STORMWATER MANAGEMENT PLAN

TriCare (Hastings) Limited
Lot 1 DP 786570
87-89 Tweed Coast Road, Hastings Point

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AGED CARE FACILITY DEVELOPMENT
87-89 Tweed Coast Road, Hastings Point
LOT 1 DP 786570

TABLE OF CONTENTS

1.0 Introduction

1.1 General Introduction

Cozens Regan Group Pty Ltd has been commissioned by TriCare (Hastings) Limited to prepare a Stormwater Management Plan for the proposed Aged Care Facility Development at 87-89 Tweed Coast Road, Hastings Point.

A Senior Housing Development was approved on the subject land in May 2007 by Tweed Shire Council. The development was commenced in 2009 by another provider. The constructed stage incorporates 91 independent living units across three buildings with basement car parks.

TriCare subsequently purchased the site in 2011 and currently operate the existing development.

The remaining stages, which comprised 94 supported living units and 67 residential aged care beds across 4 buildings, has never been built. Nevertheless, the consent remains valid.

TriCare has reviewed the balance of the approved development and concluded that the design no longer responds to the contemporary vision of senior living needs and requirements - including the quality of accommodation, allowance for lifestyle amenity, provision of greater passive and active communal spaces and the support and encouragement of age in place principles.

Accordingly, TriCare has elected to review the balance of the master plan and embark on a new delivery outcome for the balance stages of the Aged Care Facility community.

This plan is to provide an impact assessment, and any amelioration measures required to offset any potential adverse impact.

It is noted that the initial stage of the original development approval has already been constructed and thus some consideration has been made to this with regards to servicing of the remaining stages of development with the stormwater management requirements for the initial stage expected to have already been installed in accordance with the previously approved Stormwater Management Plan.

1.2 Scope of Plan

The development impact on the peak discharge and runoff and details of any measures required to comply with the council's requirements is documented. The determination of the pollutant loads generated from the site will not be calculated in this plan as the provisions of Section D.7.12 will be used to determine the size of the required treatment device. The remedial measures to treat the runoff, to ensure compliance with the provisions within the Tweed Urban Stormwater Quality Management Plan", specifically annexure D7 –"Stormwater Quality" are also documented.

1.3 Site Description

The TriCare Hastings Point development site is located at 87-89 Tweed Coast Road, Hastings Point, Lot 1 DP 786570 Parish of Cudgen and County of Rous.

The 37,390m^2 site is located at the southern end of the Hastings Point. Hastings Point is predominantly a low-scale coastal settlement providing a range of recreational, holiday and residential opportunities.

The site is surrounded by public open space and environmental land including Cudgera Creek to the west, Cudgera Beach and dunal foreshore to the east and the Pottsville Environmental Park to the north and south. An existing Service Station adjoins the site's south-east.

The site is cleared of all existing structures and falls to the rear towards Cudgera Creek. A detailed survey of the site has been carried out, a copy of which is contained in Appendix B.

The subject property is shown below, with the approximate property highlighted in red and the approximate site extent highlighted in green.

Figure 1 – Locality Image – Google Earth

1.4 DESCRIPTION OF DEVELOPMENT

The TriCare Hastings Point development comprises both independent living units (ILUs) and a residential aged care home (RAC) home, that will be supported by a range of other services.

Specifically, the proposal includes:

- A 47 place RAC (Building D) comprising:
  - individual private rooms with ensuites facilities.
  - shared dining, lounge and sitting rooms.
  - café.
  - kitchen.
  - serveries.
  - nurses' stations.
  - offices.
  - staff room and facilities.
  - waste room; and
  - loading bay.
- 51 ILUs split across 3 buildings, including:
  - 24 ILUs in Building E
  - 18 ILUs in Building F
  - 9 ILUs in Building G.

Complimenting the ILUs and RAC, the development offers a range of communal facilities for entertainment, health, active and passive recreation. These facilities include:

- Bowling Green and pavilion with bowls store, amenities, kitchen and covered seating area.
- Indoor swimming pool and spa, with amenities and viewing area.
- Perimeter walking trail; and
- Landscaped gardens.

The proposed development will provide an important contribution to supporting the need for seniors' accommodation and care within the Kingscliff locality.

No changes to the existing Stage 1 development are proposed.

Refer to the Architectural Plans contained within Appendix C.

2.0 Stormwater Management Plan – D7 Requirements

The following documentation and assumptions have been used in the preparation of the Stormwater Management Plan. Plans 220450/SK12 and should be read in conjunction with the details contained within this document.

2.1 Adoption of Annexure A

Analysis of the impacts of the proposed development have been determined in accordance with the provisions of Annexure D7 "Stormwater Quality" and this plan should be read in conjunction with Drawings 220450/SK12. Notwithstanding these requirements, Annexure A "Code of Practice for Soil and Water Management on Construction works" has and should be adopted as the minimum requirements. Consideration of this reference material has been used in the preparation of this document.

2.2 Existing Site Drainage and Catchments

Drainage from the site is proposed to be collected in a piped system and directed to Cudgera Creek. The proposed legal point of discharge is Cudgera Creek.

The site is not subject to the influence of any external catchments. Currently discharge from the site is by sheet flow to Cudgera Creek.

The existing site area is 3.781ha which comprises vacant land and a developed portion of the site. The developed portion of the site has a collection system that already discharges via a pipe system to the legal point of discharge.

The proposed development area has a catchment area contributing to the drainage system in the order of 1.397 ha. The development are is propose to consist of impervious roof area, car park, driveway and landscape areas. This catchment is divided into four (4) sub-catchments which are assessed in section 3.4 of this report.

The roof area will discharge to the legal point of discharge without treatment. The driveway area subject to rainfall will require treatment of the runoff by an oil and grit separator.

2.3 Operational Requirements

During the Operational phase treatment is required to minimise the impact of Suspended Solids, Nutrients (Total Phosphorus and Total Nitrogen), litter and oil and grease. The provisions of Table 5.4 of the "Tweed Urban Stormwater Quality Management Plan" define the discharge criteria to be satisfied for the operational phase of any new development. The relevant objectives are tabulated in the table below:

Pollutant			
Nutrients	Maximum permissible load that may be discharged kg/ha/year		
	Average year (1719mm)	Wet Year (2185mm)	Dry Year (929mm)
Suspended solids (SS)	300	400	120
Total Phosphorus (TP)	0.8	1.1	0.35
Total Nitrogen (TN)	4.5	6	1.5
Litter	Retention 70% of annual litter load greater than 5mm		
Coarse sediment	Retention of 90% of annual load of sediment coarser than 0.125 mm		
Oil and grease (hydrocarbons)	<10 mg/litre in flows up to 40% of Q1 peak.		

Calculations for the pollutant generated and the treatment methods and expected results of the treatment are detailed in **Section 3**.

The impact on discharge from the site, due to increased impervious area is also considered in **Section 3**.

3.0 Stormwater Management – Operational Phase

3.1 Water Quality Parameters

Appendix F of the NSW EPA publication "Managing Urban Stormwater: Council Handbook (Draft), December 1997", recommends that the modelling approach for this size development be a Level 1 assessment. Assessment of the average annual storm load is required, and the treatment determined.

The buildings, driveways, car parks and landscaping areas, will generate pollutants. The base data adopted for this assessment is:

- Average annual rainfall 1719 mm/year
- Runoff coefficient for impervious areas 0.9
- Runoff coefficient for landscaping areas 0.5

3.2 Water Quality Assessment

The drainage system is proposed to discharge to the existing stormwater network and the receiving body of water for this system is Cudgera Creek.

No investigations of the downstream area have been taken to establish a baseline since the design discharge parameters have been given by the "Tweed Urban Stormwater Quality Management Plan".

The primary pollutants of concern as a result of this development are:

- Sediments
- Nutrients
- Oils and grease

The following sections assess pollution generation and detail methods of treatment.

3.2.1 Treatment Goals

The provisions of the "Tweed Urban Stormwater Quality Management Plan" need to be satisfied for the Operational Phase of the project. As such the water quality objectives, for the hard stand areas only, as detailed in Table 5.4 of the "Tweed Urban Stormwater Quality Management Plan, equate to the following discharge criteria for an average year. Some consideration must be given to the car park area, which would be subject to periodic cleaning:

- Suspended Solids (SS) 163.8 kg/year
- Total Phosphorus (TP) 0.436 kg/year
- Total Nitrogen (TN) 2.457 kg/year

These water quality goals are to be achieved prior to discharging into the drainage system. Treatment of the runoff collected from the roof drainage is not required.

Using the "deem to comply" provisions of Section D.7.12 of the "Tweed Urban Stormwater Quality Management Plan a proprietary device can be determined on size and the treated pollutant loads not required to be determined. It therefore is proposed to provide a treatment device, for the removal of suspended solids and nutrients using this method.

3.2.2 Oil and Grit Separator

The potential for sediment generation and oil/grease within the driveways and car parks warrant the consideration of primary treatment in the form of an Oil and Grit Separator. This should be located at the collection point prior to discharging into the existing system (Refer to drawings 220450/SK12, Sk13 & SK14).

Oil and Grit Separators have varying efficiencies of pollutant removal dependant on the type of unit selected, however the use of a grease trap (or equivalent) is proposed. The minimum wet well size for each catchment is tabulated below. The size of the wet wells was determined using the requirements of Section D7.12.

Catchment No.	Road Area (Ha)	Sediment Capacity m^3	Oil Capacity m^3	Proposed Device
A	0.087	0.78	0.174	Humeceptor STC2
B	0.00	-	-	N/A
C	0.00	-	-	N/A
D	0.153	1.37	0.306	Humeceptor STC3

The installation of closely spaced grated stormwater inlets should also be considered to assist in the removal of the gross pollutants (rubbish, leaf matter, etc.). Management of these structures will require regular maintenance and details for this are outlined below.

3.3 Water Quality Management

3.3.1 Objectives

The objectives are to provide a stormwater drainage system that reduces the impact of the development compared with the existing pre-development loads. Management practices to assist in the reduction of the reliance on the primary treatment structures will be implemented.

Provision of long-term water quality monitoring for this development is considered impractical and is not proposed.

3.3.2 Maintenance Control Measures

The Contractor/Builder is responsible for the installation and maintenance of the primary control measures during the construction phase and the defects liability period.

Maintenance responsibilities for the operating life of the project revert to the Owner/ business operators once the defects liability period has expired.

Maintenance will require:

a) Regular sweeping and rubbish removal from the driveway and landscaped areas, including rubbish removal from the grated stormwater inlets. This should be done visually on a daily basis.
b) Monitoring the oil and grit separator regularly and inspecting at least every three (3) months and after every storm event large enough to produce runoff.
c) Cleaning out the oil and grit separator when the storage capacity has been reduced by 30%.
d) Collect all litter, cuttings and leaf litter for composting or disposal off site.

3.4 Discharge Management

This section deals with the change in characteristics of stormwater runoff as a result of the proposed development. The increase in impervious area will result in an increase in the peak discharge and also the volume of runoff.

The controlled catchment area of 1.13ha will discharge directly to the proposed infiltration trenches. The post development phase will result in an increase in the impervious area of land and subsequently will result in an increase in the peak discharge and volume of runoff.

Council's requirements for development in this estate are clear. Runoff for the ARI 3-month storm is to be collected and discharged via an infiltration trench. The rate of infiltration has been set at 3m/day while the detention time for all captured runoff is to be limited to 24 hours. Surcharge from the system runoff is to be controlled by a visible overland flow path.

The discharge rate is to be limited to the pre-development flow rates for each catchment and assessment of the flow rate required for the total development site is carried out in section 3.4.1.

3.4.1 Peak Discharge Summary

The increase in impervious area will result in an increase in the peak discharge and also the volume of runoff. Discharging runoff via infiltration will reduce the impact of the increase in stormwater discharge from the site. The existing and proposed stormwater runoff rates have been estimated for the development as follows:

		Pre Development					Post Development				
Catchment	**ARI**	**Area (ha)**	**C**	**Tc Min**	**I (mm/hr)**	**Q (m^3/s)**	**Area (ha)**	**C**	**Tc Min**	**I (mm/hr)**	**Q (m^3/s)**
Total	5	1.397	0.75	10	154	0.407	1.397	0.80	6	186	0.527
	100	1.397	0.96	10	236	0.868	1.397	1.00	6	284	1.088

The proposed development will increase the impervious fraction discharging from the total catchment and subsequently increase's the proposed runoff. Proposed runoff is to be captured by on site piped drainage and directed to the infiltration areas.

An increase in discharge for the major event, from 0.868m^3/s to 1.088m^3/s, is in the order of a twenty five percent (25.4%) increase. To provide a pre-development discharge rate, detention in the order of 105.6m^3 would be required.

The proposed infiltration areas to satisfy council requirements for the ARI 3 months infiltration area will be greater than the detention required to offset the post-development flow rate.

No further mitigation of the discharge from the site is required for the major storm events.

3.4.2 On Site Detention

The onsite detention required for the ARI 3-month storm based on the discharge for an infiltration trench with a total floor area of 235 square meters.
It should be noted that an increase in floor area for the trench would increase the rate of discharge.

Using Basha's Equation the total required storage volume to cater for the future stages of the development is calculated as **230 m^3** for the storm duration of between 1 & 3 hours. Detailed calculations are contained in **Appendix A**.

The onsite detention is to be provided by a series of infiltration pits and drainage system comprising property pits and stormwater lines

The size of the required infiltration pits is tabulated below.

Catchment No.	Building Area (ha)	Road Area (ha)	Total Catchment Area (ha)	Detention for Infiltration (m^3)	Infiltration Basin Area (m^2)
A	0.1237	0.087	0.3727	61.5	62
B	0.2707	-	0.2707	45	45
C	0.2980	-	0.298	45	45
D	0.2138	0.153	0.4375	78.8	80

3.4.3 Infiltration Pit

The onsite detention required is proposed to be catered for in the infiltration pit. The field grates to be installed on site are to allow for filtering of the collected water. The location of any pits is not shown on the Stormwater Management Plan, as they will be a function of the landscaping which has not been documented at this stage.

The infiltration trench specified on the Concept Stormwater Management Plan is the Atlantis “Filtration” and “Cell Matrix” products however other products such as the Everhard “Everglas” and “Ausdrain” are also considered acceptable. Construction of a rubble infiltration pit is also acceptable however the volume required is to be forty percent larger than designed to allow for the volume of the clean gravel.

4.0 Conclusion

There is a need to provide mitigation of the peak stormwater discharge to satisfy Council's conditions. Meeting the water quality objectives, as set out by the Tweed Shire Council is one of the primary objectives and all aspects have been considered. The potential impact on the quality of receiving waters for this project is to be mitigated as follows:

a) Provision of Oil and Grit Separator's to improve discharged water quality from the carpark hardstand areas during the operational phase.

b) Provision of infiltration pits to comply with Council's requirements, with the need for the mitigation of the ARI 3-month stormwater discharge. The major event discharge (ARI-100 year) will also be mitigated to less the pre-development discharge rate with the installation of the proposed infiltration areas.

c) Management of operations of the site during the lift of the development to minimise the potential pollutant loads.

The implementation of standard industry site practices is considered satisfactory for this development.

References

1. NSW, Environment Protection Authority, 11/97, "*Managing Urban Stormwater: Council Handbook, (Draft)"*.
2. NSW, Environment Protection Authority, 11/97, "Managing Urban Stormwater: Treatment Techniques".
3. The Institution of Engineers, Australia, Queensland Division, December 1996, "Soil Erosion and Sediment Control, Engineering Guidelines for Queensland Construction Sites".
4. NSW Department of Housing, 8/98, "Managing Urban Stormwater: Soils and Construction".
5. Brisbane City Council, Feb 2000, "Sediment Basin Design, Construction and Maintenance".

APPENDIX A

OSD Calculations and
Infiltration Pit Calculations

A.1 On Site Detention Storage Requirements

Use the Basha Equation, QUDM Section 6.06.1, to calculate the storage volume required to attenuate the ARI 3 month storm discharge.

Details of the Basha Equation are as follows:

$$V_s / V_i = r (2 + r) / 3$$

Where V_s = storage volume required
V_i = volume of inflow to storage
r = reduction ratio
= $(Q_i - Q.) / Q_i$

Where Q_i = incoming discharge to storage
Q_o = allowable outflow from storage

Inflow volume, V_i, is estimated as follows:

$$V_i = 4 t_c Q_i / 3$$

A.1.1 Catchment A

The rate of infiltration and the floor area of the trench determine the allowable discharge. A floor area of 65 m^2 is to be adopted thus the discharge rate is:

Allowable discharge from storage = Infiltration rate x Floor area
= 0.00003 x 65
= 0.0019 m^3/s

Hence Q_0 = 0.0019 m^3/s

The required storage volumes for various duration storms are as follows:

The required storage volumes for various duration storms are as follows:

t_c (mins)	I (mm/hr)	Q_i (m^3/s)	Q_o (m^3/s)	r	V_i (m^3)	V_s (m^3)
50	17.3	0.017829	0.001950	0.89	72	61.5
60	15.6	0.016077	0.001950	0.88	65	54.2
75	13.6	0.014016	0.001950	0.86	56	46.3
90	12.2	0.012573	0.001950	0.84	51	40.5
120	10.19	0.010501	0.001950	0.81	42	32.3
180	7.89	0.008131	0.001950	0.76	33	22.9
240	6.57	0.006771	0.001950	0.71	27	17.6
300	5.71	0.005884	0.001950	0.67	24	14.1
360	5.08	0.005235	0.001950	0.63	21	11.5

Therefore adopt a storage volume of 62 m^3 to ensure that the ARI 3 month storm is captured and detained for infiltration

Infiltration Pit

Use the infiltration equations contained in Section 9.4.5 of "Managing Urban Stormwater – Soils and Construction", to calculate the appropriate dimension for the infiltration pit. It should be noted that the equations produced by OMEE 1994 only allow for infiltration through the base of the trench.

Details of the equations from OMEE are:

$$D = PT$$

Where D= maximum allowable depth (m)
P = infiltration rate (m/hr)
T = draw down time (hr)

Thus D = 0.125 * 24
= 3.0m

It is proposed to provide an infiltration pit with a floor area of 62 m^2. The depth required to provide the volume of storage as detailed above is 1.0 m. This value is less than the

maximum depth allowable. Using the above equation and determining for the design depth the draw down time is calculated as 8.33 hours. This is less than the required time of 24 hours.

Increasing the surface of infiltration enhances the pollutant removal. Since removal of some of the pollutants via the collection pit is proposed this is not considered critical, however the optimum area should be considered:

$$A = 1000V/(Pnt)$$

Where
A = bottom area of trench (m^2)
V = runoff volume to be infiltrated (m^3)
P = percolation rate (mm/hr)
n = porosity of the storage media (0.6 assumed)
t = change in detention time (hr)

Thus
$A = 1000* 62/(125*0.6*24)$
$= 34\ m^2$

This also complies with this optimum area.

A.1.2 Catchment B

The rate of infiltration and the floor area of the trench determine the allowable discharge. A floor area of 45 m^2 is to be adopted thus the discharge rate is:

Allowable discharge from storage = Infiltration rate x Floor area
= 0.00003 x 45
= 0.00135 m^3/s

Hence Q_0 = 0.00135 m^3/s

The required storage volumes for various duration storms are as follows:

t_c (mins)	I (mm/hr)	Q_i (m^3/s)	Q_o (m^3/s)	r	V_i (m^3)	V_s (m^3)
50	**17.3**	**0.012893**	0.001350	0.90	52	**45.0**
60	**15.6**	**0.011626**	0.001350	0.88	47	39.9
75	**13.6**	**0.010136**	0.001350	0.87	41	33.9
90	**12.2**	**0.009092**	0.001350	0.85	36	29.8
120	**10.19**	**0.007594**	0.001350	0.82	31	23.8
180	**7.89**	**0.005880**	0.001350	0.77	24	16.9
240	**6.57**	**0.004896**	0.001350	0.72	20	13.1
300	**5.71**	**0.004256**	0.001350	0.68	17	10.5
360	**5.08**	**0.003786**	0.001350	0.64	15	8.7

Therefore, adopt a storage volume of 45m^3 to ensure that the ARI 3 month storm is captured and detained for infiltration.

Infiltration Pit

Use the infiltration equations contained in Section 9.4.5 of "Managing Urban Stormwater – Soils and Construction", to calculate the appropriate dimension for the infiltration pit. It should be noted that the equations produced by OMEE 1994 only allow for infiltration through the base of the trench.

Details of the equations from OMEE are:

$$D = PT$$

Where D= maximum allowable depth (m)

P = infiltration rate (m/hr)
T = draw down time (hr)

Thus D = 0.125 * 24
= 3.0m

It is proposed to provide an infiltration pit with a floor area of 45 m^2. The depth required to provide the volume of storage as detailed above is 1.0 m. This value is less than the maximum depth allowable. Using the above equation and determining for the design depth the draw down time is calculated as 9.26 hours. This is less than the required time of 24 hours.

Increasing the surface of infiltration enhances the pollutant removal. Since removal of some of the pollutants via the collection pit is proposed this is not considered critical, however the optimum area should be considered:

A = 1000V/(Pnt)

Where A = bottom area of trench (m^2)
V = runoff volume to be infiltrated (m^3)
P = percolation rate (mm/hr)
n = porosity of the storage media (0.6 assumed)
t = change in detention time (hr)

Thus A = 1000* 45/(125*0.6*24)
= 25 m^2

This also complies with this optimum area.

A.1.3 Catchment C

The rate of infiltration and the floor area of the trench determine the allowable discharge. A floor area of 50 m^2 is to be adopted thus the discharge rate is:

Allowable discharge from storage = Infiltration rate x Floor area
= 0.00003 x 50
= 0.0024 m^3/s

Hence Q_0 = 0.0024 m^3/s

The required storage volumes for various duration storms are as follows:

t_c (mins)	I (mm/hr)	Q_i (m^3/s)	Q_o (m^3/s)	r	V_i (m^3)	V_s (m^3)
50	17.3	0.01432	0.00150	0.90	57	**49.5**
60	15.6	0.01291	0.00150	0.88	52	43.9
75	13.6	0.01125	0.00150	0.87	45	37.3
90	12.2	0.01009	0.00150	0.85	40	32.7
120	10.19	0.00843	0.00150	0.82	34	26.1
180	7.89	0.00645	0.00150	0.77	26	18.6
240	6.57	0.00543	0.00150	0.72	22	14.3
300	5.71	0.00472	0.00150	0.68	19	11.5
360	5.08	0.00420	0.00150	0.64	17	9.5

Therefore, adopt a storage volume of 50 m^3 to ensure that the ARI 3 month storm is captured and detained for infiltration

Infiltration Pit

Use the infiltration equations contained in Section 9.4.5 of "Managing Urban Stormwater – Soils and Construction", to calculate the appropriate dimension for the infiltration pit. It should be noted that the equations produced by OMEE 1994 only allow for infiltration through the base of the trench.

Details of the equations from OMEE are:

D = PT

Where D= maximum allowable depth (m)
P = infiltration rate (m/hr)
T = draw down time (hr)

Thus D = 0.125 * 24
= 3.0m

It is proposed to provide an infiltration pit with a floor area of 50 m^2. The depth required to provide the volume of storage as detailed above is 1.00 m. This value is less than the maximum depth allowable. Using the above equation and determining for the design depth the draw down time is calculated as 8.45 hours. This is less than the required time of 24 hours.

Increasing the surface of infiltration enhances the pollutant removal. Since removal of some of the pollutants via the collection pit is proposed this is not considered critical, however the optimum area should be considered:

A = 1000V/(Pnt)

Where A = bottom area of trench (m^2)
V = runoff volume to be infiltrated (m^3)
P = percolation rate (mm/hr)
n = porosity of the storage media (0.6 assumed)
t = change in detention time (hr)

Thus A = 1000* 50/(125*0.6*24)
= 27.7 m^2

This also complies with this optimum area.

A.1.4 Catchment D

The rate of infiltration and the floor area of the trench determine the allowable discharge. A floor area of 80 m^2 is to be adopted thus the discharge rate is:

Allowable discharge from storage = Infiltration rate x Floor area
= 0.00003 x 80
= 0.0024 m^3/s

Hence Q_0 = 0.0024 m^3/s

The required storage volumes for various duration storms are as follows:

t_c (mins)	I (mm/hr)	Q_i (m^3/s)	Q_o (m^3/s)	r	V_i (m^3)	V_s (m^3)
50	17.3	0.022812	0.002400	0.89	91	78.8
60	15.6	0.020570	0.002400	0.87	82	69.9
75	13.6	0.016528	0.002400	0.85	72	59.4
90	12.2	0.014826	0.002400	0.84	64	52.0
120	10.19	0.012384	0.002400	0.81	54	41.5
180	7.89	0.009589	0.002400	0.75	42	29.6
240	6.57	0.007984	0.002400	0.70	35	22.7
300	5.71	0.006939	0.002400	0.65	30	18.3
360	5.08	0.006174	0.002400	0.61	27	15.1

Therefore, adopt a storage volume of 80 m^3 to ensure that the ARI 3 month storm is captured and detained for infiltration

Infiltration Pit

Use the infiltration equations contained in Section 9.4.5 of "Managing Urban Stormwater – Soils and Construction", to calculate the appropriate dimension for the infiltration pit. It should be noted that the equations produced by OMEE 1994 only allow for infiltration through the base of the trench.

Details of the equations from OMEE are:

D = PT

Where D= maximum allowable depth (m)
P = infiltration rate (m/hr)
T = draw down time (hr)

Thus D = 0.125 * 24
= 3.0m

It is proposed to provide an infiltration pit with a floor area of 80 m^2. The depth required to provide the volume of storage as detailed above is 0.97 m. This value is less than the maximum depth allowable. Using the above equation and determining for the design depth the draw down time is calculated as 8.33 hours. This is less than the required time of 24 hours.

Increasing the surface of infiltration enhances the pollutant removal. Since removal of some of the pollutants via the collection pit is proposed this is not considered critical, however the optimum area should be considered:

A = 1000V/(Pnt)

Where A = bottom area of trench (m^2)
V = runoff volume to be infiltrated (m^3)
P = percolation rate (mm/hr)
n = porosity of the storage media (0.6 assumed)
t = change in detention time (hr)

Thus A = 1000* 80/(125*0.6*24)
= 40 m^2

This also complies with this optimum area.

APPENDIX B

Contour and Detail Survey

NOTES

LOT AREAS AND BOUNDARY DIMENSIONS HAVE BEEN COMPILED FROM DEPOSITED PLANS AVAILABLE AT NSW LAND REGISTRY SERVICES (NSW LRS). NO BOUNDARY SURVEY OR INVESTIGATION HAS BEEN MADE AND NO BOUNDARIES HAVE BEEN MARKED. ACCORDINGLY THE POSITION OF IMPROVEMENTS RELATIVE TO BOUNDARIES SHOWN HEREON IS DIAGRAMMATIC ONLY.

BEARINGS SHOWN ON THIS PLAN ARE ORIENTATED TO NORTH VIDE MGA. IF SHADOW DIAGRAMS ARE TO BE CALCULATED THEY MUST BE CALCULATED USING TRUE NORTH.

SERVICES & UTILITIES SHOWN ON THIS PLAN HAVE BEEN LOCATED BY COMBINATION OF FIELD SURVEY AND REFERENCE TO SERVICE PLANS FROM STATUTORY AUTHORITIES. ONLY VISIBLE AND APPARENT SERVICE COVERS AND POLES HAVE BEEN LOCATED BY FIELD SURVEY. SERVICE DETAILS AND LOCATIONS SHOULD BE CONFIRMED WITH THE RELEVANT SERVICE AUTHORITY DURING DESIGN & PRIOR TO ANY CONSTRUCTION. THE LOCATION OF UNDERGROUND SERVICES HAS NOT BEEN INVESTIGATED BY USHER & COMPANY PTY LTD.

WHERE THE EXACT LOCATION OF UNDERGROUND SERVICES IS CRITICAL TO THE DESIGN OR CONSTRUCTION THE RELEVANT PARTY SHOULD ARRANGE TO HAVE AN UNDERGROUND SERVICES TRACE CARRIED OUT TO CONFIRM THE SERVICES EXACT LOCATION. IN THIS REGARD ALL PARTIES SHOULD CONTACT THE 'DIAL BEFORE YOU DIG' SERVICE.

CONTOUR INTERVAL 1.0m MAJOR 0.25m MINOR

AHD HEIGHT DATUM HAS BEEN TRANSFERRED TO THE SUBJECT LOT VIA TRIG HEIGHTING. AHD LEVELS SHOWN HAVE AN ACCURACY OF 0.05m.

LEGEND

0.3/8/8 — 0.3 TRUNK DIAMETER/6m FOLIAGE SPREAD/8m HEIGHT
TREE SIZES ARE ESTIMATES ONLY

UE — UNDERGROUND POWER (NOT SURVEYED)
CUG — UNDERGROUND COMMUNICATIONS (NOT SURVEYED)
UNDERGROUND UNKNOWN SERVICE (NOT SURVEYED)
W — UNDERGROUND WATER (NOT SURVEYED)
S — S — UNDERGROUND SEWER (NOT SURVEYED)
// // FENCE

BPZ BUFFER PROTECTION ZONE
FL FLOOR LEVEL
INV INVERT
SV STOP VALVE
STOP VALVE
STORMWATER GRATE
SEWER MANHOLE
HYDRANT
IC INSPECTION COVER
GATE
PHOTO LOCATION & DIRECTION
BENCHMARK
+33.00 SPOT HEIGHTS

DIAL BEFORE YOU DIG www.1100.com.au

Notes :

1. This plan is prepared for the client from a combination of field survey and existing records for the purpose defined by the client and should not be used for any other purpose.
2. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of this plan.
3. Origin of MGA Coordinates and AHD Vertical datum:
   SS48797 166840
   Easting: 556118.118
   Northing: 6861747.786 (AHD)
   MGA (Map Grid Of Australia 1994 - Zone 56)
4. This plan is on ground '1:1' scale coordinates orientated to MGA azimuth using GNSS. To convert to MGA grid coordinates apply the scale factor of 0.99963.

UNDERGROUND SERVICES APPROXIMATE ONLY (PLOTTED USING DBYD)

20 METRE BANK OFFSET (STAKED ONSITE MARKED WITH PINK FLAGGING)

BUSH PROTECTION ZONE (WHITE TOP STAKE ONSITE WITH YELLOW)

CRITICAL NOTES:

1. It appears that numerous private underground services are present onsite. Only the surface features of these have located by Usher and Company hereon. It is highly recommended that a service locator be employed to trace services prior to any construction.
2. The 20m bank offset shown on this plan has been determined from the current Cudgera Creek top of bank. The current Cudgera Creek top of bank differs from the original creek boundary shown on CP7158-1759. We recommend a plan of redefinition be carried out on the subject lot to determine current natural boundary position.

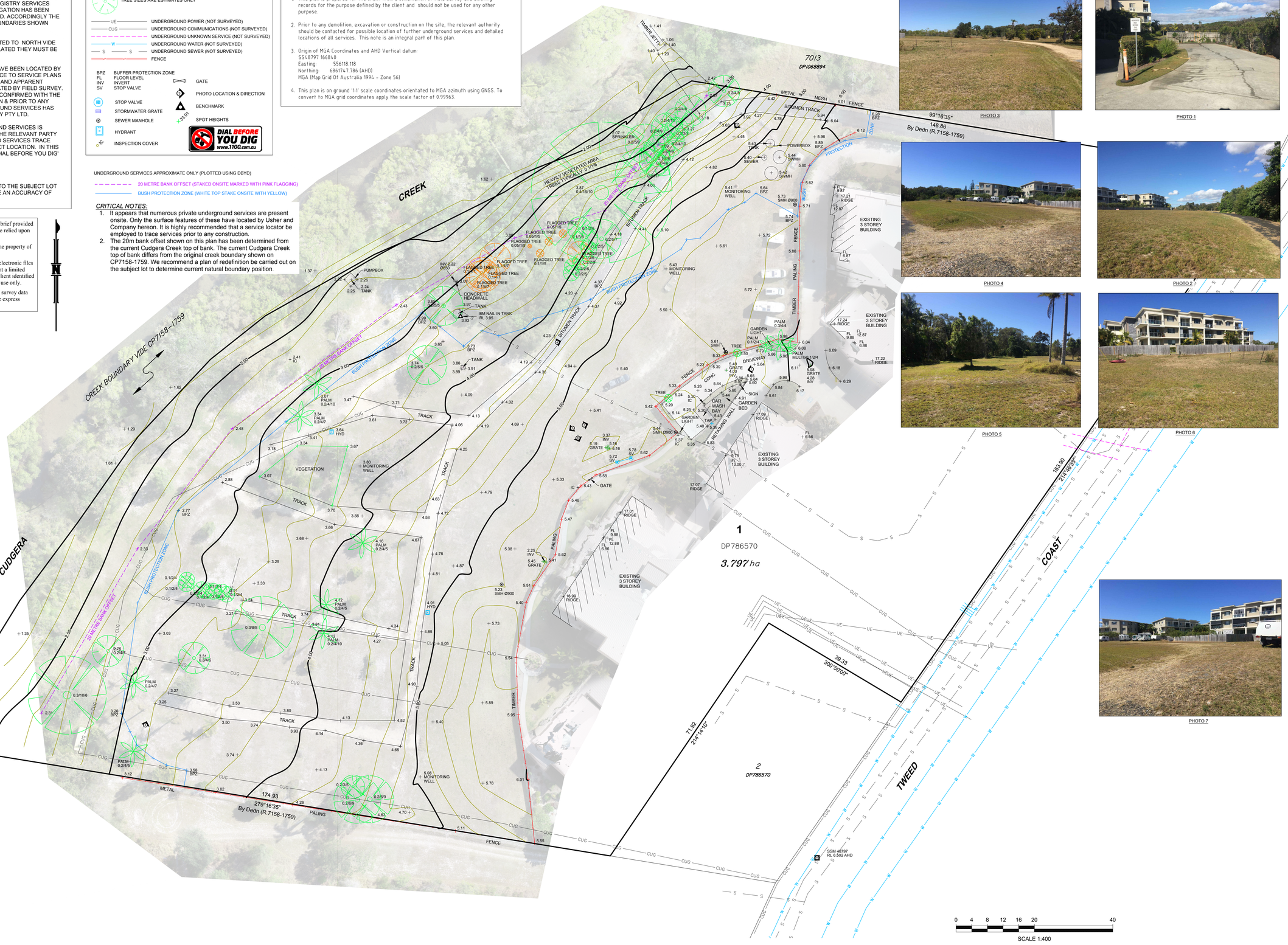


PHOTO 3


PHOTO 1

PHOTO 4

PHOTO 2

PHOTO 5

PHOTO 6

PHOTO 7

0 4 8 12 16 20 40
SCALE 1:400

USHER & COMPANY
Surveying & Land Development Consultants
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PO Box 8069, ORANGE NSW 2800
Phone: (02) 6361 1422
Fax: (02) 6361 1423
Email: ausher@usherandcompany.com.au

APPROVED

Amendments

ISSUE	DATE	DETAILS
A	16-09-2019	Original Issue

PLAN:

PLAN OF PARTIAL DETAIL AND LEVELS
AT No.85-87 TWEED COAST, HASTINGS POINT
BEING LOT 1 IN DP 786570

LGA:	TWEED
SUBURB:	HASTINGS POINT
ORIGIN:	SSM 48797 RL 6.502 AHD CLASS LB, ORDER L2 SCIMS 09/09/2019
REDUCTION RATIO:	1:400
DATUM:	AHD
DATE OF SURVEY:	12-09-2019
SURVEYED BY:	BR / JT
DRAWN BY:	LL
CLIENT:	TRICARE
PLAN REFERENCE:	10623
	B1
ISSUE:	A

APPENDIX C

Architectural Plans

AREA SCHEDULE (SITE COVERAGE)

PROPOSED BUILDINGS

BOWLS PAVILION	111.3m²
POOL PAVILION	485.06m²
BUILDING D	1315.63m²
BUILDING E	1523.88m²
BUILDING F	1082.70m²
BUILDING G	580.32m²
TOTAL BUILDING COVER	5098.88m²

EXISTING DEVELOPMENT (AS PER R.H. FRANKLAND & ASSOCIATES PROJECT NO. 05170 DRAWING: TP00 REV E AND TP01 REV P)

COVERED	5740m²

PROPOSED DEVELOPMENT

COVERED	5098.88m²

TOTAL

COVERED	10838.88m² (approx.)
UNCOVERED	27131.12m² (approx.)
SITE COVERAGE (TOTAL AREA = 37970m² approx.)	28.55% (approx.)

1 OVERALL AREA PLAN - SITE COVERAGE
1 : 500

Arqus DESIGN

Integrated perspective

Arqus Design Pty Ltd
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DATE	REVISION	ISSUE
24.01.22	DRAFT DA PACKAGE	A
24.08.16	DRAFT DA PACKAGE	B
24.10.09	DA PACKAGE	C

CLIENT

TriCare
Retirement Living. Home Care. Aged Care.

PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - SITE COVERAGE

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
1 : 500 @A1 1 : 1000 @A3	01/12/23	

DRAWING NUMBER	ISSUE
DA-2-11	**C**

ISSUED FOR 9/10/2024 10:19:41 AM

DEVELOPMENT APPLICATION

AREA SCHEDULE (CAR PARK)

NAME	AREA
BUILDING D	
BASEMENT LEVEL	906.41 m²
BUILDING E	
BASEMENT LEVEL	1218.84 m²
BUILDING F	
BASEMENT LEVEL	960.38 m²
BUILDING G	
BASEMENT LEVEL	490.20 m²
TOTAL CAR PARK AREA	3575.83 m²

NO. OF CAR PARKING SPACES

BUILDING D	23	
BUILDING E	37	30 REQUIRED
BUILDING F	33	21 REQUIRED
BUILDING G	12	12 REQUIRED
ABOVE GROUND VISITORS	20	
TOTAL	125	TOTAL 63 REQUIRED

AREAS BY NAME

- BUILDING D
- BUILDING E
- BUILDING F
- BUILDING G

1 OVERALL AREA PLAN - GFA (BASEMENT)
1 : 500
NOTE: READ IN CONJUNCTION WITH INDIVIDUAL BUILDING AREA PLANS

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24.08.16	DRAFT DA PACKAGE	B
24.10.09	DA PACKAGE	C

CLIENT

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PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - GFA (BASEMENT)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
1 : 500 @A1 @A3	01/12/23	

DRAWING NUMBER **DA-2-12** ISSUE **C**

ISSUED FOR 9/10/2024 10:20:20 AM

DEVELOPMENT APPLICATION

AREA SCHEDULE

NAME	AREA
BOWLS PAVILION	
GROUND LEVEL	75.68 m²
	75.68 m²
BUILDING D	
BASEMENT LEVEL	906.41 m²
GROUND LEVEL	1068.83 m²
LEVEL 01	1133.17 m²
LEVEL 02	1133.17 m²
	4241.57 m²
BUILDING E	
BASEMENT LEVEL	1218.84 m²
GROUND LEVEL	980.96 m²
LEVEL 01	980.95 m²
LEVEL 02	980.66 m²
	4161.40 m²
BUILDING F	
BASEMENT LEVEL	960.38 m²
GROUND LEVEL	712.71 m²
LEVEL 02	712.74 m²
	2385.84 m²
BUILDING G	
BASEMENT LEVEL	490.20 m²
GROUND LEVEL	382.97 m²
LEVEL 01	383.01 m²
LEVEL 02	383.01 m²
	1639.18 m²
POOL PAVILION	
GROUND LEVEL	435.32 m²
	435.32 m²
TOTAL GFA	12938.99 m²

EXISTING DEVELOPMENT GFA

THIS REFERENCES SHEET 'TP00' FROM THE EXISTING DEVELOPMENT STAMPED DA PACKAGE

BUILDING A	~4915m²
BUILDING B	~2755m²
BUILDING C	~8120m²
TOTAL GFA (APPROX.)	**~15790m²**

EXISTING DEVELOPMENT GFA

BUILDING D	~3335m²	BOWLS PAVILION	~75m²
BUILDING E	~2945m²	POOL PAVILION	~435m²
BUILDING F	~2140m²		
BUILDING G	~1150m²		
TOTAL GFA (APPROX.)	**~10080m²**		

OVERALL FLOOR SPACE RATIO (FSR) = APPROX. 1:0.68

AREAS BY NAME

- BOWLS PAVILION
- BUILDING D
- BUILDING E
- BUILDING F
- BUILDING G
- POOL PAVILION

1 OVERALL AREA PLAN - GFA (GROUND LEVEL)
1 : 500

NOTE: READ IN CONJUNCTION WITH INDIVIDUAL BUILDING AREA PLANS

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24.08.16	DRAFT DA PACKAGE	B
24.10.03	UPDATED DRAFT DA PACKAGE	C
24.10.09	DA PACKAGE	D

CLIENT

TriCare
Retirement Living. Home Care. Aged Care.

PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - GFA (GROUND LEVEL)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
As indicated @A1 @A3	01/12/23	

DRAWING NUMBER **DA-2-13** ISSUE **D**

ISSUED FOR 9/10/2024 10:20:52 AM

DEVELOPMENT APPLICATION

AREA SCHEDULE

NAME	AREA
BOWLS PAVILION	
GROUND LEVEL	75.68 m²
	75.68 m²
BUILDING D	
BASEMENT LEVEL	906.41 m²
GROUND LEVEL	1068.83 m²
LEVEL 01	1133.17 m²
LEVEL 02	1133.17 m²
	4241.57 m²
BUILDING E	
BASEMENT LEVEL	1218.84 m²
GROUND LEVEL	980.96 m²
LEVEL 01	980.95 m²
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BUILDING F	
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GROUND LEVEL	712.71 m²
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	2385.84 m²
BUILDING G	
BASEMENT LEVEL	490.20 m²
GROUND LEVEL	382.97 m²
LEVEL 01	383.01 m²
LEVEL 02	383.01 m²
	1639.18 m²
POOL PAVILION	
GROUND LEVEL	435.32 m²
	435.32 m²
TOTAL GFA	12938.99 m²

EXISTING DEVELOPMENT GFA

THIS REFERENCES SHEET 'TP00' FROM THE EXISTING DEVELOPMENT STAMPED DA PACKAGE

BUILDING A	~4915m²
BUILDING B	~2755m²
BUILDING C	~8120m²
TOTAL GFA (APPROX.)	**~15790m²**

EXISTING DEVELOPMENT GFA

BUILDING D	~3335m²	BOWLS PAVILION	~75m²
BUILDING E	~2945m²	POOL PAVILION	~435m²
BUILDING F	~2140m²		
BUILDING G	~1150m²		
TOTAL GFA (APPROX.)	**~10080m²**		

OVERALL FLOOR SPACE RATIO (FSR) = APPROX. 1:0.68

AREAS BY NAME

- BUILDING D
- BUILDING E
- BUILDING F
- BUILDING G

1 OVERALL AREA PLAN - GFA (LEVEL 01)
1 : 500

NOTE: READ IN CONJUNCTION WITH INDIVIDUAL BUILDING AREA PLANS

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24.10.03	UPDATED DRAFT DA PACKAGE	C
24.10.09	DA PACKAGE	D

CLIENT

TriCare
Retirement Living. Home Care. Aged Care.

PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - GFA (LEVEL 01)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
As indicated @A1 @A3	01/12/23	

DRAWING NUMBER	ISSUE
DA-2-14	**D**

ISSUED FOR

9/10/2024 10:21:21 AM

DEVELOPMENT APPLICATION

AREA SCHEDULE

NAME	AREA
BOWLS PAVILION	
GROUND LEVEL	75.68 m²
	75.68 m²
BUILDING D	
BASEMENT LEVEL	906.41 m²
GROUND LEVEL	1068.83 m²
LEVEL 01	1133.17 m²
LEVEL 02	1133.17 m²
	4241.57 m²
BUILDING E	
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POOL PAVILION	
GROUND LEVEL	435.32 m²
	435.32 m²
TOTAL GFA	12938.99 m²

EXISTING DEVELOPMENT GFA

THIS REFERENCES SHEET 'TP00' FROM THE EXISTING DEVELOPMENT STAMPED DA PACKAGE

BUILDING A	~4915m²
BUILDING B	~2755m²
BUILDING C	~8120m²
TOTAL GFA (APPROX.)	**~15790m²**

EXISTING DEVELOPMENT GFA

BUILDING D	~3335m²	BOWLS PAVILION	~75m²
BUILDING E	~2945m²	POOL PAVILION	~435m²
BUILDING F	~2140m²		
BUILDING G	~1150m²		
TOTAL GFA (APPROX.)	**~10080m²**		

OVERALL FLOOR SPACE RATIO (FSR) = APPROX. 1:0.68

AREAS BY NAME

- BUILDING D
- BUILDING E
- BUILDING F
- BUILDING G

1 OVERALL AREA PLAN - GFA (LEVEL 02)
1 : 500
NOTE: READ IN CONJUNCTION WITH INDIVIDUAL BUILDING AREA PLANS

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24.10.09	DA PACKAGE	D

CLIENT

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PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - GFA (LEVEL 02)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
As indicated @A1 @A3	01/12/23	

DRAWING NUMBER **DA-2-15** ISSUE **D**

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24.10.03	UPDATED DRAFT DA PACKAGE	C
24.10.09	DA PACKAGE	D

LANDSCAPING AREAS

DEEP PLANTING (INCLUDES ENDANGERED ECOLOGICAL COMMUNITY ZONE)	12329.862m²
LAWN	980.65m²
PLANTER	816.16m²
EXISTING LANDSCAPING	5439.16m² (approx.)
GROUND LEVEL TOTAL LANDSCAPE AREA	14126.67m²
TOTAL AREA (WITH EXISTING)	19565.83m² (approx.)

NOTE: AREAS TO BE READ IN CONJUNCTION WITH LANDSCAPE DA PACKAGE. REFER TO ARCADIA PROJECT NO. 24-244 DRAWING 21

LANDSCAPING LEGEND

- CURRENT RIPARIAN VEGETATION TREE LINE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE
- DEEP PLANTING
- LAWN
- PLANTER
- EXISTING LANDSCAPE

REFER TO LANDSCAPE ARCHITECT'S DOCUMENTATION FOR ALL LANDSCAPE AREAS

- APZ LINE

CLIENT

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Retirement Living. Home Care. Aged Care.

PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - LANDSCAPING AREAS (GROUND LEVEL)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF,SS	SP

SCALE	DATE CREATED	NORTH
1 : 500 @A1 @A3	01/12/23	

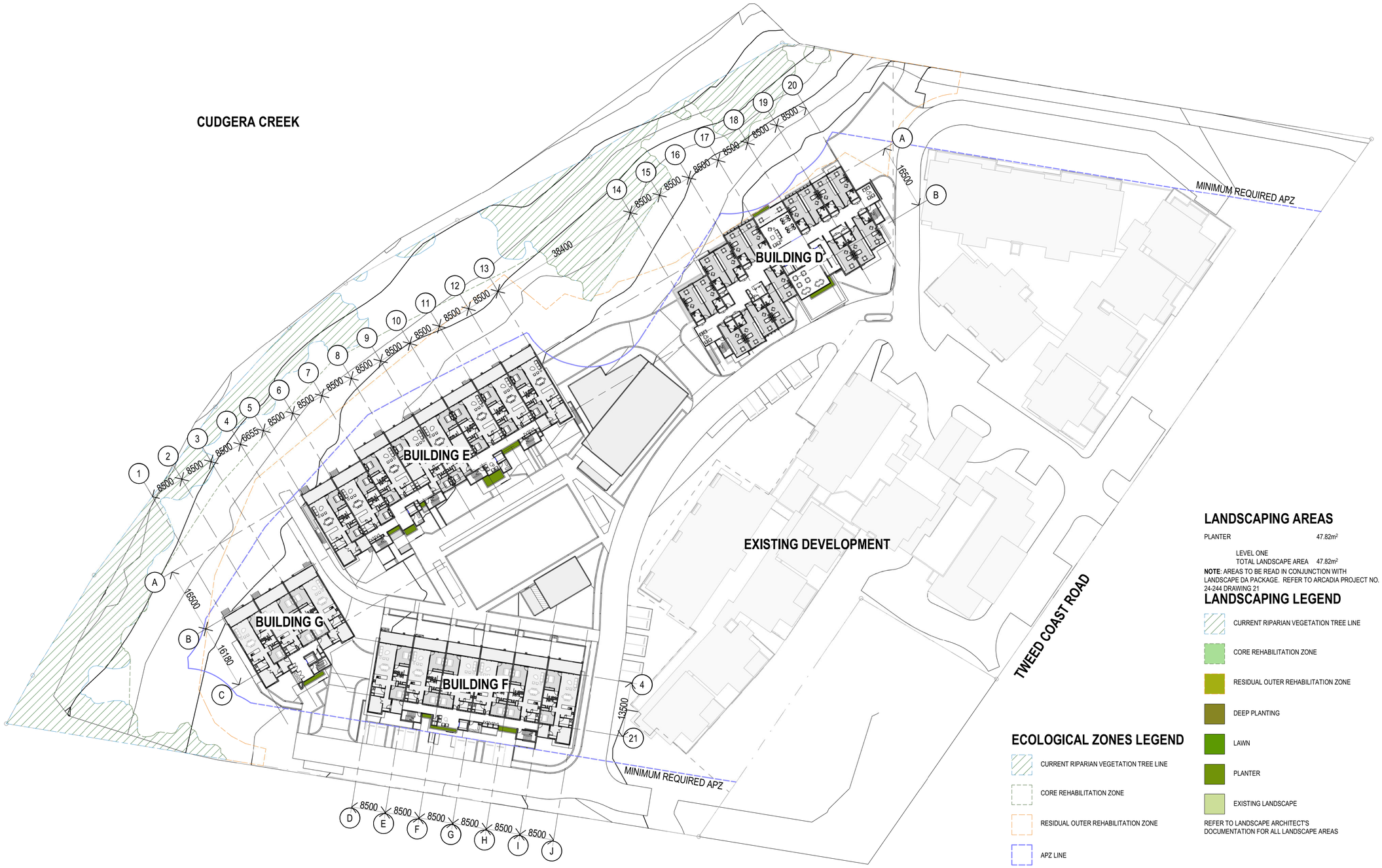
DRAWING NUMBER: **DA-2-16**

ISSUE: **D**

ISSUED FOR

9/10/2024 10:22:15 AM

DEVELOPMENT APPLICATION



1 OVERALL SITE AREA PLAN - LANDSCAPING AREAS (LEVEL 01)
1 : 500

ECOLOGICAL ZONES LEGEND

- CURRENT RIPARIAN VEGETATION TREE LINE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE
- APZ LINE

LANDSCAPING AREAS

PLANTER 47.82m²

LEVEL ONE
TOTAL LANDSCAPE AREA 47.82m²

NOTE: AREAS TO BE READ IN CONJUNCTION WITH LANDSCAPE DA PACKAGE. REFER TO ARCADIA PROJECT NO. 24-244 DRAWING 21

LANDSCAPING LEGEND

- CURRENT RIPARIAN VEGETATION TREE LINE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE
- DEEP PLANTING
- LAWN
- PLANTER
- EXISTING LANDSCAPE

REFER TO LANDSCAPE ARCHITECT'S DOCUMENTATION FOR ALL LANDSCAPE AREAS

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PROJECT

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COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - LANDSCAPING AREAS (LEVEL 01)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
1 : 500 @A1 @A3	01/12/23	

DRAWING NUMBER **DA-2-17** ISSUE **D**

ISSUED FOR 9/10/2024 10:22:46 AM

DEVELOPMENT APPLICATION

1 OVERALL SITE AREA PLAN - LANDSCAPING AREAS (LEVEL 02)
1 : 500

LANDSCAPING AREAS

PLANTER 40.32m²

LEVEL 02
TOTAL LANDSCAPE AREA 40.32m²

NOTE: AREAS TO BE READ IN CONJUNCTION WITH LANDSCAPE DA PACKAGE. REFER TO ARCADIA PROJECT NO. 24-244 DRAWING 21

LANDSCAPING LEGEND

- CURRENT RIPARIAN VEGETATION TREE LINE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE
- DEEP PLANTING
- LAWN
- PLANTER
- EXISTING LANDSCAPE

REFER TO LANDSCAPE ARCHITECT'S DOCUMENTATION FOR ALL LANDSCAPE AREAS

ECOLOGICAL ZONES LEGEND

- CURRENT RIPARIAN VEGETATION TREE LINE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE
- APZ LINE

Arqus DESIGN

Integrated perspective

Arqus Design Pty Ltd
ABN 68 135 616 303

Level 2 15 Malt Street
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New Farm Qld 4005

Registration:
Nominated Architect: Scott Peabody
QLD: 2644
NSW: 9038
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mail@arqusdesign.com.au
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Phone 07 3358 0888
Fax 07 3358 0899

Arqus Design acknowledges the Traditional Owners of Country on which we live, work and design and pay our respects to their Elders, past and present.

NOTES

Contractors are to verify all dimensions on site before commencing any work or producing shop drawings.

Detail applicable to the scale of the drawing published.

DATE	REVISION	ISSUE
24.01.22	DRAFT DA PACKAGE	A
24.08.16	DRAFT DA PACKAGE	B
24.10.03	UPDATED DRAFT DA PACKAGE	C
24.10.09	DA PACKAGE	D

CLIENT

TriCare
Retirement Living. Home Care. Aged Care.

PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - LANDSCAPING AREAS (LEVEL 02)

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
1 : 500 @A1 @A3	01/12/23	

DRAWING NUMBER **DA-2-18** ISSUE **D**

ISSUED FOR 9/10/2024 10:23:10 AM

DEVELOPMENT APPLICATION

1 OVERALL SITE AREA PLAN - IMPERVIOUS AREAS
1 : 500

LEGEND

- EXISTING IMPERVIOUS AREA
- EXISTING PERVIOUS AREA
- PROPOSED PERVIOUS AREA
- PROPOSED IMPERVIOUS AREA

PROPOSED IMPERVIOUS/PERVIOUS AREAS

IMPERVIOUS AREA	~9373.61m²
PERVIOUS AREA	~13805.05m²

OVERALL SITE IMPERVIOUS/PERVIOUS AREAS

IMPERVIOUS AREA (approx.)	~18572.43m²
PERVIOUS AREA (approx.)	~19294.05m²

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CLIENT

TriCare
Retirement Living. Home Care. Aged Care.

PROJECT

TRICARE HASTINGS POINT

87 TWEED COAST RD, HASTINGS POINT 2489, NSW

COUNTRY: BUNDJALUNG

DRAWING

OVERALL AREA PLAN - IMPERVIOUS AREAS

JOB NUMBER	DESIGN	DRAWN	CHECKED
23-0025	SP	KF	SP

SCALE	DATE CREATED	NORTH
1 : 500 @A1 @A3	01/12/23	

DRAWING NUMBER **DA-2-19** ISSUE **D**

ISSUED FOR 9/10/2024 10:23:36 AM

DEVELOPMENT APPLICATION

APPENDIX D

Concept Engineering Plans

LEGEND

- FINISHED SURFACE CONTOURS (0.5m INTERVALS 1.0m MAJOR)
- PROPOSED STORMWATER RETICULATION
- PROPOSED KERB
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- CATCHMENT BOUNDARY
- PROPOSED SWALE DRAIN
- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- BUILDING HYDRAULICS (BY OTHERS)
- ASSET PROTECTION ZONE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE

IMPORTANT NOTE:

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SCALE A 0 5 10 15 20 1 : 500

SCALE B

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DESIGNED	J.L.
DRAWN	J.L
CHECKED	T.W.N

APPROVED FOR AND ON BEHALF OF COZENS REGAN WILLIAMS PROVE PTY LTD (RPEQ No 4.)
(NER No 54.0920)
(RPEQ No 4536)

CLIENT TRI CARE (HASTINGS) PTY LTD

PROJECT PROPOSED AGED CARE FACILITY
97-89 TWEED COAST ROAD , HASTINGS POINT

CONCEPTUAL OVERVIEW STORMWATER MANAGEMENT PLAN

JOB NO. 220450

DRAWING NO. SK12

ISSUE P1

LEGEND

- FINISHED SURFACE CONTOURS (0.5m INTERVALS 1.0m MAJOR)
- PROPOSED STORMWATER RETICULATION
- PROPOSED KERB
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- CATCHMENT BOUNDARY
- PROPOSED SWALE DRAIN
- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- BUILDING HYDRAULICS (BY OTHERS)

ATLANTIS CELL INFILTRATION PIT 45m³ CAPACITY , OR TSC APPROVED EQUIVALENT

UNDERGROUND CARPARK TO BE PROVIDED WITH OIL & GRIT SEPARATION INTERNAL HYDRAULICS TO DISCHARGE TO CIVIL DRAINAGE

POOL PAVILION

LOCATE AND DIVERT EXISTING DRAINAGE , DEMOLISH DRAINAGE WITHIN LOCATION OF PROPOSED BUILDING

EXTENT OF EXISTING DEVELOPMENT

LOCATE AND DIVERT EXISTING DRAINAGE AS REQURIED, DEMOLISH DRAINAGE WITHIN LOCATION OF PROPOSED BUILDING

EXISTING 3 STOREY BUILDING

SHELTER

DISCHARGE OVERFLOW PIT

ATLANTIS CELL INFILTRATION PIT 50m³ CAPACITY , OR TSC APPROVED EQUIVALENT

GPT HUMECEPTER STC 2 OR TSC APPROVED EQUIVALENT REQUIRED IN BASEMENT

UNDERGROUND CARPARK TO BE PROVIDED WITH OIL & GRIT SEPARATION INTERNAL HYDRAULICS TO DISCHARGE TO CIVIL DRAINAGE

UNDERGROUND CARPARK TO BE PROVIDED WITH OIL & GRIT SEPARATION INTERNAL HYDRAULICS TO DISCHARGE TO CIVIL DRAINAGE

DISCHARGE OVERFLOW PIT

ATLANTIS CELL INFILTRATION PIT 78m³ CAPACITY , OR TSC APPROVED EQUIVALENT

279°16'35"
By Dedn (R.7158-1759)

GPT HUMECEPTER STC 3 OR TSC APPROVED EQUIVALENT

DP78657

3.797 ha

71.92
214°14'10"

DP.

- ASSET PROTECTION ZONE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE

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DRAWN	J.L.
CHECKED	T.W.N

APPROVED FOR AND ON BEHALF OF COZENS REGAN WILLIAMS PROVE PTY LTD (RPEQ No 4) (NER No 5449920) (RPEQ No 4536)

CLIENT: TRI CARE (HASTINGS) PTY LTD

PROJECT: PROPOSED AGED CARE FACILITY
97-89 TWEED COAST ROAD , HASTINGS POINT

CONCEPTUAL DETAIL STORMWATER MANAGEMENT PLAN 1 OF 2

JOB NO. 220450

DRAWING NO. SK13

ISSUE P1

LEGEND

- FINISHED SURFACE CONTOURS (0.5m INTERVALS 1.0m MAJOR)
- PROPOSED STORMWATER RETICULATION
- PROPOSED KERB
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- CATCHMENT BOUNDARY
- PROPOSED SWALE DRAIN
- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- BUILDING HYDRAULICS (BY OTHERS)
- ASSET PROTECTION ZONE
- CORE REHABILITATION ZONE
- RESIDUAL OUTER REHABILITATION ZONE

CREEK

RETENTION RESTORATION AREA

DISCHARGE OVERFLOW PIT

2.07 + SPRINKLER

ATLANTIS CELL INFILTRATION PIT 62m³ CAPACITY , OR TSC APPROVED EQUIVALENT

ATLANTIS CELL INFILTRATION PIT 45m³ CAPACITY , OR TSC APPROVED EQUIVALENT

GPT HUMECEPTER STC 2 OR TSC APPROVED EQUIVALENT

LOCATE EXISTING DRAINAGE AND ENSURE CLEAR OF PROPOSED WORKS

CONCRETE HEADWALL

INV 2.22 Ø650

BM NAIL IN TANK RL 3.95

UNDERGROUND CARPARK TO BE PROVIDED WITH OIL & GRIT SEPARATION INTERNAL HYDRAULICS TO DISCHARGE TO CIVIL DRAINAGE

POOL PAVILION

SHELTER

LOCATE AND DIVERT EXISTING DRAINAGE , DEMOLISH DRAINAGE WITHIN LOCATION OF PROPOSED BUILDING

EXTENT OF EXISTING DEVELOPMENT

LOCATE AND DIVERT EXISTING DRAINAGE AS REQURIED, DEMOLISH DRAINAGE WITHIN LOCATION OF PROPOSED BUILDING

EXISTING WATER PIPES LOCATION FROM DESIGNS T.B.C

EXISTING STORMWATER PITS PIPE LOCATION FROM DESIGNS T.B.C

EXISTING 3 STOREY BUILDING

DP786570

3.797 ha

99°16'35" 148.86 By Dedn (R.7158-175

A

B

1

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CLIENT: TRI CARE (HASTINGS) PTY LTD

PROJECT: PROPOSED AGED CARE FACILITY
97-89 TWEED COAST ROAD , HASTINGS POINT
CONCEPTUAL DETAIL STORMWATER MANAGEMENT PLAN 2 OF 2

JOB NO. 220450

DRAWING NO. SK14

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