

SECTION 1: CONSTRUCTION SPECIFICATION



MHMS RADIOLOGY & REHABILITATION PROJECT CONSTRUCTION SPECIFICATION

Introduction:

This Construction Specification was prepared for inclusion as part of the MHMS Radiology & Rehabilitation Project (project no. 032104)

This document will govern the standard of building materials, assembly, finishes and general construction processes to be employed in the construction of the new Radiology and rehabilitation building MHMS, Betio.

Contracting Arrangements:

'Supply & Construct' Contractors must comply with all sections of this specification.

'Construct Only' Contractors must comply only with those sections relating to the proper assembly of building components.

PRELIMINARIES:

This Specification applies to the new Radiology and Rehabilitation Building. It must be read in conjunction with the: -

- Kiribati National Building Code (KNBC),
- Project specific drawings.

In some sections of this document, the qualities or performance required of a particular item is defined by listing a particular 'Product'. Any proposal by the Contractor to use an alternative product must be supported by full technical information demonstrating that the proposed alternative is equivalent (or superior) in all respects.

If responsible for the supply of materials, the Contractor must pay all applicable import duties, freight levies, taxes, insurances, transfer fees, security fees and storage charges.

The Contractor must arrange with local supply authorities for connection to public services where applicable and pay all relevant fees and charges.

The Contractor must pay compensation to the landowner for all productive trees and plants damaged or removed in the course of the works.

It is the Contractor's responsibility to arrange for the Ministry of Infrastructure & Sustainable Energy (MISE) to carry out intermediate and completion inspections of the works. Construction progress payments are linked to MPWU inspection and approval of the works.

STEEL CORROSION PROTECTION:

All fixings (bolts / washers / nuts / screws / nails / straps) to be fully galvanised.

Pre-finished zinc, chrome or cadmium coatings will be rejected.

Coat all welds and exposed bare steel with cold galvanising treatment.

Product: 'Galmet' Cold Galvanising – zinc rich coating (grey) or approved equivalent.

TIMBER:

All timber construction to AS1720.1, AS1604.1 and any other standards referenced in them.
All timber to be minimum F7 grade, seasoned pine.
All timber to be minimum Hazard Class H3.
Roof framing timber may be sawn or dressed.
Timber for windows, doors, and joinery to be dressed.
Warning: do not burn treated pine off-cuts

FLASHINGS: (DPC)

Install continuous bitumen coated aluminium moisture barrier between all abutting timber and concrete surfaces. Joins to be lapped 100mm (min).

Product: 0.35mm thick 'Alcor' or approved equivalent.

CONCRETE:

All concrete work to AS3600 and any other standards referenced in it.
Cement to be type GP or GB.
Aggregate to be larger than 5mm and smaller than 20mm (10 to 20mm for economy).
Sand and aggregate to be washed and free from salt and minerals which may harm steel.
Water must be drinkable quality (do not use brackish water or salt water).
Concrete strength for building elements to be minimum strength of $f'c = 20\text{MPa}$.

Mix ratio for 20MPa concrete: -

Cement:	6 x 40 kg bags
Sand:	1/4 cubic metre
Aggregate:	1/2 cubic metre
Water:	120 litres

Approximate Volume Mix

Water	0.5 parts (buckets)
Cement	1 part (bucket)
Sand	2 parts (buckets)
Aggregate	3 parts (buckets)

Form up and cast in-situ all concrete building elements as detailed on project drawings.
Provide paths, steps, ramps and falls as shown on drawings.
Finish slabs with a wood float or steel trowel as shown on drawings.

MOISTURE BARRIER:

Install high impact 0.2mm thick polythene moisture barrier beneath concrete slabs as detailed. Lap joints 150mm and continuously tape. Seal around all penetrations with tape.

Product: 0.2mm 'Fortecon' sheet or approved equivalent.

STEEL REINFORCEMENT (for concrete footings, slabs, block walls, bond beams, etc as shown on project drawings):

Reinforcement to AS/NZS 4671

Welded mesh, deformed bars & ties to be Grade 300 ("D") or Grade 500 ("N").

Provide 75mm minimum concrete cover to all steel reinforcement in building elements on or below ground.

Provide 50mm minimum concrete cover to all other steel reinforcement in building elements.

Fix steel with tie wire and provide adequate lap lengths as shown on project drawings.

CONCRETE BLOCKWORK:

All Concrete Block work to AS3700 and any other standards referenced in it.
Hollow concrete blocks to be purchased from a recognised supplier OR cast on site.
200 wide hollow block dimensions: 390mm long x 190mm high x 190mm wide.
External wall thickness of blocks: 35mm. Internal web thickness of blocks: 30mm.
150 wide hollow block dimensions: 390mm long x 190mm height x 140mm wide
Refer typical drawings for hollow block profiles.

Mix for site manufactured 15MPa blocks using 10mm aggregate: -

Cement:	8 x 40 kg bags
Sand:	1/2 cubic metre
Aggregate:	1/2 cubic metre
Water:	160 litres

Approximate Volume Mix

Water	0.5 parts (buckets)
Cement	1 part (bucket)
Sand	3 parts (buckets)
Aggregate	2 parts (buckets)

Cement to be type GP or GB.

Water must be drinkable quality (do not use brackish water or salt water).

Sand and aggregate to be washed and free from salt and minerals which may harm steel.

Only bio-degradable form release agents may be used on formwork.

Vibrate and / or rod wet concrete mix well into corners of mould.

Cure concrete blocks on site by covering with plastic sheeting for 7 days.

Stack blocks (max. 3 blocks high & well spaced) for 14 days before use.

Mortar to be mixed in the ratio of 1 part (bucket) of cement with 3 parts (buckets) of sand and enough water to make the mortar workable.

Mortar joints (horizontal & vertical) to be 10mm wide.

Flush jointed mortar (do not tool joints).

Install block-on-edge ventilation panels as detailed on project drawings.

Modify blocks as detailed to form bond beams as shown on typical drawings.

Do not use door or window frames to support lintels or bond beams.

Install steel reinforcement within walls & bond beams as detailed on project drawings.

Cast holding-down bolts into top of walls as detailed on project drawings.

GROUT FILLING OF BLOCKWORK:

Completely infill all reinforced cavities or all cavities and voids in block work walls.

Cement to be type GP or GB.

Aggregate to be larger than 5mm and smaller than 20mm (10 to 20mm for economy).

Sand and aggregate to be washed and free from salt and minerals which may harm steel.

Water must be drinkable quality (do not use brackish water or salt water).

Mix ratio for grout: -

Cement:	1 part (buckets)
Sand:	2 parts (buckets)
Aggregate:	4 parts (buckets)
Water:	1 part (buckets)

BLOCKWORK FINISH:

Bag block work externally with cement render and paint finish – refer: 'Painting' section.

Render block work internally and paint finish – refer: 'Painting' section.

WINDOWS GENERALLY:

~~Fabricate & install timber window frames as detailed – refer 'Timber' section.~~

Install in blockwork openings after roof installation.

~~Fabricate timber fixed louvers where indicated and as detailed.~~

Rebate all timber joints 10mm and twice screw fix.

Install continuous flashing between timber and concrete – refer 'Flashings'.

Install flyscreen to all windows.

LOUVRE WINDOWS (where shown on project drawings):

Install operable louvre window system (anodised alum with black plastic clips & handles).

Install 152 x 6mm clear float glass louvre blades with bevelled or polished edges.

Install timber weather stop at top & bottom as detailed.

Products:

Operable Louvre System: 'Interlock' louvres or approved equivalent.

DOORS:

Fabricate & install timber doors & frames as detailed – refer 'Timber' section.

Install in blockwork openings after roof installation.

Rebate timber jamb / head joint by 10mm and twice screw fix.

Install continuous flashing between timber and concrete – refer 'Flashings'.

ROOF FRAMING:

Refer 'Timber' section for timber specifications.

Roof framing timber may be sawn or dressed – refer 'Timber' section.

Install continuous flashing beneath all timber plates fixed to blockwork – refer 'Flashings'.

Fabricate & install timber roof trusses & framing as detailed.

Do not rebate rafters more than ¼ of the total member depth.

Fix diagonal steel roof bracing strap tightly across top of rafters / trusses as shown, OR

Install continuous diagonal timber bracing fixed beneath top chord of truss or rafters.

ROOF FRAMING FIXING SCHEDULE:

Junctions	Fixings	Details
Wall plate hold down	Bolts	Galv. M12 bolts set in bond beam at 1000mm centres.
Roof truss junctions	Gusset Plates	Matching 12mm construction ply gussets to both sides of truss. 12/ 50 x 5.0mm dia galv nails to each chord or web member.
Rafters / trusses to wall plate	Nails	2 / 3.15 dia x 75mm bullet heads (skew-nailed)
	Straps	At gable ends and every second rafter / truss, install 400mm long strap fixed under wall plate & over rafter / truss. 3 / 3.15 dia x 25mm clouts into to each end of strap.
Rafters to ridge board	Nails	2 / 3.15 dia x 75mm bullet heads (skew-nailed)
	Straps	At gable ends and every second rafter, install 300mm long strap over ridge board with 3 / 2.8 dia x 25mm clouts at each end into top of opposing rafters.
Rafters / truss bracing	Straps	Double diagonal straps pulled tight & fixed across top of rafters or trusses. Fix with M12 bolts at each end & 1 / 3.15 dia x 50mm clout at intermediate members.
Battens to rafters / trusses/purlins	Nails	2 / 3.15 dia x 100mm bullet heads (skew-nailed) at each junction.
Barge batten to roof battens	Screws	2 / 100mm long countersunk wood screws at each junction.
Fascia purlin to rafters / trusses	Screws	2 / 100mm long countersunk wood screws at each junction.
Gable battens to rafters / trusses	Nails	2 / 3.15 dia x 75mm bullet heads (skew-nailed) at each junction.

Product:

Galv steel anchor / bracing strap: As noted on project drawings otherwise;
 'Pryda' 25 x 1.0mm galv steel strap OR
 'Mitek' 30 x 0.8mm galv steel strap or approved equivalent.

ROOFING:

Install reflective foil sisalation as shown above all areas. Fully tape at joins.
 Start installing corrugated steel roofing at leeward (north or west) end of roof where possible.
 Wherever possible, roof sheet should be installed in full lengths from ridge to eave.
 If necessary, end-lap roof sheets by 150mm (min) centred over a roof batten.
 Extend roof sheet 50mm beyond fascia. Turn up trays at ridge.
 Fix roof sheet every second corrugation at eaves and ridge.
 Fix roof sheet every 3 to 4 corrugations elsewhere.
 Install standard Custom Orb barge capping as detailed.
 Fix barge capping through roofing to each roof batten with roofing screws.
 Fix barge capping to roofing at 300mm centres with stitching screws.
 Install standard Custom Orb ridge capping fixed through roofing with roofing screws.
 Lap sections of ridge & barge capping 150mm, silicon seal & screw-fix.
 Form holes for fixings with a fine sharp punch.
 Use hex head roofing screws with EPDM washers suited to roofing profile only - DO NOT use roofing nails.
 Roof flashing: flash projections above or through the roof with two part flashings consisting of an apron flashing and an over-flashing, with at least 100mm vertical overlap. For awning roof abutment to the wall, install the overflashing in a 25mm deep raking sawcut built in the concrete beam.
 Pipe penetrations: seal with a neoprene coupling clamped to the pipe and fixed to the profile of the roof sheeting.

Products:

Reflective foil sisalation: 'Green Insulation': *Reflecta-Guard* (refer to Annex 1, IF3)

Corrugated steel roofing: 'Bluescope Lysaght': *Colorbond ULTRA* Custom Orb, AZ200 G300 in 'Windspray'
 Base metal thickness (BMT): 0.55mm
 (refer to Annex 1, IF2)

Roofing screws (metal / wood): 'Bluescope Lysaght': *STORM-Tite* Class 4 in 'Windspray' (refer to Annex 1, IF2)
 65mm long for roofing, ridge & top of barge capping;
 25mm long for fascia capping & underside of barge capping

Stitching screws (metal / metal): 'Bluescope Steel': SHS 10-12 x 20mm Stitching Screws

Barge & ridge cappings: 'Bluescope Lysaght': *Colorbond ULTRA* Custom Orb, AZ200 G300 in 'Windspray'
 Base metal thickness (BMT): 0.55mm

ROOF VENTILATOR:

Install roof ventilator to manufacturer's instructions.
 Roof ventilator and ceiling register to be located between trusses as shown on the drawing.
 For roof ventilator: place flashing with top edge slip under the ridge capping. Ensure flashing covers corrugations equally.
 Turn the corrugations of roof sheeting upwards around opening. Dress flashing to form sheeting profile. Use matching profile infill if required for bottom edge of flashing to achieve weatherproof seal.
 If the top edge of the supplied flashing is exposed and does not extend to the ridge capping, install a flat flashing with turned down sides over the top edge of the ventilator flashing and extend back to the ridge capping.

Roof ventilator: 'Edmonds' *vent-A-room* in 'Woodland Grey' (refer to Annex 1, IF4)

GABLE CLADDING:

Install external metal claddings as shown on gable ends.
 Start installing metal cladding @ mid of gable.

Metal cladding should be installed in full length, (vertically)
Metal cladding should have 150mm min or 3 to 4 corrugations lapping.
Use hex metal roofing screws with EPDM washers suited cladding profile. (DO NOT use roofing nails)
Extend metal cladding 50mm below plate bottom.

Products: 'Bluescope Lysaght' Colorbond UTRA Custom Orb, AZ200 G300 in 'Windspray'

CEILINGS:

Install ceilings only where shown on the drawings.
Ceiling framing timber may be sawn or dressed – refer 'Timber' section.
Fix continuous ceiling battens to u/side of joists or trusses with 100mm c/sunk wood screws.
Ceiling battens to be spaced at 600mm centres, both directions.
Fix 6mm fibre cement sheet with 2.8 x 30mm galvanised FC nails at 300mm centres in the centre of the sheet and at 150mm centres at sheet edges.
Flush jointing: use fibre cement sheet with recessed edges. Provide a flush finish using perforated reinforcing tape. In tiled areas do not apply a topping coat after bedding the perforated paper tape in bedding compound.
Install ex.50 x 25 timber cornice bead to perimeter of each room.
Install 600x600mm. drop-in plywood access hatch where shown with 50 x 25mm timber perimeter bead.

Ceiling lining: 'James Hardie' Villaboard or approved equivalent.

FLOORING:

Install vinyl floor tiles (300x300) where indicated on the drawings.
Install vinyl floor tiles to manufacturer's instructions.
Set out tiles from the centre of the area. Match edges and align patterns. Arrange the material so that variation in appearance is minimised. Use non-slip vinyl tiles, light grey colour.

Products:
Viny tiles Alabaster 1600, Prestige PUR 300x300 or approved equivalent.
(Refer to annex 1 IF8)

Install ceramic tiles where indicated on drawings.
Install ceramic tiles to manufacturer's instructions.
Use adhesive as recommended by the manufacturer for the particular application.
Screed to fall tiles as detailed.
Turn membrane down into the floor waste puddle flanges and adhere.
Use non-slip tiles. Consult architect for tile size and colour selection prior to installation.

JOINERY & FITTINGS:

Fabricate and install joinery items as detailed.
All timber to be dressed – refer to 'Timber' section. All plywood to be marine grade.
Laminated bench tops:
Material: moisture resistant medium density fibreboard (MDF).
Minimum thickness: 30mm
Finish: scratch resistant melamine or similar finish, adhesive fixed on both sides of MDF. Colour: white, gloss finish.
All edges to be solid timber piece.
Refer 'Painting' section for finishing joinery items.

PAINTING:

Paint only the following surfaces / materials:-

Item / Location	Paint System
Window frames, door frames, fixed louvres & door leafs	<ul style="list-style-type: none"> one coat oil-based wood primer fill nail holes & cracks with acrylic putty and lightly sand two coats oil-based exterior gloss enamel
Timber joinery	<ul style="list-style-type: none"> one coat oil-based wood primer fill nail holes & cracks with acrylic putty and lightly sand two coats oil-based interior gloss enamel
Fibre cement sheet ceilings and trims	<ul style="list-style-type: none"> one coat acrylic sealer and primer fill recesses with acrylic putty with an addition of 10% of fresh Portland cement and lightly sand two coats water-based ceiling white (matt finish)
Gable cladding – metal sheet	<ul style="list-style-type: none"> one coat acrylic sealer and primer fill nail holes & cracks with exterior grade acrylic patching compound with an addition of 10% fresh Portland cement and lightly sand two coats water-based semi-gloss enamel
Internal block work walls	<ul style="list-style-type: none"> one coat acrylic primer two coats marine grade paint
External block work walls	<ul style="list-style-type: none"> one coat acrylic primer sealer undercoat two coats semi-gloss enamel
Steel columns, plates, angles.	<ul style="list-style-type: none"> one coat latex-acrylic primer undercoat two coats semi-gloss enamel

Sand timber smooth and clean off all dirt and grease prior to painting.

Do not combine paints from different manufacturers in a paint system.

Use the appropriate paint system as recommended by the manufacturer for different materials.

Use mineral turpentine for cleaning up equipment after using oil-based paints.

Consult with architect regarding the colour scheme prior to painting.

Products:

Use paints by Dulux, British Paints, Resene, Taubmans or approved equivalent.

RAINWATER COLLECTION / ROOF PLUMBING:

Rainwater collection system is to comply with the requirements of the Kiribati National Building Code.

Install gutters prior to fixing roof sheeting.

Fix to fascia & steel roofing with galvanised steel straps at 600mm centres.

Provide 1:200 (min) fall toward outlet end.

Install in-ground first flush diverters to 'wet' rainwater collection system.

Products:

Gutters : 'Bluescope Lysaght': *Colorbond ULTRA* Quad (or 'D') gutter, AZ200 G300, in 'Windspray'
Base metal thickness (BMT): 0.55mm

Downpipes: 'Vinindex' 100mm dia. UPVC stormwater pipes & fittings (solvent cement joints) or approved equivalent.

Gutter fixing strap: 'Bluescope Lysaght': standard *Colorbond ULTRA* Quad (or 'D') gutter fixing strap

Water supply pipe: 'Iplex' 20mm dia. UPVC pressure pipes & fittings (solvent cement joints) or approved equivalent.

PUBLIC WATER SUPPLY:

Comply with all regulations of the Kiribati National Building Code and local supply authority.

Submit applications, install water meters and provide 'as-built' drawings as required.

Water supply pipe: 'Iplex' UPVC pressure pipes & fittings (solvent cement joints) or approved equivalent.

SANITARY FITTINGS (where applicable and where shown on project drawings):

Install sanitary fittings to manufacturer's instructions.

Sanitary fittings heights and locations as shown on the drawings.

Refer to [Annex 1](#) for Product specifications and locations.

SANITARY DRAINAGE:

Sanitary drainage to be installed in compliance with the Kiribati National Building Code.

Install inspection / rodding openings at all changes in pipe direction.

Exposed UPVC pipework to be UV stabilised.

Exposed pipes to be fixed with galv steel straps at 450mm CTS, plugged & screwed to wall.

Grated sumps to be fitted with water traps to prevent odours escaping from the system.

Sewer backvents and drains from handbasins & sinks to be 50mm diameter.

All other drains to be 100mm diameter (min).

Products:

Sewer Pipework: 'Vinindex' UPVC sewer pipes & fittings (solvent cement joints) or approved equivalent.

PUBLIC SEWER DRAINAGE:

Connect new drainage systems to public sewer.

Comply with all regulations of the Kiribati National Building Code and local authorities.

Submit application for connection and provide 'as-built' drawings as required.

SITE DRAINAGE:

In accordance with Kiribati National Building Code requirements, grade land around buildings to direct surface water away from hospital facilities and toward natural depressions.

WIRELESS SMOKE ALARM DETECTOR.

- Hardwire, interconnected wireless smoke alarm with battery backup
- Uses photoelectric sensing technology which is environmentally friendlier.
- Low battery warning; simple to use silence/test
- Add additional battery operated First Alert One line alarm to expand with wires

Product

Wireless Smoke Alarm. SA521CM FIRST ALERT SMOKE ALARM.. (Refer to 1, IF6)