The following tables summarise the pros, cons and sustainability attributes of various sub-floor construction systems (Table 1) and floor materials/coverings (Table 2) as discussed in the article 'Strength, stability and performance—The right floor for your build' in *ReNew* magazine issue 143.

Table 1. Sub-floor systems—summary and pros/cons.

Sub-floor system	Materials used	Pros	Cons
Simple slab on ground and stiffened raft slabs	Concrete, steel	High thermal mass (note: needs to be suitable for climate; needs strategies for heating/cooling slab; may become an issue as climate changes/warms) Can act as sub-floor, structural floor and floor surface Termite resistant Bushfire resistant Long lived	High embodied energy unless using eco-concrete, which (often) also uses a waste product (fly ash from furnaces and power stations) Difficult to fully insulate underneath, particularly edge insulation while maintaining termite resistance Not recyclable Not easily reused at end of life, but can be used for road fill etc Need to add piers/bores for reactive soil types
Wafflepod (standard)	Concrete, polystyrene, steel	Good insulation High thermal mass Uses less concrete than other slabs Cheaper to install than other slabs	High embodied energy (though less than other slabs) Need to add piers/bores for reactive soil types, which reduces cost difference from other slab types
Wafflepod (Cupolex)	Concrete, recycled plastic, steel	Moderate insulation Moderate thermal mass Can run utilities through voids after the slab is poured Can ventilate voids to eliminate moisture problems, but this reduces thermal performance	High embodied energy (though less than other slabs) Plastic not easily recycled with current recycling stream in many parts of Australia
Suspended slabs	Concrete, steel	As for on-ground slabs, plus: High strength compared to wood joist floors	As for on-ground slabs, plus: Requires strong supporting structure such as concrete or brick walls
Bearers and joists—timber	Concrete, timber or galvanised steel stumps Timber bearers and joists	Low embodied energy (concrete stumps small part of system) Long lived when designed right (particularly concrete stumps) Can be designed to be termite resistant Can be designed and prefabricated off-site for faster assembly on site Insulation can be added relatively easily at build time	Thermal mass depends on structural floor materials used, but likely to be low Timber may not be termite resistant Timber needs to be of the correct strength for the use and mould/rot resistant Check sourcing of timber
Bearers and joists—cold rolled steel	Concrete, timber or galvanised steel stumps Cold rolled steel bearers and joists	Light and strong Recyclable Long lived Insulation can be added relatively easily at build time Can be designed and prefabricated off-site for faster assembly on site	Higher embodied energy than timber Thermal mass depends on structural floor materials used, but likely to be low High thermal conductivity unless thermally broken
Bearers and joists—hot rolled steel	Concrete, timber or galvanised steel stumps Hot rolled steel bearers and joists	Heavy, requires cranes to install Recyclable Long lived Insulation can be added relatively easily at build time Can be designed and prefabricated off-site for faster assembly on site	High embodied energy Thermal mass depends on structural floor materials used, but likely to be low High thermal conductivity unless thermally broken
Bearers and joists—timber/steel combo	Concrete, timber or galvanised steel stumps timber/steel combo bearers and joists	Light and strong Long lived Insulation can be added relatively easily at build time Can be designed and prefabricated off-site for faster assembly on site	Composite not easily recycled unless deconstructed Thermal mass depends on structural floor materials used, but likely to be low

Table 2. Flooring materials—pros/cons and material sustainability considerations.

Flooring material	Pros	Cons	Material sustainability
Concrete	No extra materials needed High thermal mass	Consider insulation Polishing result may not be as expected Surface hard/can be cold	Consider VOCs and eco-credentials of finishes High embodied energy; use eco-concrete
Concrete screed	Allows for in-screed heating to be added after slab is laid	Additional materials needed	As above
Timber floorboards	Low embodied energy	Low thermal mass May be draughty; seal and/or insulate underneath	Consider VOCs and eco-credentials of finishes Consider timber source Can use recycled timber
Bamboo floorboards	Low embodied energy	Low thermal mass May be draughty; seal and/or insulate underneath Lower quality may be soft and warp from moisture	Cheaper bamboos may use toxic glues Consider VOCs and eco-credentials of finishes Consider bamboo source
Particleboard flooring	Eliminates draughts under another floor finish	Check water resistance	Check VOCs in resin binder Consider VOCs and eco-credentials of finishes Consider wood chip source
Ceramic tiles	Good for wet areas Hard wearing Provides some limited thermal mass	Needs occasional regrouting	High embodied energy
Slate tiles	Good for wet areas Hard wearing Provides some limited thermal mass	Needs occasional regrouting	Check source of slate
Stone/marble tiles	Good for wet areas Hard wearing Provides some limited thermal mass	Needs occasional regrouting	Check source of stone
Laminates	Relatively easy to DIY install	Can scratch/dent, not usually repairable	May off-gas from vinyl or other coatings; check sustainability of components
Rubber sheets and tiles	Very durable	Check natural, not synthetic	Natural material Can be made from recycled rubber
Carpet—synthetic	Hard-wearing Stain-resistant	Not as fire resistant as other materials	Not easily recycled at end of life May off-gas depending on plastics used
Carpet—wool	Fire resistant	Can stain easily	Natural material Consider ethical credentials
Coir, sisal, jute, seagrass		Stains easily Short lifespan	Natural material, usually compostable
Cork		Needs sealant to protect from stains and scuffs Need to protect from furniture legs	Natural material Can be made from recycled cork
Vinyl	Hard wearing Stain resistant Waterproof	Can go brittle over time	May want to avoid due to off-gassing of plasticisers Not generally recyclable
Linoleum	Hard wearing	May discolour or stain over time	Natural material Almost completely biodegradeable