoor air intakes or opening windows or doors.

Relief air from air conditioning systems should also not be re-introduced into the building.

Vent stacks could re-introduce contaminated air and foul odours if positioned close to outdoor air intakes.

Heat recovery between exhaust and air conditioning systems can pose risk of cross contamination if the integrity of the heat exchanger cannot be guaranteed. | Toilet exhaust, or exhaust from potentially contaminated spaces are to be positioned at least 15m away from any outdoor air intakes, opening windows, external doors or site boundaries. Discharge from exhausts systems shall not be directed towards intakes, building openings or site boundaries.

Vent stacks shall be positioned at least 15m away from outdoor air intakes, and shall comply with the separation distances from building openings (windows and doors) as specified in SANS 10252-PART 2.

Heat recovery systems should not be used unless the integrity of the heat exchanger can be determined and the potential cross contamination limited. | NA | American Society of Heating, Refrigerating and Air-Conditioning Engineers, U.S (ASHRAE); Building Readiness (Update: 19 Aug 2020). www.ashrae.org/covid19

The Chartered Institution of Building Services Engineers (CIBSE); Covid-19 Ventilation Guidance V3 (15 July 2020); www.cibse.org |
| IAQ-12 | E | Toilet ventilation systems | To minimise the risk of potentially contaminated air from ablutions to spread to occupied spaces | Toilets generate aerosols and introduce pathogens in the air when flushing. These contaminates are be removed and migration to occupied spaces must be minimised.

Opening windows in accordance with regulations are commonly used in buildings and is a compliant solution. However, wind effects could create pressure differentials that could result in air flowing from ablutions to occupied spaces. In such cases mechanical extraction systems are to be used.

Higher extract rates will be more effective in removal of contaminants and ensuring positive airflow from occupied spaces into ablution areas.

Opening windows used for toilet ventilation may result in contaminated air flow to the occupied space depending on the wind direction. | To minimise aerosols being introduced in the air, toilets must be flushed with closed lids.

Opening windows should not be used where there is a risk of flow from ablutions to occupied spaces due to wind effects. Where such a risk is present in an existing building, windows should be sealed and mechanical extract is to be fitted.

Toilet extract systems are to be designed to provide 20 air changes per hour for the entire ablution space.

Toilet exhaust systems must be operated 24/7. Where fitted with variable speed drives (VSD), extract rates could be reduced 3 hours after occupancy ends and up to 3 hours before occupancy starts. | Install toilet bowl extraction system to remove pollutants at source | Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/fileadmin/user_upload/REHVA_COVID-19_guidance_document_V3_03082020.pdf. Accessed on: 9 Oct 2020

South African Bureau of Standards (SABS); SANS10400-O (2011); www.sabs.co.za |

				Additional background from REHVA.			
IAQ-13	R	**UV-C lights**	UVGL systems to control occurrence of viruses and bacteria within buildings	As an alternative to filtration, viruses could be deactivated by means of UVC lights. UVC lights can be installed in various location such as room or ceiling mounted or in the air distribution systems. Effectiveness of UV systems are dependent on various factors such as the distance of the pathogens from the UV lamp, lamp intensity, and exposure time which is determined by the flow rate and velocity. These systems are only effective if designed in accordance with tested manufacturer recommendations. These systems are hazardous and could cause eye damage. Care should be taken when designing, installing and operating these systems. More research is required to confirm potential disadvantages, e.g. creating a sterile environment.	UVC light systems can be considered where short term upgrades to ventilation systems in high risk areas are difficult to implement.	NA	Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/filea dmin/user_upload/R EHVA_COVID-19_guidance_docum ent_V3_03082020.p df. Accessed on: 9 Oct 2020
IAQ-14	R	**Air purifiers**	Reduce indoor air pollutants in a smaller areas / rooms	Room air purifiers clean recirculated air through its filters. These can capture virus particles if fitted with HEPA filters or other approved system. These units are typically effective for a small zone only. Generally smaller well distributed air-purifiers are more effective rather than using a centrally located single larger unit. +H39	These systems can be considered where short term upgrades to ventilation systems in high risk areas are difficult to implement. Ensure adequate air changes to suit the space in accordance with tested manufacturer recommendations.	Multiple Mobile Units available and in use for high risk areas	US Environmental Protection Agency (EPA); Air Cleaners and Air Filters in the Home, Available at: https://www.epa.go v/indoor-air-quality-iaq/air-cleaners-and-air-filters-home. Accesses on: 17 Sept 2020 https://www.epa.go v/sites/production/fi les/2019-09/documents/harri man_stephens_bren nan_-_new_guidance_for _residential_air_clea

							ners_-_ashrae_journal_sept-2019._web_version.pdf
IAQ-15	R	Carpets and Vacuum cleaning	Reduce indoor air pollutants by limiting the amount of carpets installed in the buildings and applying carpet cleaning techniques to prevent pollutants from becoming airborne	Carpets are a possible source of infections, allergic reactions and asthma. Allergens and secondary contaminants, VOCs, dust mites, etc. have negative effect on the indoor air quality and occupants general health. Vacuum cleaning of carpets could make viruses and other particles airborne, which are then inhaled by occupants.	Carpet vacuuming is to be done outside occupied hours. Vacuum cleaners to be fitted with HEPA filters and cleaning staff must wear appropriate PPE. Alternatively no carpets as floor covering is to be considered.	Install a central vacuum system with an external exhaust.	Rune Becher, Johan Øvrevik, Per E. Schwarze,1 Steinar Nilsen, Jan K. Hongslo, and Jan Vilhelm Bakke; US National Library of Medicine, National Institutes of Health; Do Carpets Impair Indoor Air Quality and Cause Adverse Health Outcomes: A Review. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5858259/#:~:text=3.1.,10%2C11%2C12%5D. Accessed on: 17 Sept 2020 Dept of Health, Government of Western Australia; Infection control advice for COVID-19 environmental cleaning in non-healthcare settings (home and workplace); Available at: https://ww2.health.wa.gov.au/~/media/Files/Corporate/general%20documents/Infectious%20diseases/PDF/Coronavirus/COVID19-Environmental-

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						Cleaning-for-workplaces.pdf. Accessed on: 17 Sept 2020

4. SAFE WATER SYSTEMS CATEGORY

CREDIT No.	ESSENTIAL/ RECOMMENDED	CREDIT NAME	AIM OF CREDIT	BACKGROUND INFORMATION	RECOMMENDED BEST PRACTICE	ENHANCED PERFORMANCE	REFERENCE / FURTHER READING
WATS-01	E	**Sewer systems and waste water traps**	Minimise the risk for the spread of contaminants or pathogens from the sewer system to the occupied space.	The sewer system is a potential source of many pathogens and should be separated from all potentially occupied spaces. It is suspected that SARS, the Covid-1 virus was spread via the sewer system in Asia. There are several potential ways in which pathogens could spread from the sewer system which include: i) Dried out water traps i.e. traps which are not supplied with a regular flow of water; ii) Traps where the water or liquid from the seals are cleared out by system pressure fluctuations / vacuums in an incorrectly designed sewer system; iii) Poorly maintained, cracked or broken sewer pipes.In most instances, the water seals separate the sewer system from a negatively pressurised space such as ablution areas where extract systems are fitted, or air-conditioning systems where the condensate drain is connected to a fan coil unit, plant room or similar. Any breach in the integrity of the sewer system will result in potential contamination being drawn from the sewer system into the space or the air-conditioning system.	All traps are to be filled with water and checked regularly, deep seal traps to be used as specified in SANS 10252-2. Traps with infrequent use are to be filled with non-evaporating liquid or sealed. Traps connected to air-conditioning system where condensate formation is not likely spilt be filled with non-evaporative liquid. Systems must be professionally designed to ensure that vacuums are not formed behind water or liquid traps. Systems must be commissioned and tested to ensure vacuums are not generated.The practise of using vacuum breakers inside ceiling voids or ducts to be avoided, where the possibility of failure can result in odours released into these spaces and recirculated by means of ventilation systems. Best practice is to provide soil and waste ventilation pipes to the outside above roof level and not close to air inlets and building openings.The integrity of all sewer piping must be checked regularly	NA	Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/filea dmin/user_upload/R EHVA_COVID-19_guidance_docum ent_V3_03082020.p df. Accessed on: 9 Oct 2020World Health Organisation (WHO), Water, sanitation, hygiene, and waste management for the COVID-19 virus - Interim guidance; 19 March 2020, www.who.int

					and odours investigated immediately.		
WATS-02	R	**Potable water systems quality control**	Ensure potable water quality is tested and safe for human consumption.	All water systems including tanks, geysers, pipes, cooling towers etc. could support growth of pathogens including legionella, especially during times of limited use especially during lockdowns.	Systems must comply with SANS 10252-1. Test potable water quality regularly or after prolonged periods of not being in use in accordance with SANS 241-1 and 241-2 for compliance with human consumption. Follow recommendations of CIBSE TM13: Minimising the Risk of Legionnaires Disease Ensure that water supplies are filtered and disinfected prior to storage and distribution for consumption. A residual concentration of free chlorine of ≥0.5 mg/L after at least 30 minutes of contact time at A pH <8.0... This chlorine residual should be maintained throughout the distribution system.	NA	Representatives of the European Heating, Ventilation and Air Conditioning Association (REHVA); REHVA COVID-19 guidance document, August 3, 2020; Available at: www.rehva.eu/filea dmin/user_upload/R EHVA_COVID-19_guidance_docum ent_V3_03082020.p df. Accessed on: 9 Oct 2020 World Health Organisation (WHO), Water, sanitation, hygiene, and waste management for the COVID-19 virus - Interim guidance; 19 March 2020, www.who.int The Chartered Institute of Building Services Engineers (CIBSE); TM13: 2013 Minimising the Risk of Legionnaires Disease; www.cibse.org
WATS-03	R	**Reused or harvested water quality**	Minimise the risk of spread of contamination from reused or harvested water for non-potable use.	Many buildings are fitted with grey or rain water harvesting systems to minimise potable water consumption. Harvested or recycled water may be used for toilet flushing or for irrigation purposes. If contaminants or pathogens are not eliminated or deactivated, it could potentially pose a risk to	Re-used or harvested water systems must be designed and maintained in accordance with best practice standards and local regulations to ensure the spread of contaminants and infection is prevented. Any re-used water for storage and distribution to be strictly controlled	NA	World Health Organisation (WHO), Water, sanitation, hygiene, and waste management for the COVID-19 virus - Interim guidance; 19 March 2020, www.who.int

				occupants, especially where aerosols are generated during toilet flushing.	for the safe purpose use of the water and regularly tested to conform to the required quality. Disinfection and filtration to be implemented and controlled. Any recycling systems are to be isolated and water not reused unless a professionally designed and maintained system is not in place.		
WATS-04	R	**Access to drinking water**	Promote hydration through availability of high quality of drinking water throughout the building.	Research shows that people generally consume less amount of water than recommended by recognised authorities such as the European Food Safety Authority. This results in inadequate hydration which is linked to higher Body Mass Index (BMI) and greater risk of obesity.	At least one drinking water dispenser is installed within a short walking distance of regularly occupied and all dining areas.	NA	Tammy Chang, MD, MPH, MS, Nithin Ravi, MPH, Melissa A. Plegue, MA, Kendrin R. Sonneville, ScD, RD, and Matthew M. Davis, MD, MAPP; Inadequate Hydration, BMI, and Obesity Among US Adults: NHANES 2009–2012 ; Available at: https://www.ncbi.nl m.nih.gov/pmc/artic les/PMC4940461/; Accessed on: 17 Sept 2020
WATS-05	E	**Hand washing facilities**	Availability of appropriate hand washing facilities	As per the WHO hand washing is one of the primary defences against the spread of infection. Soap is essential to deactivate or remove pathogens from hands.	Appropriate hand washing facilities must be made available throughout the building, and must be easily accessible to all occupants. It must be possible to close tap fittings automatically or without needing hands to be used. Water temperature should be comfortable to allow or encourage frequent hand washing. A mixer is to be used that regulates the water temperature. Install hand operated liquid soap	Taps and soap dispensers are automated with proximity sensor.	World Health Organisation (WHO), Water, sanitation, hygiene, and waste management for the COVID-19 virus - Interim guidance; 19 March 2020; www.who.int Department of Employment and Labour; Government Notice: Consolidated Direction on Occupational Health and Safety Measures

					dispenser, not less than one per two wash hand basins. A maintenance procedure must be implemented to ensure soap is available at all times.		in Certain Workplaces (28 Sept 2020). Available at: https://www.nioh.ac.za/wp-content/uploads/2020/09/OHS-workplace-Directive_-28-Sept-2020.pdf; Accessed on: 9 Oct 2020
WATS-06	R	Hand drying	Availability of hand drying facilities while minimising contact	A common solution for hand drying to minimise contact is air hand dryers. Some studies suggest that pathogens could be deposited on hands if exposed to certain bathroom air hand dryers. An alternative solution would be to use paper hand towels, where the paper is not exposed to potentially contaminated bathroom air. Paper towels can also be used to operate other contact surface in ablutions, such as toilet doors, toilet seats and lids, taps, etc.	Install a paper pull towel dispenser where the paper is not exposed to potentially contaminated bathroom air. The dispenser should have automatic tear off or pull out to avoid contact. A maintenance procedure must be implemented to ensure that paper is available at all times.	Paper towels automated with proximity sensor	Luz del Carmen Huesca-Espitia, Jaber Aslanzadeh, Richard Feinn, Gabrielle Joseph, Thomas S. Murray, Peter Setlow; Deposition of Bacteria and Bacterial Spores by Bathroom Hot-Air Hand Dryers; Available on: https://aem.asm.org/content/84/8/e00044-18.short, Accessed on: 11 Sept 2020
WATS-07	R	Toilet sanitising	Sanitising of the toilet seat and bowl	The toilet and the toilet seat could expose users to potential pathogens. Pathogens could spread from aerosol generation when toilets are flushed.	A toilet seat sanitiser dispenser is to be installed in each toilet cubicle. Toilet bowls are to be fitted with automatic disinfectant dispensers. A maintenance procedure must be implemented to ensure sanitisers or disinfectants are available at all times.	NA	Yun-yun Li, Ji-Xiang Wang, and Xi Chen; Can a toilet promote virus transmission? From a fluid dynamics perspective, AIP Physics of Fluids; Available at: https://aip.scitation.org/doi/10.1063/5.0013318; Accessed on: 17 Sept 2020
WATS-08	R	Toilet and urinal operation	Minimise contact with potentially infected surfaces	Automation of toilet and urinal flush mechanisms and toilet lid operation will minimise contact and potential spread of infection.	Install contact free automated dual flush mechanisms for toilets. Install a contact free automated flush for urinals.	Install automated toilet lid closer.	Yun-yun Li, Ji-Xiang Wang, and Xi Chen; Can a toilet promote virus transmission? From a fluid

							dynamics perspective, AIP Physics of Fluids; Available at: https://aip.scitation.org/doi/10.1063/5.0013318; Accessed on: 17 Sept 2020

5. DESIGN CATEGORY

CREDIT No.	ESSENTIAL/ RECOMMENDED	CREDIT NAME	AIM OF CREDIT	BACKGROUND INFORMATION	RECOMMENDED BEST PRACTICE	REFERENCE / FURTHER READING
D-01	E	Workstation separation	Put in place workstation separation devices and screens to minimise the risk of infection spread among occupants	Open plan office areas with desks with no partitioning panels or with inadequate partitioning panels could expose occupants to higher levels of aerosols or droplets, and thus may increase the level of infection. Workstations in modern office environments are typically arranged optimally in an open area to fit the largest possible number of staff members. Whilst designs are typically carried out to allow for 10m2 per person, the fit-outs often go down to 5-7m2 per person, especially in call centre set-ups. Such high density workstations are inefficient at managing airborne virus transmission due to close proximity of staff and physical measures such as screens need to be put in place to separate staff. Typically screens were about 400mm above desks but this may need to be increased in height to create a very private space and better protection from other team members sitting nearby. Attention must be given to the demotivational quality of working with high screens on 3 sides of work stations.	Where possible, reconfigure workstations back to back with at least 1.8m separation; Alternatively, staff members to occupy every second workstation, leaving unoccupied space in between themselves to maintain physical distance. Remove chairs where necessary to maintain the distance. Screens to be of adequate height to protect staff when standing and sitting at works stations without creating isolated or cut off spaces for working. Screens not to inhibit air flow and ventilation. Adequate light to still be achieved in each work station. The height of these should be above the breathing zone of a person in their normal working position, i.e. seated or standing upright.	Department of Employment and Labour; Government Notice: Consolidated Direction on Occupational Health and Safety Measures in Certain Workplaces (28 Sept 2020). Available at: https://www.nioh.ac.za/wp-content/uploads/2020/09/OHS-workplace-Directive_-28-Sept-2020.pdf; Accessed on: 9 Oct 2020 Department of Employment and Labour; Government Notice: Consolidated Direction on Occupational Health and Safety Measures in Certain Workplaces (28 Sept 2020). Available at: https://www.nioh.ac.za/wp-content/uploads/2020/09/OHS-workplace-Directive_-28-Sept-2020.pdf; Accessed on: 9 Oct 2020

D-02	R	Walk off matts	Minimize the introduction of pollutants into indoor air through the building entrances.	When someone who is infected coughs or sneezes, the virus droplets land on the ground to then be walked over and carried further to other areas on shoes.	Walk-off matts to be installed at regularly used entrances. Entry matts are to be cleaned properly at least once a day.	https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html
D-03	E	Hand sanitizer dispensers	Availability of hand sanitisers throughout the building	Sanitising of hands with an alcohol based (70% alcohol minimum) sanitiser is an effective measure to limit infection spread, and can be used in areas where water and soap are not easily accessible.	Hand sanitiser (with min 70% alcohol) dispensers are to be installed within close proximity where contact with commonly touched surfaces cannot be avoided. These include entrances, lift lobbies, at copy and print stations, kitchenettes, landings at stairs, escalators, etc. A maintenance procedure must be implemented to ensure disinfectant is available at all times. Staff handwashing & sanitising stations - If a handwashing station is available, wash your hands with soap and water instead. - Sanitising liquid are to be made available and to be non-contact type and are well located and easy to operate (via foot pedal or sensor). - Provide hand sanitisers at all entry / exit points and all communal and high risk areas as identified by the building separation and zoning plan - Additionally all staff issued with personal alcohol based hand sanitisers and staff use them often and after touching high risk areas. - Provide associated signage at well located points. Recommendations from CDC on when to use hand sanitiser **Alcohol-based Hand Sanitizer** - **Before** and **after** visiting a friend or loved one in a hospital or nursing home. - If soap and water are not readily available, use an alcohol-based hand sanitizer that contains **at least 70%**	Department of Employment and Labour; Government Notice: Consolidated Direction on Occupational Health and Safety Measures in Certain Workplaces (28 Sept 2020). Available at: https://www.nioh.ac.za/wp-content/uploads/2020/09/OHS-workplace-Directive_-28-Sept-2020.pdf; Accessed on: 9 Oct 2020 https://www.cdc.gov/handwashing/hand-sanitizer-use.html https://www.fda.gov/consumers/consumer-updates/safely-using-hand-sanitizer

					alcohol, and wash with soap and water as soon as you can. • **DO NOT** use hand sanitizer if your hands are visibly dirty or greasy—for example, after gardening, playing outdoors, fishing, or camping.	
D-04	E	**Contact Surfaces**	Implement design interventions to minimise contact with surfaces that are frequently touched by occupants	Frequently touched surfaces, e.g. door handles, could become infected by means of direct or indirect pathogen deposits. Implementing design measures to limit occupants' contact with such surfaces contributes to limiting of infection spread.	Interventions that can be considered include: • Install doors with kick plates to reduce the need for using handles to open or close door, e.g. swing doors that open both ways; • Where suitable, install doors with automated opening and closing; • Where biometric devices are installed ensure that there are always sanitisers available to sanitize the contact surface before use; • Where possible install door stops to keep doors in the open position, e.g. main entrance, ablutions, meeting rooms, etc.; • Design ablutions so that entry doors can be left opened without compromising users' privacy; • Select materials that are durable and suitable for repeated cleaning with alcohol based or other aggressive cleaning detergents; • Select materials that reduce the lifespan of viruses, based on the latest research.	