Choosing Materials Key Considerations

Extraction and manufacture	
Impact of extraction	Does the material come from a renewable source? Is it made from re-used or recycled content? Does its extraction cause environmental problems such as noise, visual pollution, release of dust and noise, or release of greenhouse gas emissions?
Energy use	How much energy is consumed over the life of material, from extraction or manufacture to demolition and reuse, recycling or disposal? (This matters because energy generation produces greenhouse gas emissions and may use non-renewable resources.) 'Embodied energy' is all of the energy used over the life of a material or building. Embodied energy figures for New Zealand published by VUW have been used. CSIRO in Australia has estimated that the embodied energy of an average Australian house is about 1,000 GJ – about the same amount of energy as is used running the house over 15 years. In general, low embodied energy means a material is environmentally friendly. However, this should be balanced against other factors such as the material's durability and its impact on day-to-day energy consumption. For example, heavier styles of construction which have higher embodied energy may also provide good thermal mass, potentially reducing heating costs. Over the life of a building of 50 years or more, the advantages of lower running costs can outweigh the higher embodied energy in its construction.
By-products/emissions	Does the processing or manufacture of the material cause pollution or greenhouse gas emissions?
Sourcing	
Material sources	Consider where a material is made, and where the raw materials come from. Is it made close to the site or transported from elsewhere in New Zealand, or is it imported? Are the raw materials local or imported? The more transport involved in getting the material to the building site, the more greenhouse gas emissions it is contributing to.
Availability	Is the material readily available off shelf, available to order (what is the lead-in time?), or available on indent (what is minimum quantity?).

Cost	Consider the total costs associated with the material over its life – not just the up-front costs. Consider, for example, long term maintenance costs, and costs of replacement, recycling and disposal at the end of its useful life. Consider both materials and labour. A number of small components will generally cost more to install than one large component.
Transport to site	Consider the weight and bulk of the material. Transport costs will be higher for heavy or bulky materials. The more transport involved in getting the material to the building site, the more greenhouse gas emissions it is contributing to.
Construction/installation	
Health and safety during construction/installation	Does the material cause health and safety issues (such as off-gassing of solvents) for people installing it?
Ease of construction/ installation	How easy is the material to install? Does it require skilled labour? What is the risk of wastage?
Adaptability	Once installed, can the material, construction type or component be easily replaced or adapted to meet occupants' needs or changing uses of the building? The more adaptable a material, the less waste there will be as occupants' needs change.
Performance	
Health and safety during life of building	Some materials affect occupant health – for example, by giving off volatile organic compounds, run-off from CCA-treated timber.
Structural capability	Does the material contribute to the building's structural strength?
Durability*	Consider the minimum statutory requirements for durability, the actual expected or serviceable life span, and how long the client/owner might expect it to last. If a material lasts a long time, it might be more sustainable than an alternative that is less durable.
Maintenance rating	Is the material low, medium or high maintenance? What maintenance is required to ensure durability and weathertightness provisions of the NZ Building Code continue to be met? How easy will the material be able to be maintained or be replaced once installed?
Moisture resistance	Will the material absorb and/or be affected by moisture? Is it resistant to the passage of moisture or does it allow the building to breathe?
Rot, mould and corrosion	Will the material rot, harbour mould, or corrode? Rot and corrosion affect performance. Mould can be toxic.

Thermal performance	Does the material help to reduce energy use over the life of the building by providing thermal insulation? Does the material help to reduce energy use over the life of the building by providing thermal mass?
Sound insulation	Does the material contribute to sound insulation?
Fire performance	How will the material perform in the event of a fire?
Waste disposal/recycling/re-use	
Re-use	Can the material be re-used at the end of its useful life? Re-use is the best way to minimise waste.
Recycling	Can the material be recycled at the end of its useful life?
Waste disposal	How much waste does this material produce during construction and after deconstruction/ demolition? What are the impacts of disposal – for example, are toxins or pollutants released?

* with normal maintenance