When I'm working on a problem,
I never think about beauty. I think
only how to solve the problem. But
when I have finished, if the solution
is not beautiful, I know it is wrong.
Richard Buckminster Fuller

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

Copenhagen
London
Sydney
Hong Kong
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Application No: DA-173/2021
Date Received: 12/05/2021

SUSTAINABLE DESIGN

STEENSEN VARMING

ESD DA Report

Project Name:	BSBLSC	**Document No**	197184 S02
Project No:	197184	**Revision**	01
Checked:	AM		
Subject	ESD DA Report		

Sydney September 23, 2020
Project No. 197184

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1.0 Executive Summary

The Bondi Life Saving Club seeks to promote leadership by example, through the sustainable building design of their renovated facility, based on industry good practice, in delivering a well-balanced and sustainable outcome.

Our approach seeks to:

- Promote strategies that closely align with the functional and conditional requirements of the spaces they serve.
- Support the Waverly Councils EAP (Environmental Action Plan) within the boundary of the project.

Some of the key strategies under consideration include:

- Incorporate a high-performance building envelope, to ensure energy efficiency as well as occupant comfort (including thermal, visual, and acoustic comfort);
- Incorporate appropriate passive and active design strategies to ensure a low-energy as well as low-maintenance design solution;
- Seek opportunities for onsite power generation;
- Adopt water sensitive urban/landscape design principles;
- Reduce water consumption at point of use through specifying efficient fixtures and fittings;
- Adopt practices to minimise demolition, construction and operational waste including recycling of demolition and construction waste;
- The selection of environmentally preferable materials.

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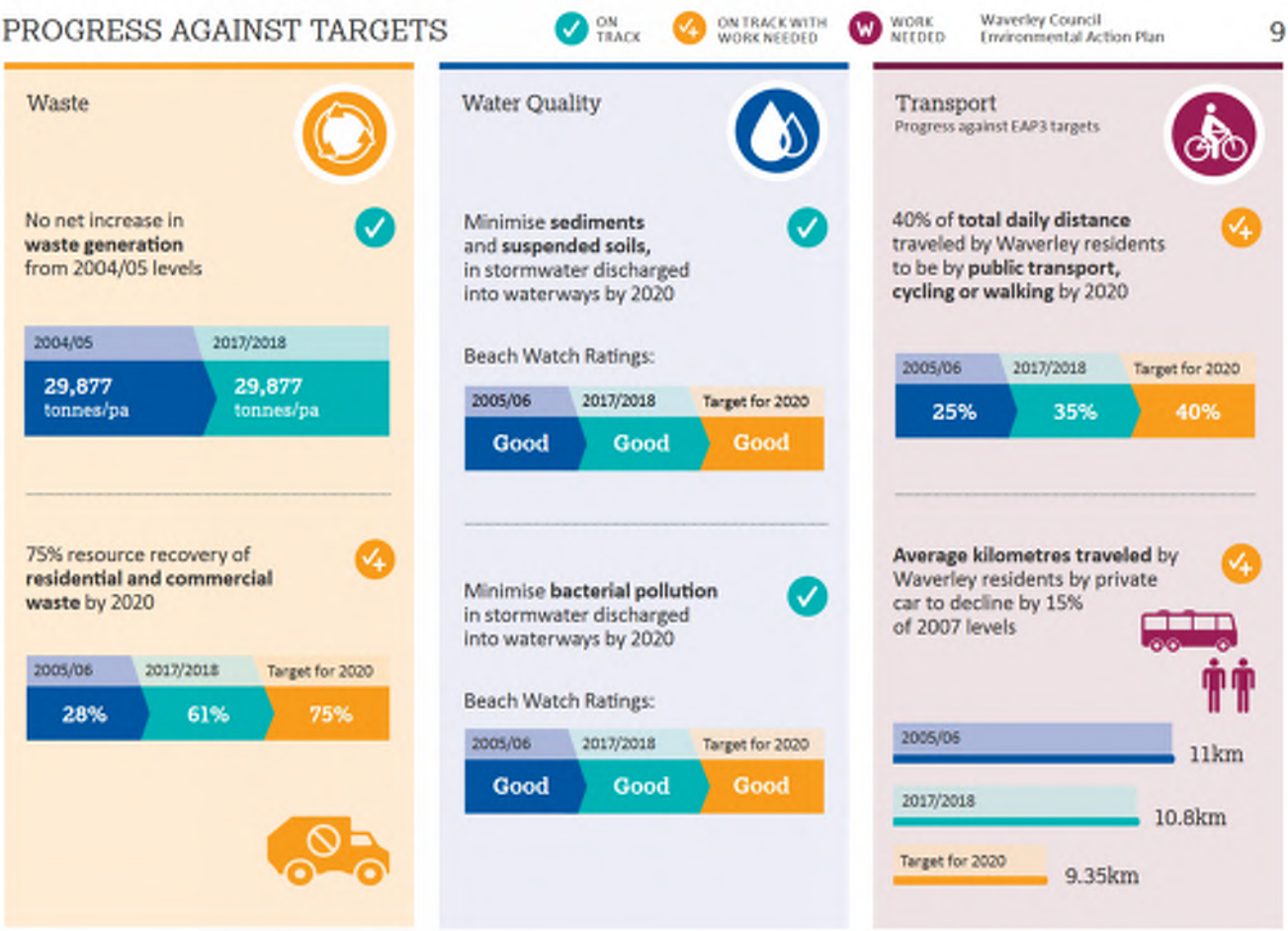
2.0 Introduction

The Waverly Environmental Action Plan (EAP) 2018 -2030, places a strong emphasis on: operational waste, water quality, transport, biodiversity, greenhouse gas emissions and water use. Of particular relevance to this project (at a building level), the redevelopment of the Bondi Life Saving Club can positively contribute through the reduction of greenhouse gas emissions, water and waste consumption. The strategies presently under consideration, have been further outlined in the following sections of this report.



Waverly Environmental Action plan 2018 -2030

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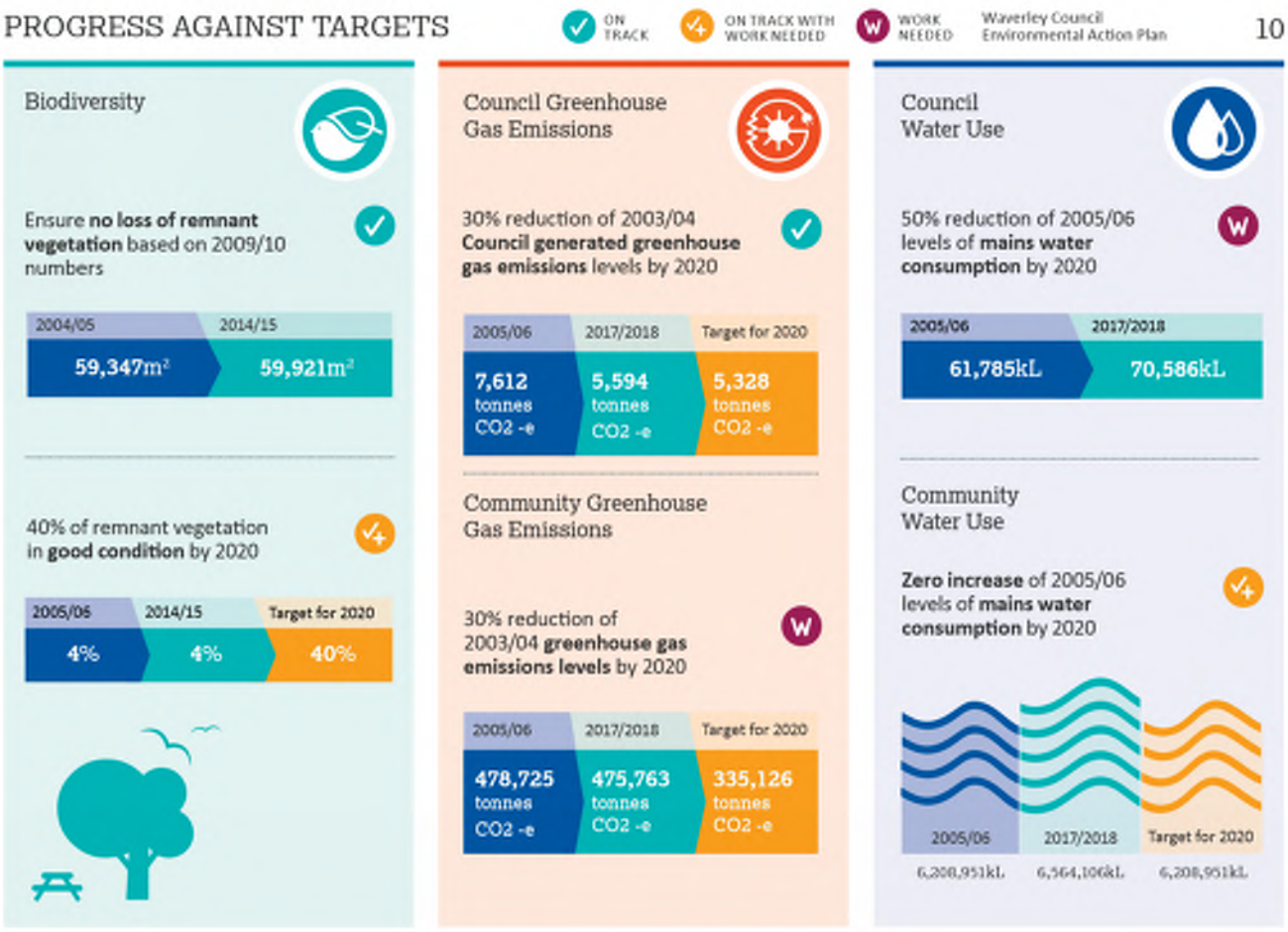

Waverly Environmental Action plan 2018 -2030

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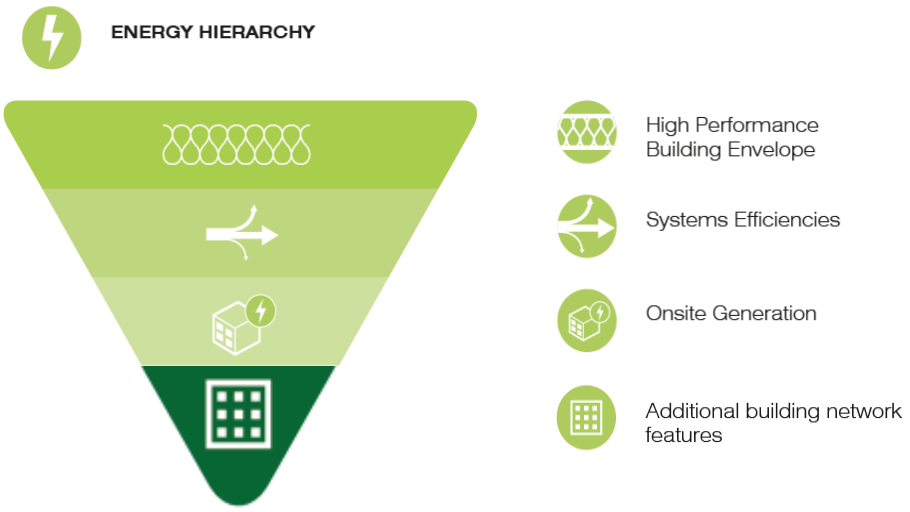
3.0 GHG Emissions Reduction

3.1 Passive design approach

The proposed approach to sustainability and energy related systems is based on applying an "energy hierarchy" methodology.

This methodology has the reduction of energy use as its priority, and then seeks to meet the remaining energy demand by the most efficient means available, before the inclusion of on-site generation and importation of green power.



The following initiatives are under consideration and their individual merits will be assessed further during future design stages:

- **Building Form:** To been designed with consideration of façade access for greater access to natural daylight and opportunities for natural ventilation, within the constraints of the site;
- **Passive design principles:** Will be employed to respond to environmental conditions of the building including orientation, solar access, prevailing winds, seasonal and diurnal temperatures changes;
- **Building envelope performance:** Airtightness and herma performance) will be enhanced in accordance with NCC (National Construction Code) 2019;
- **A Mixed Mode Ventilation strategy:** Will be accessed for improved indoor air quality, whilst also reducing energy consumption associated with air-conditioning. When external and internal conditions are favourable, external windows can open to facilitate natural ventilation;
- **Energy efficient LED lighting, zoning, controls and site co-ordination:** For both internal and external lighting systems;
- **Occupancy controls:** Be provided, so that AV, lighting and mechanical systems can be switched off (either manually or automatically) when spaces are unoccupied;

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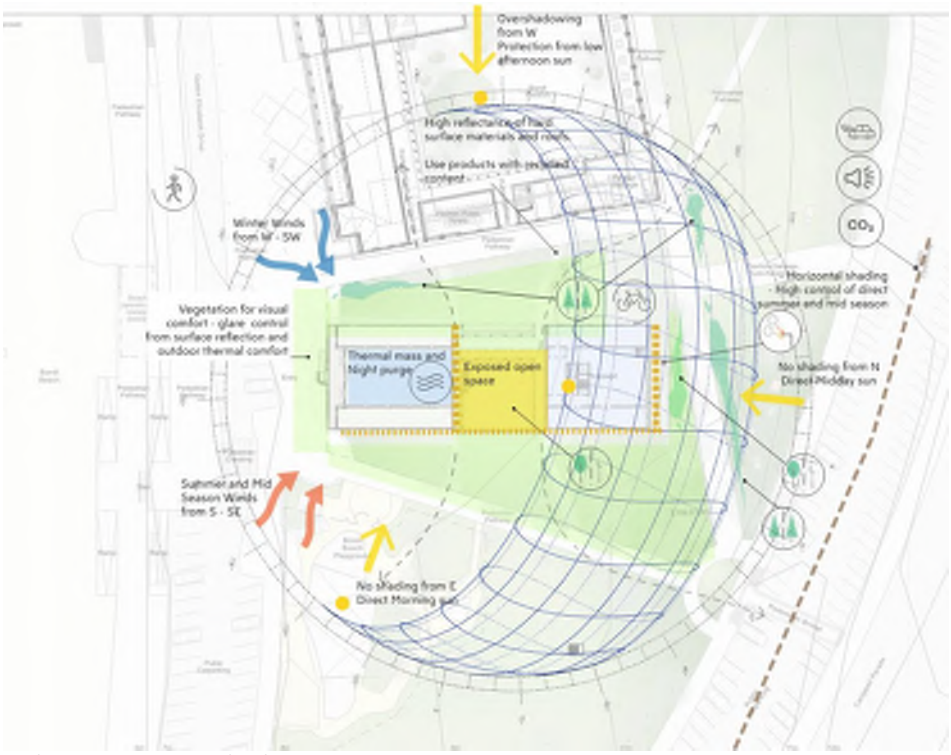
- **On site renewables:** A Solar photovoltaic (PV) array has been proposed and will be located on the roof. Energy generated onsite can be reused onsite;
- **High efficiency HVAC (Heating, Ventilation & Air-conditioning)** systems to be incorporated;
- **CO_2 monitoring:** to be considered where applicable in the appropriate control of outdoor air provisions.

The below diagram provides an overview of several key strategies intended to provide both a comfortable indoor and external environment.

- Most of the climatic conditions and site restrictions (noise, pollution) can be treated through vegetation. A careful selection of planting types will address wind issues, exposed to the direct sun facades and open areas;
- It's suggested to utilise thermal mass and 'night-purge' during warmer seasons in reducing the cooling demand for the following day. Night-purge is essentially the cooling down of exposed thermal mass within the building (concrete slabs, concrete walls) by allowing the natural ventilation openings to remain open during the night thereby drawing in cooler ambient air which cools down the exposed thermal mass (subject to security);
- Exposed external hard surfaces ideally to be of high reflectance value to minimise heat island effect and create a more comfortable outdoor environment.



Refer to Appendix A for full size site analysis plan

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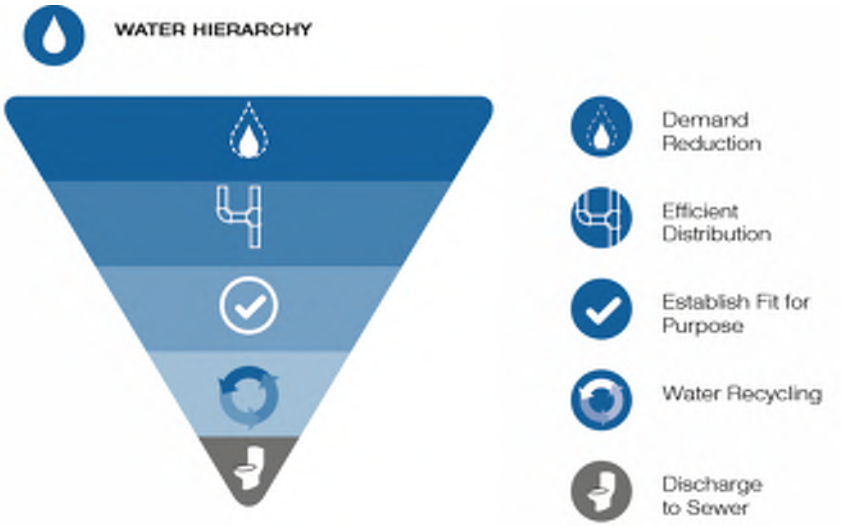
4.0 Water Reduction

The water hierarchy is the hierarchy of water conservation priorities. The hierarchy aims to firstly reduce water consumption, then re-use water for a secondary purpose without treatment, before finally through the recycling of water that requires a treatment process.



The following initiatives are under consideration and their individual merits will be assessed further during future design stages:

- **Reduced water demand 'at point of use'**:
  - Water efficient fixtures / fittings (such as taps, showerheads, toilets, zip taps, dishwashers etc certified under the WELL rating scheme);
  - Efficient low-flow fixtures and fittings;
  - Low water-intensive landscaping;
  - High-efficiency irrigation system;
  - Occupant awareness.
- **Reduce water use 'through efficient design'**:
  - Leak detection;
  - Metering.
- **Waverley Council recycled water storage:**
  - No rainwater tanks are proposed for the project;
  - Connection will be provided to Waverley Council's large non-potable storage system increasing efficiency and reducing maintenance.

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5.0 Material Selection

Selection of environmentally preferable materials is a key priority for the project as building materials consume energy and natural resources during its manufacture and for their transportation to the construction site. Choices of materials and construction methods can significantly change the amount of energy embodied in the structure of a building.

Low-impact construction methods such as offsite prefabrication/preassembly shall be applied where applicable. Prefabricated structures built in purpose-built factories are less labour intensive, more time efficient, and produce less waste compared to traditional onsite construction methods. Raw materials and construction elements are not exposed to the elements, which ensures high quality in the final building, and the construction process is less weather dependant.

Preference will be given to materials that contain high-recycled content and/or are highly recyclable. The following initiatives are under consideration and their individual merits will be assessed further during future design stages:

- **Use sustainable timber:** Timber products used for concrete formwork, structure, wall linings, flooring and joinery should be sourced where possible from reused, post-consumer recycled or FSC-certified, or PEFC certified timber;
- **Steel:** Specified to meet specific strength grades, energy-reducing manufacturing technologies, and off-site fabrication. Steel may be sourced with a proportion of the fabricated structural steelwork via a steel contractor accredited by the Environmental Sustainability Charter of the Australian Steel Institute;
- **Recycled concrete:** Reduce the use of Portland cement through substitutions. Fine and coarse aggregate inputs can be sourced from manufactured sand or

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other alternative materials, and the amount of Portland cement will be reduced within the concrete mix;

- **High recycled content or recyclability:** Furniture items with high recycled or recyclability content to be considered;
- **Site waste management plan:** During the demolition and construction phase, a project-specific site waste management plan (WMP) should be developed and implemented, for recycling of demolition and construction waste.

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6.0 Waste Reduction

Traditional waste disposal methods such as disposing to landfill and incineration can result in negative environmental effects such as surface water contamination, soil contamination, pollution, etc. The impact of these effects can spread far and wide from degradation/contamination of ecosystems to and human wellbeing.

The 'waste hierarchy approach' aims to firstly avoid and reduce the amount of waste generated, then to implement recycling and recovery strategies prior to disposing waste to landfill.

The following initiatives are under consideration and their individual merits will be assessed further during future design stages:

- **Operational Waste Management Plan;**
- **Future-Proofing Waste Infrastructure.**

Site Plan - Proposed

Overshadowing
from W
Protection from low
afternoon sun

High reflectance of hard
surface materials and roofs.

Use products with recycled
content

Winter Winds
from W - SW

Vegetation for visual
comfort - glare control
from surface reflection and
outdoor thermal comfort

Thermal mass and
Night purge

Exposed open
space

- Horizontal shading
- High control of direct
summer and mid season

No shading from N
Direct Midday sun

Summer and Mid
Season Winds
from S - SE

No shading from E
Direct Morning sun

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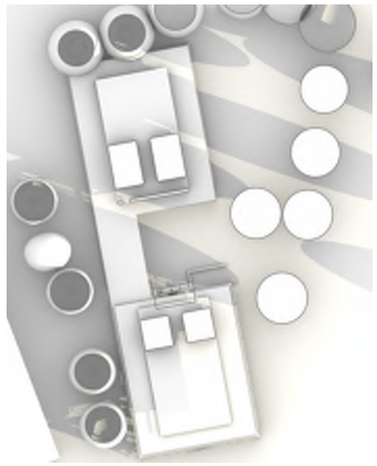
APPENDIX A

DEC - 6AM



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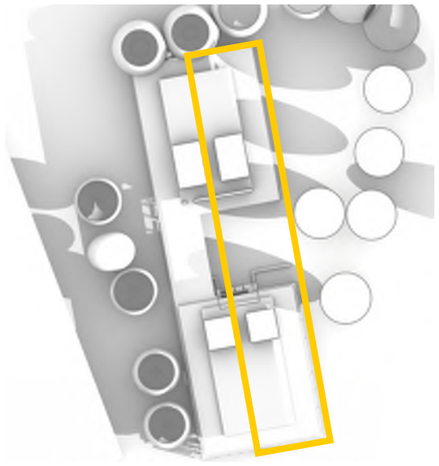

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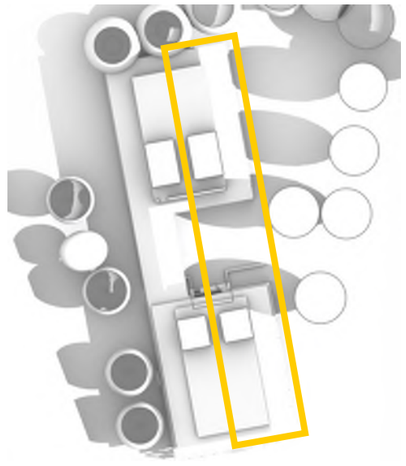

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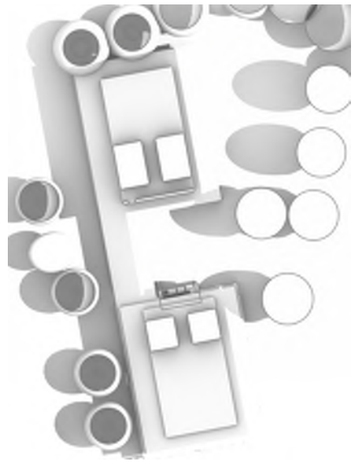

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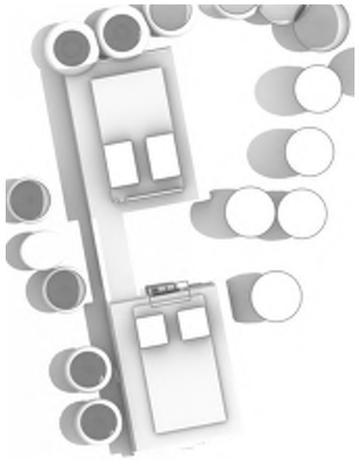

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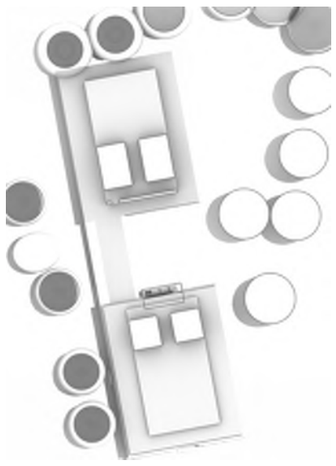

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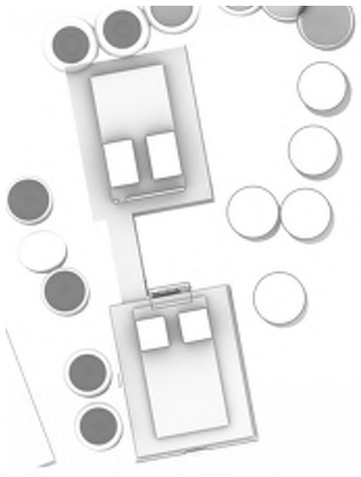

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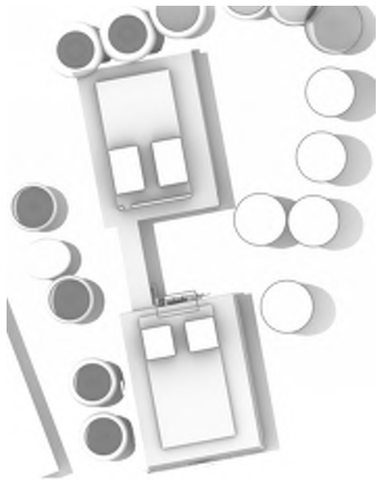

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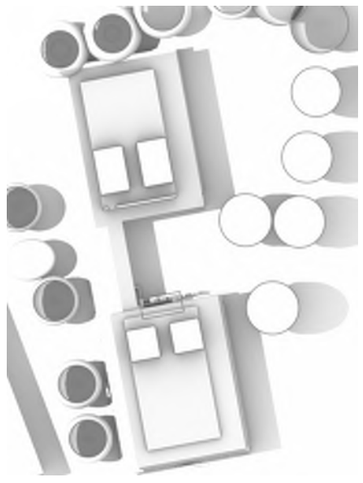

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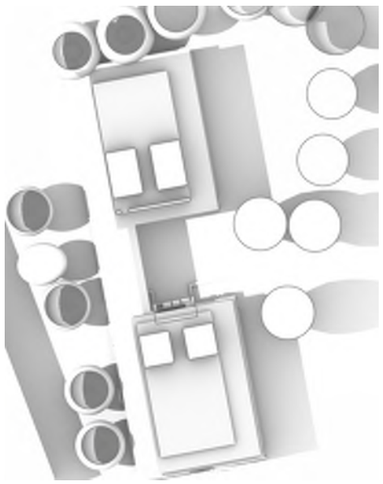

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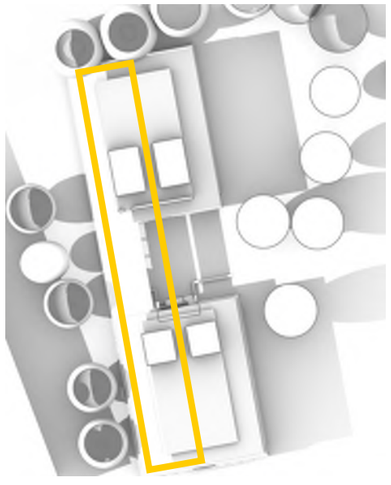

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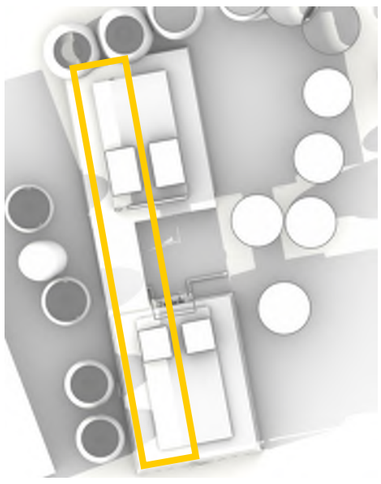

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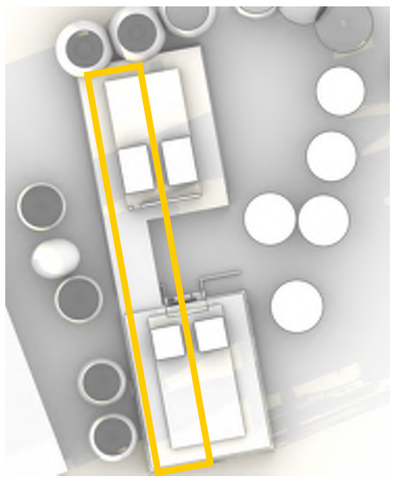

The sunpath diagrams represents the expected direct sun penetration within the current design. Periods of concern are highlighted in orange.

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APPENDIX B