SUSTAINABLE INITIATIVES

Re-use of Existing Structure & Carbon Footprint Reduction

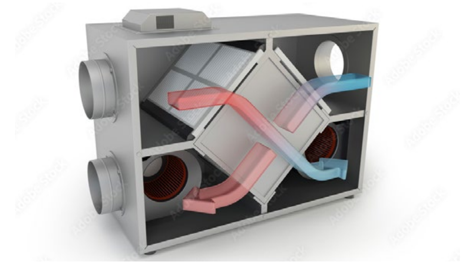
- Environmental impact will be minimised wherever possible by reusing salvage-able elements of the existing build-ing - this will include the large existing concrete slab and existing car park hardstand. Re-use of the existing stone cladding will be adopted.
- Typically around 20% of a new building's carbon footprint comes from the founda-tion and floor.
- Selecting new elements with a lower car-bon footprint and recyclable material can reduce the amount of materials needed, lowering effects on the environment and cost. Locally sourced, low-embodied energy materials may also be specified.
- Targeting operational & embodied car-bon in the above ways is in line with the NZ government's commitment to a 40% reduction in building related emissions by 2030 and Net Zero carbon by 2050.

Hydronic Heating & Hot Water Heating

- In-slab hydronic heating with air-to-water heat pump technology will allow even radiant heat and a comfortable environ-ment, with high energy efficiency and very low running costs. It also helps re-duce mould, condensation and draughts.
- A centralised hot water heating system combined with an air source heat pump can reduce the energy cost of water heating by up to 65%.

Heat Recovery Ventilation & Indoor Air Quality

- A heat recovery ventilation system allows fresh air coming into the building to pass though a heat exchanger, which captures the heat from the warm stale air leaving the building and transfers it to the incom-ing fresh air.
- More than 70% of heat energy can be recovered in this process, making it very energy efficient.
- Mechanical ventilation such as the above also allows a more controllable and comfortable environment, when natu-ral ventilation isn't always effective, i.e. strong winds, cold days, etc.



Energy Modeling & Monitoring

- Early energy Modeling of the envelope and building services in the design stage will result in higher efficiencies and help reduce greenhouse gas emissions.
- A sub-metering system, will allow moni-toring of energy use for individual com-ponents such as the heating and cooling systems, ensuring ongoing building effi-ciency and maintenance. They also have a future-proofing role by indicating when the heating/cooling is nearing their end of life, saving the building from running inefficiently.

Solar PV (Future-proofing)

- The large flat roof allows for a ample PV panels to be retrofitted in the future. The electrical switchboard will be designed to allow seamless installation.
- PV helps reduce the building's depen-dence on the electrical grid.
- By sizing the system accordingly to strike a balance, the aim is to reduce the amount of electricity needed for cooling and align it with the energy generated by the panels.
- Solar panels can also provide an energy offset throughout the year, not just during peak cooling times.

Solar Heat Gain Reduction, Daylighting & Thermal Efficiency

- The large building eaves to the North, along with louvered systems, help reduce solar heat gain and overheating in the summer, while also reducing direct glare into library spaces.
- A multicell polycarbonate facade system on the 'pop-ups' reduces solar heat gain & UV compared with glass, while having a high light transmission, even lighting and better thermal insulation. This allows good filtered daylight into the building, reducing the amount of artificial lighting.
- The external building envelope will adhere to the new NZBC H1 standards which have greatly increased minimum thermal performance standards.

Rainwater Reuse & Control

- Excess rainwater from the roof will be released to garden areas and allowed to flow overland to the river, rather than into pipes.
- Landscaping will be designing to avoid ir-rigation, but in places that are vulnerable to drying out, roof water would be used. A rainwater tank may be used for excess storage.
- Minimising hard surfaces, i.e. using permeable lime chip paths for secondary routes, will allow higher permeability of the surrounding site.
- An increase in planted areas with native species will assist be suitable to the site conditions.

Transport

- Promotion of bicycle transport will be facilitated with more cycle stands than required by Greenstar standards.
- Similarly, there will be provision for EV changers and spaces for fuel efficient vehicles.

Climate Change & Resilience

- Climate resilience is a key consideration. Using NIWA climate projection data in the energy modeling can optimise the building systems to help future-proof for more extreme temperature changes.
- A new structural slab layer over the existing will increase the floor level well above the minimum required, allowing for a more resilient building to cope with future flooding from more common and high intensity rainfall events.