STORMWATER DESIGN REPORT

PROPOSED SUMMITCARE
11-19 FRENCHMANS ROAD
RANDWICK, NSW

Revision 00
DECEMBER 2019

HENRY & HYMAS CONSULTING ENGINEERS PTY LTD
LEVEL 5, 79 VICTORIA AVENUE
CHATSWOOD NSW 2067
Tel: (02) 9417 8400
Fax: (02) 9417 8337
Our Job No. 19826
E-mail: email@hhconsult.com.au

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1. INTRODUCTION

This Engineering Report has been prepared to supplement the proposed Development Application (DA) to Randwick City Council for the proposed work for the Summitcare development located at 11-19 Frenchmans Road, Randwick (Figure 1).
The scope of engineering works includes stormwater drainage design and documentation for the proposed development. In particular, this report will illustrate compliance of the proposed system in accordance with the requirements under the Randwick City Council Private Stormwater Code.

Figure 1 – Locality sketch

2. SITE CHARACTERISTICS

The existing site is approximately 2710m² and is bounded by Frenchmans Road along the southern boundary, and McLennnan Avenue on the northern boundary, while it is surrounded by residential premises along the eastern and western boundaries.

The site is currently mostly impervious and occupied by buildings and houses with concrete pavement around. The site is found to be approximately 59% roofed, 29% hardstand and 12% landscape. The site currently generally falls in a northerly direction, although the obtained survey lacks on precise information about the existing stormwater for the main lot and the acquired properties.

3. PROPOSED DEVELOPMENT

The site is proposed to be re-developed with a new Summitcare building in the form of a vertical village, hence maintaining the current nature of the site. The site is proposed to have a building a new residential care facility spanning across the lot, with multiple habitable floors, one level of basement carpark and one level of storage basement. Refer to figure 2 for the proposed architectural layout.

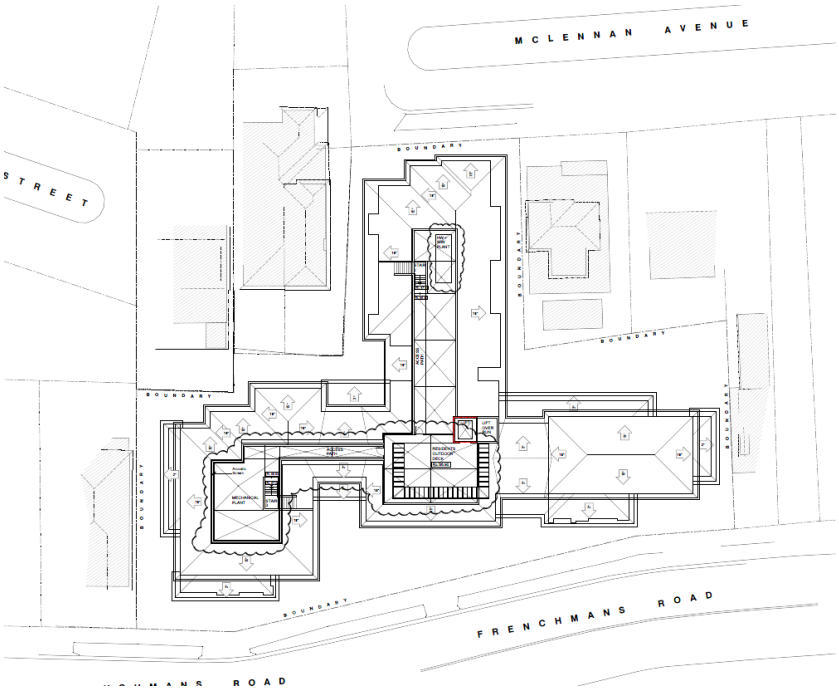


Figure 2 – Architectural Layout

The site is proposed to be 26% landscape, 11% hardstand and 63% roof. This represents an improvement in catchment nature in comparison with the existing site condition, which means that, unlike most developments, this site is proposing a reduction in paved area.

4. STORMWATER MANAGEMENT

The objective is to provide stormwater controls which ensure that the proposed development does not adversely impact on the stormwater flows and water quality of waterways within, adjacent and downstream of the site.

4.1 Stormwater Quantity

The drainage system has been designed to collect all concentrated flows from the future building pad and impervious surfaces such as driveways, footpaths and roof areas. The piped drainage system has been designed generally to convey the 1 in 20 year ARI with adequate provision for the 1 in 100 year ARI to be safely conveyed overland.

In accordance with Randwick City Council Private Stormwater Code, the proposed site requires the implementation of on-site detention (OSD) to control the stormwater discharge to the kerb.

The roof catchment is designed to be discharged into the two OSDs on site, with a distribution of approximately 40% and 60% of the roof being connected to OSD1 and OSD2 respectively.
The stormwater network for the surrounding landscape outside the building is proposed to be conveyed from the front of the site through a system of pits and pipes and a swale to the closest stormwater pits. The landscape catchment is to bypass the detention as it is 100% pervious area, although it has been integrated into the model to ensure a total final discharge of 25L/s from the site.

The permissible site discharge (PSD) for the development has been adopted to be 25L/s up to and including the 20 year ARI design storm, given the adoption of a kerb outlet into McLennan Avenue, in accordance with section 3.1 of Randwick City Council Private Stormwater Code.

The storage volume has been determined using the Mass Curve Technique, which resulted in a requirement of 108m³ of storage volume, as per Randwick City Council Private Stormwater Code. For OSD volume calculations, refer to drawing 19826_DA_C211.
The overland flow path is also being conveyed by means of a swale around the perimeter of the site to ensure all overflows from storms larger than the design storm, up to the 1 in 100 year storm is safely routed on the site.

The adopted configuration for the tanks is to have two separate concrete tanks (refer to drawing 19826_DA_C100), to which all downpipes are connected from the roof. The tanks are proposed to be located on the underside of the ground floor slab, hanging from the ceiling into the basement carpark. The access points for inspection and maintenance of the tanks will be through stormwater pits located on the top of the tanks, which will be accessible from the ground floor terraces.

4.2 Stormwater Quality

Urban developments have the potential to increase gross pollutants, sediments, hydrocarbons and nutrient concentrations in stormwater runoff. To limit impact on the downstream water quality, water quality measures at source and end of line treatments will be provided. This section describes the specific implementation of these measures for the proposed development.
Water quality measures will be implemented for the site to ensure that stormwater runoff is treated sufficiently prior to discharge to the downstream stormwater system.

The site is found to provide an improvement in the nature of the type of ground, as the landscape area will be increased from 12% to 26% of the total site area.

The majority of the site is comprised of roof area directed to the two OSDs, which are fitted with trash screen filters at the outlet points. The larger tanks (OSD1) also provides, in the most downstream chamber, a sedimentation pit to further reduce the pollutants leaving the system.

Furthermore, the basement levels are designed to collect all stormwater to a pump out pit located on the lower basement. The pump out pit has been sized to cater for the stormwater from the basement ramp/driveway that is not covered by roof. This pump out pit is designed to perform as a sediment pit, which will further reduce the pollutant entering the OSD upon emptying of the pit.
Two 10kL Rainwater tanks are proposed upstream of the OSD to collect the roof water for reuse. The use of rainwater tanks is an important part of the overall water quality treatment train for the site as rainwater stored will be used for irrigation of the landscape surrounding the building. An appropriately sized first flush and overflow system will need to be designed and detailed by the hydraulic consultant at CC stage.

The remaining area of the site is comprised of landscape area, which is diverted through grass swales with subsoil to the closest downstream stormwater pits. The swale is designed to allow infiltration, which will reduce the amount of overflowing stormwater on the surface. Pits along the swale or/and at the downstream point are also to be fitted with Oceanprotect pit baskets or approved equivalent, to ensure that the stormwater that is not

filtered through the ground is still treated prior entering the stormwater network. Refer to drawing 19826_DA_C100 for exact locations.
Oceanprotect pit baskets will assist in the water quality treatment for the site by capturing a large portion or gross pollutants, large sediment particles and organic matter that may also contain nutrients.

5. MAINTENANCE AND MONITORING

To ensure the continued efficient and correct operation of the proposed integrated water management infrastructure, a 'maintenance and monitoring schedule' is included in the Appendix B of this plan. The schedule details the frequency of inspections, what is to be inspected and what rectifications to make if required for the water management infrastructure located within the proposed development. The schedule is to be implemented upon commissioning of the water management infrastructure and remain in place for the life of the development; with all records kept on site for inspection should the approval authority deem it necessary.

6. CONCLUSION

It is usually inevitable that a re-development will have an impact on the existing landform and stormwater runoff characteristics due to earthworks, change of land-use and changes in impervious areas. By providing a safe and efficient design, and implementing appropriate measures during construction and operation of the development, it can be ensured that there will be minimal impact on the existing environment and no impact on the existing stormwater network as a result of the proposed development.

The design provides safe and efficient vehicular and pedestrian areas for the proposed development which will be sympathetic to the needs of the users. Design efficiencies have been adopted to ensure a balance between retaining wall heights and extents of earthworks, whilst maintaining grades that are considerate to the end user. These efficiencies assist in minimising construction costs and to minimise the impact on local landfill resources.

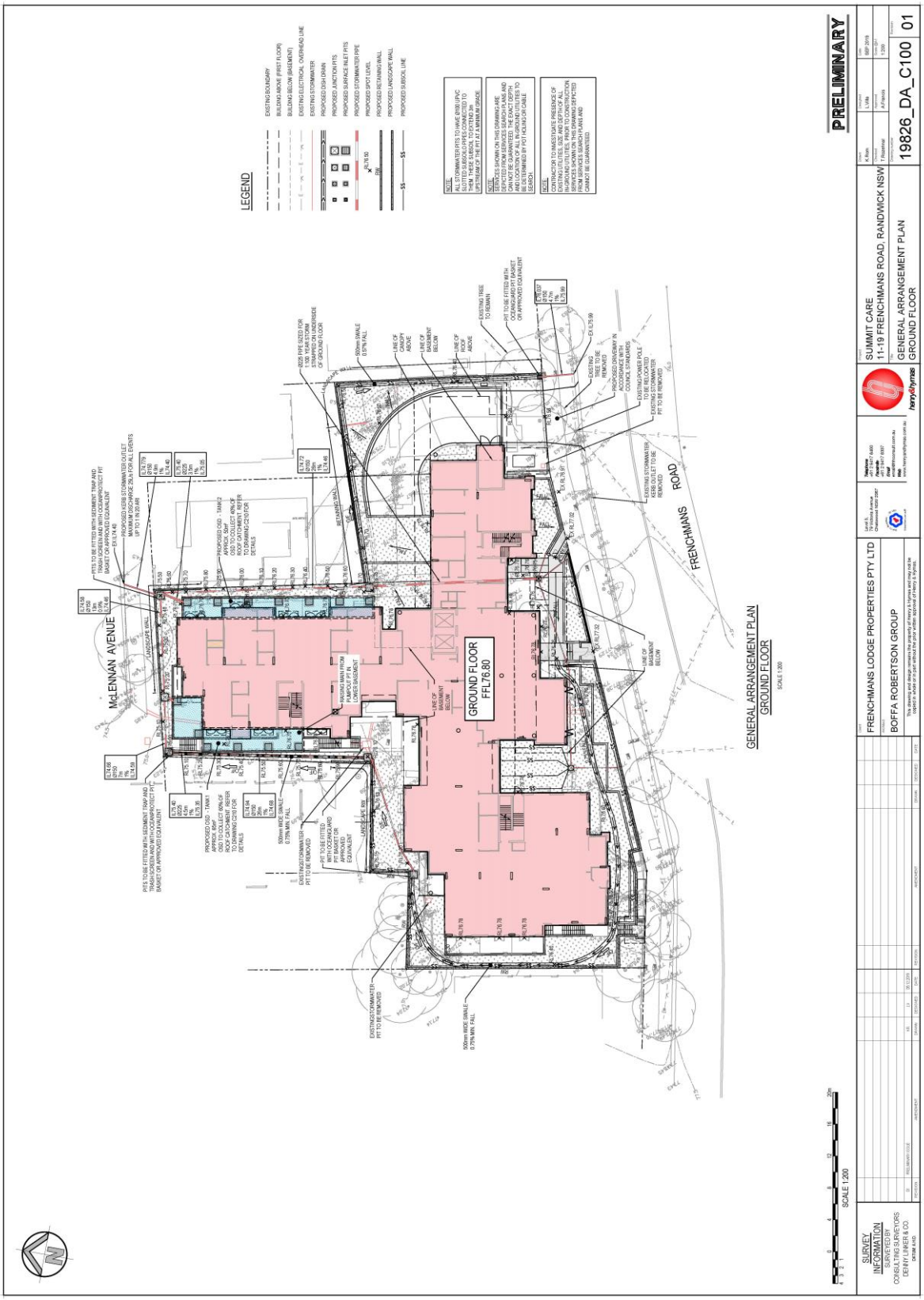
Appropriate stormwater management practices are proposed to be implemented, in order to minimise the impact of the proposed development on the existing stormwater system, whilst ensuring safe and efficient conveyance of runoff and the provision of adequate freeboard to habitable areas.

By providing a design which is in accordance with both Randwick City Council's requirements and best practice principles, it can be ensured that there will be minimal impact on the existing environment as a result of the proposed development.

REFERENCES

- INSTITUTION OF ENGINEERS, AUSTRALIA - "Australian Rainfall and Runoff", 1987, Volume 1 and 2
- Randwick City Council Private Stormwater Code
- Randwick City Council Development Control Plan (DCP) 2013

APPENDIX A – GENERAL ARRANGEMENT PLAN



APPENDIX B – MAINTENANCE AND MONITORING SCHEDULE

WATER QUALITY MANAGEMENT PLAN
11-19 FRENCHMANS ROAD
RANDWICK NSW

PROPOSED WATER QUALITY MEASURES:

- **STORMWATER PITS AND PIPES**
- **OSD TANKS**
- **PUMP OUT PIT**
- **RAINWATER TANKS**
- **SEDIMENTATION PIT**
- **GRASS SWALE**

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
STORMWATER PITS AND PIPES			
Pits, grated drains and pipes around the site	Annually	Maintenance Contractor	Check pits, grated drains and pipes for blockages. Remove debris and flush pipes if required.
Check step irons for corrosion	Annually	Maintenance Contractor	Remove grate, examine step iron and repair any corrosion or damage.
Check fixing of step irons is secure	Six monthly	Maintenance Contractor	Remove grate and ensure fixings are secure prior to placing weight on step iron.
OSD TANKS			
Orifice blockages	Every 6 months	Owner	Inspect and remove any blockage from orifices by removing debris screen and inspecting the outlet orifice. Refer to the general arrangement plan for outlet location.
Orifice plate	Once a year	Owner	Check the attachment of the orifice plat to the wall of the tank/chamber/pit to ensure the plate is mounted securely. If plate is found to be loose, tighten the fixings and seal any gaps.
Orifice sharpness	Every 5 years	Owner	Measure and ensurethe orifice diameter is as per work-as –executed plans. Check for the orifice to be sharp, not pitted or damaged.
Debris screen inspection	Once a year or after very heavy rain	Owner	Remove debris screen and clean from residuals. Examine the screen for rust and/or corrosion especially at the corners or welds. Ensure screen fixings to the wall/chamber/pit are secure and repair if found otherwise.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
OSD walls inspection	Once a year	Owner	Inspect tank walls inside and outside (if applicable) for cracks or spalling and repair as required. Also clear of any vegetation if present.
Outlet sump and outlet pipe	Every 6 months	Owner	Check for corrosion and remove any sediment build-up. Check the outlet pipe is clear and confirm pipe drains freely by flushing the outlet pipe.
PUMP OUT PIT			
General maintenance	Annually	Maintenance contractor	Check the sump pit for any debris that could interfere with the pump's operation. Check if there is an oil spill on the water surface, as this could be a sign that the pump is releasing coolant and may need a replacement. Check for frayed wires or exposed connection and have them repaired by a licenced electrician. Test the pump by adding a few liters of water in the pit, enough to trigger the pump to start operating. If the pump does not activate, check again for debris and any blockages.
RAINWATER TANKS			
Gutters	As per supplier recommendations	As per supplier recommendations	Check the gutter and downpipes that divert water from the roof to the tank to not be blocked by leaves and sediment.
Others	As per suppliers recommendations	Maintenance Contractor	Refer to manufacturer or tank suppliers recommendations
SEDIMENTATION PIT			
General maintenance	Annually	Maintenance contractor	Clear out the sump in the pit from the accumulated debris.
GRASS SWALE			
Sediment deposition	Three monthly or after heavy rain	Maintenance contractor	Remove sediment build up from swale and in and around trees.
Holes or scour	Three monthly or after heavy rain	Maintenance contractor	Infill any holes in the turf/grass area. Check for erosion or scour repair. Provide energy dissipation (eg. Rocks and pebbles at inlet) if necessary.
Litter control	Three monthly or after heavy rain	Maintenance contractor	Check for litter (including organic litter) in and around the swale area. Remove both

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
			organic and anthropogenic litter to ensure flow paths are maintained.
Pests and diseases	Three monthly or after heavy rain	Maintenance contractor	Assess plants for disease, pest infection, stunted growth or senescent plants. Treat or replace as necessary. Reduced plant density reduces pollutant removal and performance.
Maintain original plant densities	Three monthly or after heavy rain	Maintenance contractor	Infill planting – between 6 and 10 plants per square meter should be adequate (depending on species) to maintain a density where the plants' roots touch each other. Planting should be evenly spaced to help prevent scouring due to a concentration of flow.
Weeds	Three monthly or after heavy rain	Maintenance contractor	Inspect for and manually remove weed species. Application of herbicide should be limited to wand or restrictive spot spraying due to the fact that the swale is directly connected to the waterways.
Inspection after rainfall	Twice a year after rain	Maintenance contractor	Occasionally observe the swale system after a rainfall event to check infiltration. Identify signs of poor drainage (extended ponding). If poor drainage is identified, check land use and assess whether it has altered from design capacity (eg. Unusually high sediment loads may require installation of a sediment forebay).

Site Operator needs to prepare:

- an emergency liquids spill management procedure which includes notification of relevant agencies, including the Sydney Catchment Authority;
- records of inspections, monitoring and maintenance program, and the frequency of such activities for the forecourt area and site stormwater management system, including stormwater pits, rainwater collection and reuse system, the collection and disposal of oily liquids captured in the oil-water separator, and underground tank monitoring equipment;
- records of water quality monitoring results;
- the identification of the individuals or positions responsible for inspection, monitoring and maintenance activities including a reporting protocol and hierarchy, and procedures for managing and notification of water quality emergencies;
- check lists for recording inspections, monitoring and maintenance activities including the disposal of oil.

These reports shall be submitted for the first year with future requirements to be determined by system performance to establish clear and appropriate management processes for water quality systems that have the potential to adversely affect the environment and quality during the operational stage of the development so as to ensure a sustainable neutral and beneficial impact on water quality over the system's lifetime.

For, and on behalf of,
H & H Consulting Engineers Pty Ltd

Our Ref: 19826 Date: 11 December 2019