

SECTION B: GUIDANCE AND PROTOCOLS FOR THE DESIGN PROCESS

Code/ Protocol	Clause	Completed (drop-down)
B1 Sustainable Infrastructure	The Design Practitioner (DP) must ensure that the identified design solution has met the functional statements of SECTION C and is compliant with UNOPS Policy for Sustainable Infrastructure. If the DP identifies the possibility of negative social or environmental impacts, it is the DP's responsibility to raise this risk to the Project Manager.	
B2 National Design Standards	The UNOPS Design Manual and any national building code standards must be jointly applied, and compliance with the more stringent standard is required. DPs should crosscheck national and UNOPS standards in order to determine and, if necessary, provide reasoning for the appropriate standards to be used.	
B3 Life Safety	The design solution must comply with and, in some cases, exceed national building codes which relate to life safety as per the requirements of Section B2. When a performance requirement is defined, the Design Practitioner must provide evidence of compliance.	
B4 Design Brief Criteria	When the Design Brief is not provided by a third party, the Design Practitioner (DP) is responsible for preparing this document. The DP is subsequently responsible for demonstrating that the design solution meets appropriate design criteria and has addressed all elements of the brief.	
B5 Services Design & Maintenance	The Design Practitioner is responsible for examining the possible alternatives, future maintenance implications and provision of recommendations for a design solution. The solution must meet the design criteria and partner and end user requirements in accordance with the local context.	
B6 Services Infrastructure on Site	The Design Practitioner must demonstrate that the design solution is appropriate for the services infrastructure available or planned for the site. The design should also consider maintenance implications for services to maximize the potential design horizon and functionality of the infrastructure.	
B7 Green Technology	The Design Practitioner must demonstrate that appropriate solutions have been considered to reflect the intent of reducing energy consumption and greenhouse gas emissions during both construction and over the lifetime of the infrastructure. Particular attention should be paid to ongoing costs and periodic maintenance of the infrastructure services until the design horizon is reached.	
B8 CCA & DRR	The Design Practitioner must demonstrate that steps have been taken to identify the most suitable site available, preferably in a zone that is least vulnerable to the effects of climate change and natural hazards. When infrastructure development is planned in a vulnerable zone, or is restricted to a specific site, or entails works with existing building infrastructure, the Design Practitioner must demonstrate that adequate measures have been incorporated into the design solution to make the infrastructure as resilient as possible and practicable.	
B9 Environmental Imperatives	The Design Practitioner must demonstrate that due care has been exercised to assess the environmental impact of the project and that suitable measures have been put in place to respond to recommendations identified during the assessment, in accordance with the UNOPS Environmental Management System.	
B10 Duty of Care	Design Practitioners MUST only undertake tasks that they are competent to fulfill. The Design Practitioner must comply with his/her professional obligations to UNOPS, professional organizations and the host country.	
B11 Design Review	The Design Practitioner must demonstrate that due care has been taken to meet the performance requirements as set out in SECTION C and that errors and omissions identified in the Design Review process are rectified and implemented as directed by the Project Manager .	

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B12 Construction Changes Affecting Design	If the proposed design changes constitute a significant change to the design intent of the building, and/or exceed the variation limits within the contract approval, and/or could potentially affect the risk category of the infrastructure, or constitute a structural change, the Project Manager must refer the changes to the Design Practitioner and Design Reviewer .	
SECTION C: TECHNICAL OBJECTIVES, FUNCTIONAL STATEMENTS AND PERFORMANCE REQUIREMENTS		
Site (C1)		
C1.PR 1 Rights of Way/ Rights of Use	The DP MUST investigate existing Rights of Way, both formal and informal, where these cross all or part of the Site. Positions of such rights of way and rights of use MUST be marked on the topographic survey drawings, and positions pegged on site.	
C1.PR 2 Displacement of People	Displacement could occur as a result of people living on the site, or people using the site to earn their living, e.g. growing crops, grazing livestock. Where relevant, DPs MUST consider design solutions that enable continued use of the site.	
C1.PR 3 Bio-Diversity	DPs MUST make enquiries with relevant authorities such as national or international conservation bodies regarding the likelihood of any significant bio-diversity issues arising as a result of the infrastructure project, unless this process has been completed as part of an environmental assessment. Should investigations show that bio-diversity issues exist, the DP MUST report this to the PM, so that UNOPS can bring the issue to the Direct Partner / Donor / Government / national conservation bodies, preferably before any major design work is carried out.	
C1.PR 4 Cultural Heritage	DPs MUST enquire into the possibility that any buildings on the site could be of cultural or historical significance.	
c.	Should investigations show that cultural heritage issues exist, DPs MUST report this to the PM, so that UNOPS can bring the issue to the Direct Partner / Donor / Government before any major design work is carried out.	
d.	Should the government have any requirements regarding steps to be taken to protect culturally sensitive buildings or areas, such steps should be clearly stated in the approval documents from the government. The DP MUST ensure these are clearly identified and adhered to in the design documents.	
C1.PR 5 Archaeological Significance	a. DPs MUST enquire into the possibility that the Site is situated on land which could be of archaeological significance, as well as research the subject on internet sites or any other relevant information sources. b. Should investigations show that the Site is on land of any archaeological significance, DPs MUST report this to the PM, so that UNOPS can bring the issue to the Direct Partner / Donor / Government before any major design work is carried out.	
C1.PR 6 Site Environmental Assessment	The PM, with the assistance of the DP, MUST identify any problems with the site and should allow for this in construction estimates. The DP MUST verify with the UNOPS PM whether any specific environmental remediation or control measures are required in the design documentation.	
C1.PR 7 Site Infrastructure Services	DPs MUST consider the following in the initial planning phase: a. Any adverse impact on the site or local populations resulting from the design, and any issues identified in the environmental assessment. b. The potential for positive site impacts resulting from the design.	
C1.PR 8 Demining	UNOPS often works in post conflict areas, where the presence of land mines and unexploded ordinance is a very real danger. The DP MUST not enter the site area until a clearance certificate has been issued and approval for access provided by UNOPS. The DP MUST document any areas that are off limits for the contractor due to demining issues.	

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C1.PR 9 Site Ownership	Where possible, the Direct Partner, Donor or Government MUST provide an official deed / document showing ownership, signed and stamped by the relevant authorities.	
C1.PR 10 Technical Surveys/ Reports	DPs MUST obtain all technical surveys necessary to complete the design of the infrastructure. This could include, but are not limited to, environmental assessments, topographical surveys, and geotechnical surveys.	
C1.PR 11 Site Clearing	The DP MUST identify the full extent of any site clearing in the documents, if it forms part of the construction contract. Any site clearing MUST comply with the previously identified requirements from C1.PR 3 to C1.PR 6.	
C1.PR 12 Demolition of Existing Structures		
Building	The DP MUST identify the full extent of any demolition in the design documentation if it forms part of the construction contract. The DP MUST ensure that the demolition does not impact any other site infrastructure or adjacent infrastructure.	
Materials	The PM, with the aid of the DP, MUST identify the ownership of the demolished materials and ensure it is included in the technical documentation. Consideration should be given to the disposal of construction waste in a social and environmentally responsible manner.	
Equipment	If specific equipment is to be reused, the PM must ensure that ownership is determined. The DP MUST determine the suitability of the equipment before the design is completed.	
C1.PR 13 Vehicular access and car parking	The DP MUST check that: a. That vehicle parking is sufficient on the site or on adjacent areas next to site area for the likely volume and size of vehicles. b. The effect of transport to and from the new infrastructure on the existing road system, when positioning entries and egress to and from the site. This could be through application to local municipalities or transport authorities. c. Turning spaces, wheel loads, clearing heights and accessibility for heavy vehicles (e.g., fire engines, flatbed delivery trucks, containerised transport, buses) accessing the site and any required parking spaces.	
C1.PR 14 Accessible parking	Parking spaces for persons with disabilities MUST be provided in accordance with the table in the section.	
b.	For rehabilitation and outpatient facilities for physical therapy, 1 in 5 patient and visitor parking spaces MUST be provided to serve patients whose mobility is affected.	
c.	For residential facilities, parking spaces provided to serve the facilities MUST comply with the above table. Where at least one parking space is provided for each residential unit, at least one accessible parking space MUST be provided for each residential dwelling unit required to provide mobility features.	
Element Materials Selection (C2)		
C2.PR 1 Fitness for purpose	The choice of building elements and materials MUST take into consideration that the materials fit the requirements as defined in C2.PR2 to C2.PR4.	
C2.PR 2 Local sources	All selection of building materials MUST be carried out on the basis of professional judgement of choices between locally available systems and materials, and systems that require either importation or the establishment or enhancement of a manufacturing facility	

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C2.PR 3 Life cycle	Other than the services and equipment, building elements MUST be envisaged to have the required lifetime for the infrastructure project, an acceptable life cycle cost, and which can be recycled safely at the end of their useful life, where feasible.	
C2.PR 4 Hazardous elements and materials	Elements and materials with known hazardous content MUST not be used. Appropriate precautionary measures are required for materials that may be hazardous only during construction activities.	
C2.PR 9 Termite treatment	Termite treatment MUST be specified in any zone that is infested with termites. The treatment is to be carried out during construction and must carry a guarantee of a minimum of ten years.	
C2.PR 10 insulation	The DP MUST carefully consider insulation, both thermal and acoustic, even in environments where local practice is to not insulate the building.	
C2.PR 11 Fire resistance	Fire resistance MUST be considered with reference to SECTION C4, including the contribution of materials to the spread of fire. Fire doors, walls and stops MUST be incorporated in the design where appropriate.	
Structure (C3)		
C3.PR 1 Codes	As per SECTION B2, the DP MUST comply with national or international design codes appropriate to the country in which the structure is built. As a rule, codes are prescriptive and must be researched carefully. The DP will assess the national and UNOPS requirements and apply the stricter standard. Likewise, if no national code is in place, the DP will apply the relevant functional statements, technical parameters and performance recommendations & requirements indicated in this manual.	
C3.PR 2 Progressive collapse	The structure MUST be designed so that if structural damage or failure occurs it will do so in such a way that time is allowed for occupants to evacuate the building prior to total collapse.	
C3.PR 3 Earthquake design	Structural design for earthquake zones MUST be undertaken only by professional structural engineers with specialist experience. Establishing the seismic design parameters is a critical part of the designer's task and all information MUST be obtained from national codes, seismic maps and worldwide sources. When choosing a structural system the designer, both engineer and architect, MUST give consideration to all the strengths and weaknesses of different construction methods and especially pay attention to connection detailing and their ability to withstand seismic action. The designer MUST also give consideration to the use of energy absorbing design features, which are not costly when measured against the life-cycle cost of a building.	
C3.PR 4 Deflections and deformations	The DP MUST check the design for deflections and deformations and ensure not only that the fluctuations are permitted within the relevant standard, but also that such deflections and deformations do not cause damage to other parts of the building or to installed equipment and fittings.	
C3.PR 5 Neighbouring buildings	The DP MUST investigate the potential for neighboring buildings and structures to be affected by the infrastructure works and any negative effects MUST be eliminated or mitigated.	

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C3.PR 6 Calculations	In preparing the design calculations, the DP MUST use internationally recognized structural design software or, if working manually, prepare neat and proper records of the design calculations. The design record MUST be made available for third party reviews and checks at any time and MUST be handed over as part of the end users Taking-Over package along with as-built drawings. Design revisions and changes carried out during construction MUST be incorporated in the final design record.	
C3.PR 8 Foundations	When designing foundations, careful analysis of the Geotechnical Investigation is required and all factors such as soil type and soil bearing capacity, water table, and potential for ground movement MUST be taken into consideration by the DP. The history of the site must be investigated, especially to discover if the site is filled and a cut and fill platform exists in the location proposed for the building.	
C3.PR 10 Construction details	The structural engineer and the architect together MUST design details that not only meet the structural requirements but are also not too complex. The local skill level and expected quality achievable MUST be considered so the construction details can be executed without compromising the design intent and can be supervised on site by the site engineer.	
C3.PR 11 Existing buildings	In cases where an existing building is converted and/or renovated, the load bearing structure MUST be subjected to a detailed investigation.	
Fire safety (C4)		
C4.PR 1 Structural integrity	All buildings MUST be designed so that their structural integrity is maintained during a fire to permit the evacuation of occupants and provide limited protection of firefighting personnel. For further guidelines and specific parameters stemming from this requirement, please see the relevant section.	
C4.PR 2 Evacuation and escape	All buildings MUST comply with the following requirements for evacuation and escape in the event of a fire. For further guidelines and specific parameters stemming from this requirement, please see the relevant section.	
a. Travel distance	A clearly marked exit door to the outside of the building or a stairwell from upper floors with a maximum travel distance of 40m from the furthest point on the floor	
b. Signage visibility	The exit sign is to be visible from within the corridor. Signage to be provided for guidance in corridors where the exit door is obscured from view.	
c. Exits Number	The minimum number of exits points per floor to be two (2) locations, widely separated to provide alternative escape points. Buildings occupied by more than 500 people per floor require 3 exits and more than 1,000 people per floor require 4 exits. Exception: Small buildings that are less than 100m ² and 20 occupants per floor, for a maximum two story building, may have one exit location	
d. Exits opening direction	A designated exit door is to be provided in all rooms that may be occupied by more than 20 people and must open in the direction of exit path.	

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e. Exit door width	All exit door widths (or multiple door assemblies such as double swing doors) must be suitable for the expected numbers of people. The minimum clear width of a designated exit door is 900mm inside the frame.	
f. Width of corridors and stairs	All staircase and corridor widths must be suitable for the expected numbers of people. The minimum clear width of a corridor is 1,500mm and staircase is 1,200mm between wall faces. The projection of any doors into the clear width is not permitted. Exception: The only exception to the requirement for stair width is that stairs serving less than 50 occupants may be 900mm between wall faces.	
g. Dead ends	Dead end corridors must be no more than 6m in length where they branch off from the main egress corridor.	
h. Fire isolated stairs	Where a building contains more than 3 upper floors, one of the exit stairs MUST be a fire isolated stair.	
i. Emergency lighting	All buildings MUST have emergency lighting with battery backup to ensure safe evacuation in the event of power failure, including lit exit lighting and other emergency fixtures located in strategic points in the travel path to the exit.	
C4.PR 3 Fire exits	The number of fire exits required for each building is dependent on the numbers of people in the facility based on the floor area. The table in this section MUST be used for guidance in calculation of the maximum number of occupants within a building. See Table 3 for maximum number of occupants specifications.	
C4.PR 5 Smoke and Fire Separation	All buildings MUST comply with a number of requirements for smoke and fire separation, laid out in the relevant section.	
a. Smoke separation	Smoke separation is to be achieved with a smoke resistant barrier that completely separates different areas inclusive of ceiling void spaces. See relevant section for zoning and area specifications.	
b. Internal fire separation	Fire separation is to be achieved, at a minimum, with a 2 hour fire rated barrier that completely separates different areas. No windows are permitted in the fire wall except for certified fire rated window assemblies. See relevant section for building constraints specifications.	
c. Fire separation on the same Property	All new buildings should be separated from existing buildings on the same site See relevant section for separation specifications. Exception: Where the new building is an extension or modification to an existing building, the separation of buildings does not apply.	
d. Fire separation from adjoining property	Fire separation between the new building and the side or back boundary of the property shall be a minimum of 2.5m for a single story building and 1.0m more of setback for each additional story, where the wall of the new building contains windows facing the boundary. See relevant section for boundary setbacks specifications.	

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C4.PR 6 Fire detection and protection systems	All buildings MUST comply with a number of requirements for fire detection and protection systems, laid out in the relevant section.	
a. Alarms and detectors	Fire detection systems are required for all buildings greater than 300m ² . The systems shall be smoke detectors permanently wired to an audible alarm. Thermal detectors are required to locations such as kitchens where smoke alarms may not be appropriate. If a wired system is not technically feasible, battery-powered detectors with individual alarm capacity shall be used.	
b. Zonal controls	Zonal controls are needed in all buildings greater than 1,000m ² in area. Fire indicator panels (FIPs) should be installed in the facilities that contain multiple detection zones. These will be located in readily accessible locations to assist with the firefighting response. If a connection to municipal fire brigade facilities is feasible, this is required for all buildings greater than 3,000m ² in area	
c. Fire extinguishers	Portable fire extinguishers are required for all buildings as a first response method for a developing fire. These shall be located by the DP on building floor plans. The maximum floor area per extinguisher is 500m ² . The maximum travel distance between extinguishers is 45m or 23m, if the building contains a single extinguisher.	
d. Fire hose reels and standpipes	If a hose reel and standpipe system is not technically feasible either due to insufficient water supply, electrical supply for fire pumps, or other factors caused by the remote location of the site or other factors, alternate risk mitigation techniques MUST be provided. See relevant section for possible mitigation techniques.	
e. Fire sprinkler systems	In locations where sprinkler systems are feasible, there are normally existing regulatory frameworks that govern their use and these MUST have precedence in this instance as per the protocol in SECTION B. If a sprinkler system is required, then the DP should seek expert guidance on its design and installation on a 'one-off' basis.	
C4.PR 7 Signage	The DP MUST specify signage to be included in the design documentation. In all buildings greater than 300m ² of total floor area, signage MUST be provided in the local language to clearly identify all locations of fire extinguishers, hose reels, stand pipes adjacent to the equipment. Each floor of a building MUST be displayed on a plan mounted on a wall near the entrance to each floor. See relevant section for the information to be identified.	
C4.PR 8 Locks on exit points	All exit points, escape corridors, escape doors, MUST not be lockable in the direction of escape. Door hardware schedules must comply with this requirement.	
C4.PR 9 Emergency equipment	To ensure that emergency equipment is available for use at all times, access doors to hose reels or extinguisher cabinets MUST not be locked. If in the open, controls on the equipment MUST not be locked.	
C4.PR 10 Inflammable liquids	All buildings that contain, or propose to contain, significant volumes of inflammable liquids, such as petroleum, oil or paint products, MUST have special provisions for storage. These provisions are laid out in the relevant section.	
b.	Between 0.3m ³ and 1.5m ³ of material, the room shall be fire isolated from adjoining spaces with a minimum of 1 hour fire rated enclosure inclusive of door. The room may contain a window to the exterior of the building and have high and low level vents to the exterior.	

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	c. Between 1.5m ³ and 5.0m ³ of material, the room shall be fire isolated from adjoining spaces with a minimum of 2 hour fire rated enclosure inclusive of door. The floor MUST contain a bund to ensure retention of contents in the event of leakage or a drum failure. The room MUST not have a window and MUST have high and low level vents to the exterior.	
	d. More than 5.0m ³ of material, the room MUST be separate from the building located a minimum of 6m from the nearest habitable building. Construction as per c) alternative above. Where buildings such as warehouses contain significant volumes of inflammable goods or liquids, these MUST be designed to limit the potential spread of fire, contain any liquids, and have acceptable firefighting capacity.	
	e. Spark proof switches, lights, ventilation fans (if used) are required for all storage capacities greater than 0.3m ³ . All storage shelving should be spark resistant such as concrete or timber rather than steel shelving.	
C4.PR 11 Firefighting services	In those locations where externally provided governmental, municipal or city-based firefighting services exist, these MUST be consulted for confirmation of all fire protection measures and requirements for firefighting vehicle access; specific hydrant locations, sizes and capacities; FIP locations; and external communication link for detection alarm notifications.	
Access and egress (C5)		
C5.PR 1 Circulation space	Each building MUST be designed to: a. Allow movement into and out of the building in a safe and unobstructed manner during normal use. The primary point of access MUST be clearly defined to enable simple access with signage or non-written visual means depending on the design circumstances. b. Have sufficient circulation space within the building to enable its intended function in an efficient and smooth manner. For further guidelines and specific parameters stemming from this requirement, please see the relevant section.	
C5.PR 2 External steps	External steps leading to the entry/exit point of buildings MUST comply with all of the requirements specified in the section.	
a. Capacity	Must provide capacity greater than the expected number of persons that may use them during a fire or emergency event.	
b. Step depth	Must be consistent in step depth and riser for the full length and height.	
c. Riser height	The maximum riser height is 180mm. Minimum riser height is 100mm. Minimum tread is 280mm.	
d. Slip hazard	The potential slip hazard on tread surface in wet, icy or snowy conditions must be considered in material selection.	
e. Thread marking	The marking of the tread nosing in a different colour or texture to assist sight-impaired people must be considered.	
f. Handrails width	Handrails must be provided to one side of the stair when the width is less than 1,500mm; handrails must be provided on each side of the stairs where stair width is between 1,500mm and 3,000mm wide; if the stair width is greater than 3,000mm wide, intermediate handrails must be provided to the stair to assist safe movement. The clear distance of the handrail from the wall or obstruction is to be between 50-75mm.	
g. Handrails location	Handrails to be well secured and able to withstand all normal usage forces without obvious deflection, located 865mm-965mm to top of rail above step height.	
h. Landings	Landings every 12 risers with a minimum length of 1,200mm between stairs EXCEPT if the external stair is a steel fire escape stair, it should comply with C5.PR 3.	

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C5.PR 3 Internal steps	Internal stairways within buildings MUST comply with all of the requirements specified in the section.	
a. Width	Must not be less than the minimum widths for escape as noted in SECTION C4.PR 3	
b. Step depth	Must be consistent in step depth and riser for the full length and height.	
c. Riser height	The maximum riser height is 180mm. Minimum riser height is 100mm. Minimum tread is 280mm.	
d. Slip hazard	The potential slip hazard on tread surface in wet, icy or snowy conditions must be considered.	
e. Handrails width	Hand rails must be provided to each side of the stairs where width is less than 2,400mm wide. If the width is greater than 2,400mm wide, intermediate hand rails must be provided to assist safe movement. The clear distance of the handrail from the wall or obstruction is to be between 50-75mm.	
f. Handrails location	Hand rails are to be well secured and able to withstand all normal usage forces without obvious deflection, located 865mm-965mm to top of rail above stair height.	
g. Landings	Landings every 16 risers with a minimum length of 1,200mm between stairs.	
C5.PR 4 Balustrade	Balustrade panels to balconies used as primary access MUST not be less than 1,000mm in height from floor level of balcony to top of panel. The infill between 150mm above floor level to 750mm above floor level MUST be either solid material or vertical bar, making it un-climbable for small children. Bar spacing to be maximum of 150mm centers. Balustrade panels below handrails to external stairs and internal stairs MUST contain infill as above.	
C5.PR 5 Ramps	Ramps MUST be provided for access to the main entrance/exit of a building for disabled persons, deliveries of goods, etc. Ramps MUST be used wherever possible inside the building to facilitate access to all parts of the building. For further guidelines and specific parameters stemming from this requirement, please see the relevant section.	
a.	Ensure that inaccessible services or building functional spaces that may be used by disabled persons are on the ground floor, or duplicated on the ground floor.	
b.	Ensure that toilet facilities are located in an accessible location.	
1	Minimum width of 915mm between handrails.	
2	Maximum slope of 1:12, or 8.3%.	
3	Horizontal landings at maximum of 8m length of ramp with landing a minimum of 1,525mm in length.	
4	Handrails to ramp sides at 865mm-965mm to top of rail above ramp.	
5	Threshold ramps where used for maximum of a single 150mm rise may have a steeper slope of maximum 1:8.	
6	Ramp surface finish must be considered for potential slip/slide hazard in wet, icy or snowy conditions.	
C5.PR 6 Door openings	Accessibility at door openings is critical for the effective access of wheelchairs. The design of all spaces which have wheelchair access MUST comply with the space requirements laid out in the section.	
C5.PR 7 Gender equality	Cultural and social norms regarding gender equality and access differ in the countries where UNOPS provides building infrastructure. The Design Solution MUST demonstrate that cultural and social norms have been considered while ensuring that women and men have equal access to public facilities.	
C5.PR 8 Equipment access	Equipment access for service, repair and replacement if necessary, has implications for circulation space, door opening widths, and general access to the building and roof. The DP MUST consider this aspect in the development of the design.	

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Health and amenity (C6)		
C6.PR 1 Lighting	Lighting for each building MUST comply with the requirements laid out in the relevant section.	
a. Daylight	Use daylight as a primary means of lighting in all habitable rooms during daylight hours, unless security, privacy or other technical reasons preclude it.	
b. Glazing impact	Consider the climatic conditions, orientation, size, insulation and shading of windows to limit the negative impacts of glazing. Whether it is climatically or culturally appropriate is a broad subject with many views, however the DP MUST consider the glazing solution for any building to avoid significant heating and/or cooling issues which may affect both the health of occupants and service costs for the building.	
c. Daylight penetration	Consider the maximum effective depth of daylight penetration into a building. A typical indication of maximum effective depth is 6-9m from the external wall. Please see factors to be considered in the relevant section.	
d. Artificial lighting	Consider the extent of supplementary artificial lighting for all internal rooms, or spaces unable to be lit by daylight. The level of artificial lighting shall be sufficient to enable the effective functional use of the room or space.	
C6.PR 2 Ventilation	Ventilation for each building MUST comply with the requirements laid out in the relevant section.	
a. Natural Ventilation	The minimum openable window area to the outdoors shall be 5% of the floor area in a room. In locations where adjoining rooms without openings to the outdoors use 'borrowed' ventilation from a naturally ventilated room the common wall shall have an opening of a minimum of 10% of the unventilated room floor area.	
b. Mechanical ventilation	In cold climates, where temperatures are lower than 5°C, ensure that all rooms containing bathtubs, showers, spas and other bathing facilities shall be mechanically ventilated.	
c. Cross ventilation	Enable cross ventilation where feasible and appropriate. This is particularly relevant in hot or humid climatic conditions and should be achieved with nominally equal areas of openable ventilation on opposite walls of the room or space.	
d. Other measures	Consideration should be given to other methods for natural ventilation such as stack or chimney design techniques to boost the impact of natural ventilation techniques where required.	
C6.PR 3 Concealed spaces	Every building that contains concealed sub floor spaces, attic spaces or voids within wall cavities MUST be designed to inhibit or eliminate moisture migration or condensation issues, in line with the requirements laid out in the relevant section.	
a. Temperature and dew points	Temperature variations and dew point locations relative to chosen building elements shall be assessed to avoid condensation in building cavities.	
b. Roof void space ventilation	Roof void space ventilation is to be implemented by openings at the bottom and top of sloped roofs to ensure convection air movement. All ventilation air movement MUST be located on the outer face of insulation to ensure the effectiveness of the insulation is not compromised.	
c. Sub-floor ventilation	Sub floor ventilation is required to be installed for voids between the underside of timber floor structures and the earth below. The vents shall be vermin proofed to prevent access into the crawl space and have an area of 0.7m ² per 100m ² of floor space. Minimum clearance for timber above ground is 300mm.	
C6.PR 4 Mechanical ventilation	Buildings or parts of buildings that require mechanical ventilation for exhaust MUST comply with the requirements laid out in the relevant section.	

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a. Mechanical exhaust Rates	1. Two air changes/hour for internal rooms or store rooms 2. Five air changes/hour for bathing facilities, domestic style kitchens and cleaners' rooms 3. Specific trade related exhaust requirements to be commensurate with acceptable levels prescribed for use by local authorities or bodies such as WHO.	
b. Mechanical Exhaust Systems	Mechanical exhaust systems shall not discharge into roof void spaces or ceiling spaces. All exhaust shall discharge to the outdoors.	
C6.PR 5 Space heating	All habitable spaces within buildings MUST be provided with an acceptable method of space heating in cold climates. e heating system MUST be capable of sustaining a minimum temperature of 15 degrees C and preferably 18 degrees C at any location within the heated space during normal occupancy periods. The DP designing the spaces and building MUST consider the impact of extreme cold and provide insulation, air locks and other heat management design activities to minimize heat loss and fuel usage. All pipe work, tanks, valves, and other liquid-based circulation systems MUST be insulated and located appropriately to avoid freezing conditions.	
C6.PR 6 Air conditioning	Given the variability of conditions that affect power considerations, types of equipment, and spare parts availability, the DP should prepare a design solution that provides human comfort conditions within the provided matrix. Where there are opportunities to consider alternatives to full air conditioning, or reducing equipment size by improvements to the building design or its insulation, the DP MUST investigate these options prior to finalizing the design solution.	
C6.PR 7 Washroom facilities	The DP MUST ensure that adequate toilets, washing and bathing facilities areas are provided in all buildings or adjacent to the buildings, depending on cultural expectations, and employing a gender-based approach. For a table of minimum requirements for adequate washroom facilities, please refer to the table in the relevant section.	
C6.PR 8 Accessible toilets	The DP MUST provide at least one accessible toilet facility for persons with disabilities in all buildings. For further guidelines and specific parameters stemming from this requirement, please see the relevant section.	
C6.PR 9 Accessible kitchens	All dwelling units that are configured for accessibility for disabled persons MUST contain a kitchen facility suitable for use by a person in a wheelchair. Reach and clearance spaces, under bench knee spaces and similar operational constraints MUST be considered by the DP in the design of these facilities.	
C6.PR 10 Cleaners' sinks	Cleaners' sinks MUST be used to ensure there are suitable facilities available for keeping the building clean and hygienic.	
C6.PR 11 Kitchen facilities	Tea-making facilities or kitchens MUST be separate rooms and contain sufficient cupboards, sink ventilation and water supply to enable the hygienic preparation of drinks and food appropriate to cultural norms. Cleaners' rooms MUST not be used for tea-making or food preparation.	
C6.PR 12 First aid facilities	First Aid facilities should be considered for all buildings in the interests of emergency assistance for the occupants. If the building is located in a conflict zone, then the provision of a 'sick' room as an emergency first aid room MUST be included for all buildings with an area greater than 300m².	
Services and Equipment (C7)		

Code/ Protocol	Clause	Completed (drop-down)
C7.PR 1 Water supply system		
a.	The water supply system MUST deliver water which is safe for human consumption and other uses. Laboratory analysis and a treatment regime may be required to achieve the standard for safe drinking water as defined by WHO. Toilet flushing and similar non-drinking water applications may use lower qualities of water supply.	
b.	The DP MUST research all water supply options including rain water harvesting.	
c.	Water storage requirements MUST be determined on the basis of data collected about reliability of supply and estimated daily consumption.	
d.	Water requirements for fire fighting MUST be determined and a separate storage provided if the municipal supply is inadequate and/or intermittent.	
e.	Cold water reticulation MUST be designed so that adequate supply – a minimum of 5 l/min - is available at all discharge points. The possibility of frost damage MUST be considered and precautions taken to avoid frost damage.	
f.	Hot water reticulation: the same observations apply as for cold water, but insulation is required to avoid heat loss.	
g.	The design of the water heating and pipe system MUST be such as to prevent incubation of bacteria colonies, legionella in particular.	
h.	The method of heating water, both for sanitary purposes and for heating MUST be considered carefully by the designer. Centralised heating MUST be compared with de-centralised heating in terms of initial cost and operating cost.	
C7.PR 2 Sewage and waste water		
a.	Sewage and waste water potentially presents the most serious threat to health in any project. The DP MUST consider all available technologies to determine the most environmentally sustainable option given the particular context for the project.	
b.	Waste water from kitchens MUST pass through a grease trap before being discharged into the general waste water system.	
c.	Sewage systems, collection pipe work, manholes and treatment facilities MUST be designed with great attention to detail to ensure that any potential health hazard is mitigated. In particular possible groundwater contamination and infiltration into drinking water sources must be avoided.	
d.	Neutralising tanks and plaster traps MUST be considered for waste systems for health clinics and hospitals and only deselected with good reason. Additionally, disposal systems for medical waste MUST be considered to ensure that any potential health hazard is mitigated.	
e.	The DP MUST confirm the capacity of the municipal system with the relevant authority.	
C7.PR 3 Stormwater management		
a.	Stormwater systems MUST be designed so that they safely dispose of stormwater without causing scour, flooding or contamination.	
b.	Water from roof drainage should, where practical, be harvested for use in the water supply to the infrastructure project or for site irrigation.	
c.	Water from hardened surfaces, parking and roads MUST be led through gross solid traps, silt and oil traps before either being stored for re-use in reservoirs or discharged safely into either a municipal stormwater drainage system or a waterway.	

Code/ Protocol	Clause	Completed (drop-down)
	d. The storm drains MUST be designed for normal rainfall parameters determined from meteorological data. Design MUST be resilient against extreme situations to prevent serious failure.	
C7.PR 4 Electrical systems		
	a. All electrical installations MUST result in a high degree of life safety and building safety for the project. The lifespan of the project should be considered in the design of electric installations. In the case that no such codes exist, see section B3.	
	b. All earthing/grounding devices, including lightning rods, MUST be identified on electrical documentation, as incorrectly executed earthing may result in failure of safety devices and cause a fire and/or loss of life.	
	c. The designer MUST research the local situation of power generation and distribution and establish to the greatest extent possible the reliability and capacity of supply.	
	f. When choosing standby power diesel generators the following MUST be considered: availability of competent maintenance service; availability of spare parts; reliability of operation; fuel availability and consumption.	
C7.PR 5 Communications and IT Systems	The IT requirements for server rooms, patch panel locations, PABX units MUST be defined, in cooperation with the end-user, in order to enable an acceptable level of security, operation and capability for the facility.	
C7.PR 6 Security services	The DP MUST identify in the design brief and assist with provision of any specialist services infrastructure related to security needs for the operation of the building.	
C7.PR 7 Evidence of research	The DP MUST provide evidence of research in consideration of the choice of equipment to meet C7-TO 2 and C7-FS 2 for complex equipment design solutions. These choices are critical to the future performance and effectiveness of the design outcome.	
	a. Ventilation fans, filters, exhaust hoods, make up air supply systems	
	b. Heating equipment such as boilers, burners, duct heaters, radiant heat systems	
	c. Water pumps for distribution and/or pressurisation to sanitary facilities or for heating systems, fire hydrant/hose reel systems	
	d. Air conditioning systems comprising air, ground or water based split systems, packaged systems, conventional chiller/evaporator centralised systems, VRV and other technologically advanced systems	
C7.PR 8 Testing of equipment	In the design documentation, prior to the handover of the building to users, the DP MUST:	
	a. Clearly identify those items of equipment to be tested and commissioned.	
	b. Clearly identify the need for maintenance manuals for such equipment.	
	c. Clearly identify any necessary training of occupants in the use of the equipment.	
Security (C8)		
C8.PR 1 Security levels	The DP MUST design security elements and systems that are appropriate to the level or type of threat that can be reasonably anticipated.	

Code/ Protocol	Clause	Completed (drop-down)
C8.PR 2 Codes	National codes and standards MUST be used for the design of security elements where such codes and standards exist. In the absence of these, applicable international codes should be used. Refer to SECTION B2 for further guidance.	
C8.PR 3 UN Building and compounds	United Nations Department of Safety and Security MOSS (Minimum Operating Security Standards) and MORSS (Minimum Operating Residential Security Standards) MUST be used for the design of all infrastructure for all UN buildings and compounds.	
C8.PR 4 Atypical security considerations	Some atypical security considerations may apply for other types of buildings in exceptional circumstances, and these MUST be designed to an appropriate standard to mitigate the particular threat.	
C8.PR 5 Physical security	All three main components to physical security (delay, detection, and apprehension) are required for a functional security system. The DP MUST design all Delay, Detection and Apprehension and other physical aspects of security systems to meet the security requirement. Specialist consultants may be required for major projects, in which case the DP MUST liaise with the consultant to ensure all relevant content is provided in the design documentation.	
C8.PR 6 Design considerations	Issues that MUST be considered in the design will depend on the level of threat, which may include Blast film, window bars, bunkers and safe rooms, blast walls, etc. For further guidance and specific requirements that MUST be met under certain security circumstances, consult the relevant section.	
C8.PR 7 Access control	Access Control MUST be designed to prevent unauthorized access to the building or compound, and to intercept contraband (weapons, explosives, etc.), with the minimum impact to traffic flow through the access.	
C8.PR 8 Exit control	Exit control MUST be considered. Exit searches should focus on theft or unauthorised removal of vehicles, equipment, classified material, etc.	
Green technology (C9)		
C9.PR 1 Design elements	Green technologies MUST be considered by the DP in different design elements, such as: site location planning; selection of environmentally preferable materials; minimize greenhouse gas emissions; minimize use of energy and supply with renewable sources; water use; sewage and graywater use; solid waste handling; indoor air quality, including thermal comfort, lighting quality and type of fitting; building commissioning, its operation and maintenance; and mitigation of greenhouse gases.	
C9.PR 2 Building orientation and shape	DPs MUST consider building orientation and shape to reduce energy consumption and promote natural light and ventilation whenever possible.	
Climate change adaptation and disaster risk reduction (C10)		
C10.PR 1 Impact of natural hazards	The DP MUST consider principles and good practices in the design, thinking beyond codes and standards, to design infrastructure that reduces the impact that failure due to natural hazard could have for the use of infrastructure.	
C10.PR 2 Climate change	The DP MUST design the facility with recognition of the increased impacts of climate change. The DP MUST identify all measures taken to consider these principles and practices in the design of infrastructure.	

Code/ Protocol	Clause	Completed (drop-down)
C10.PR 3 Safe health facilities	When designing health facilities, Design Practitioner MUST incorporate specific measures for the services of the building to remain accessible and functional at maximum capacity and within the same infrastructure immediately following a natural disaster, in line with WHO's "Hospitals safe from disasters' programme".	
C10.PR 4 Safe schools	When designing schools, the Design Practitioner MUST incorporate specific measures for the services of the building to remain accessible and functional at maximum capacity and within the same infrastructure immediately following a disaster, in line with the Guidance Notes on Safer School Construction developed by the Inter-Agency Network for Education in Emergencies and the Global Facility for Disaster Reduction and Recovery.	