SITE AND SOIL EVALUATION SUMMARY
2 Bedroom Visitor Accommodation

Name: Ms A Du Plessis & J Massarotto
Site Address: 52 Hayes Road, Adventure Bay, BRUNY ISLAND 7150
Postal Address: Unit 4/42 Marcel Avenue, Randwick NSW 2031

Site and Soil Assessment
Soil Category: Category 6 soils (Heavy Clay)
Soil Permeability: 0.06m/day
LTAR: 10 L/m²/day
DIR: 2mm/day
Slope/Aspect: The disposal area falls to the north with gentle slopes of 1-2 degrees.
Site Factors: The heavy clays soils and close proximity to a watercourse are both significant items that have been addressed within the report.

Wastewater System Design
This report is to assess and design a wastewater disposal system that will effectively dispose of the wastewater from a proposed 2 bedroom Visitor Accommodation at 52 Hayes Road, Adventure Bay, Bruny Island.

The total wastewater loading is based on 2 bedrooms capable of accommodating up to 4 persons. With each person generating up to 120L of wastewater per day, the total wastewater loading is expected to be: $4 \times 120L = 480L$ per day.

Proposed Wastewater System Design
Due to the heavy clay soils, as well as the close proximity of the nearby surface water, it is proposed to utilise an Aerated Wastewater Treatment System (AWTS) with irrigation.

The area required for irrigation is calculated using the following:
$A = \frac{Q}{DIR}$; $A = \frac{480}{2}$; $A = 240m^2$

Collect the wastewater in a new AWTS and pump the wastewater into a new subsurface irrigation field of 240m².

Proposed irrigation field.
The proposed irrigation field will be located to the west of the proposed Visitor Accommodation (see site plan). See detailed site plan on page 10 for proposed layout.

SEE FULL REPORT FOR FURTHER DETAILS
SITE AND SOIL EVALUATION

BACKGROUND

Site and Soil Evaluation Reports must be submitted with all applications for on-site wastewater management systems. Suitably qualified persons such as – soil scientists, engineering geologists, engineers, environmental health officers or other persons must complete evaluation reports. Designers of the on-site wastewater systems are to use their professional judgement to determine if issues outlined in the Report are relevant or if additional information is required. Also designers are to consider applicable legislation, Codes and Standards in relation to the design of the system.

For further information on site evaluation please consult AS/NZS 1547 – 2012 on-site domestic wastewater management. This report includes the necessary information for a SSE report.

REPORT

Municipality: Kingborough Council
Location: 52 Hayes Road, Adventure Bay 7150
Proposed 2 bedroom Visitor Accommodation
Lot Area: 6.128 Hectares
Owner: Ms A Du Plessis & J Massarotto
Site Plan: See attached
Date of inspection: 7th May 2019
Date of this Report: 30th May 2019
Water Supply: Tank Water (Maximum Loading 480L per day)

SITE INFORMATION

Topography and Drainage
The disposal area is located on flat and slightly elevated area with slopes of approximately 1 degrees, the drainage in this area is average, and the site has a sunny and northerly aspect.

Vegetation
The site is predominantly covered with forest and grassland vegetation.

Land Use
Tourism, accommodation and dwelling.

Geology
Jurassic Dolerite - Geological Atlas of Tasmania 1:500,000
Climate
Climate data for the site has been taken from the Australian Bureau of Meteorology web site. Mean monthly rainfall, and mean daily maximum temperature for each month has been taken directly from the Lunawanna weather station data. To allow for wetter than average weather, the adopted rainfall for each month has an additional 10% added to the mean. A summary of this climate information, as well as monthly retained rain, evapo-transpiration, and evapotranspiration less the retained rain is in the Trench 3™ assessment report. Trench 3™ uses this data when calculating the monthly water balance for the site, which helps determine the system sizing.

Soils

Test Hole 1:
- 0 – 40mm: Moss
- 40 – 140mm: Black Friable Clay (Cat 4)
- 140 – 1050mm+: Massive Heavy Clay (Cat 6)

Test Hole 2:
- 0 – 20mm: Grass
- 20 – 150mm: Black Friable Clay (Cat 4)
- 150 – 620mm+: Massive Heavy Clay (Cat 6)

Water at 595mm

- AS 1547 Soil Category 6 to be used for disposal
- Emerson Test No. 7
- Soil permeability - Estimated permeability is 0.06m/day.
- Design Irrigation Rate (DIR): 2mm day
- Long Term Absorption Rate (LTAR): 10 L/m²/day

Groundwater
Groundwater was encountered in the low lying area of test hole 2.
Site Capability Issues for On-site Wastewater Management

Sustainable Environmental Assessment & Management (SEAM)
Land suitability and system sizing for on-site wastewater management
Track 2.0 (Australian Institute of Environmental Health)

Site Capability Report
Wastewater Site Assessment 2 bedroom ancillary dwelling

<table>
<thead>
<tr>
<th>Alert</th>
<th>Factor</th>
<th>Units</th>
<th>Value</th>
<th>Costed Level</th>
<th>Limitation</th>
<th>Trench</th>
<th>Amended</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Expected design area</td>
<td>sqm</td>
<td>62,700</td>
<td>Y. High</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Density of disposal systems</td>
<td>pga km</td>
<td>2</td>
<td>Mod.</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Slope angle</td>
<td>degrees</td>
<td>2</td>
<td>Y. High</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Slope form</td>
<td>Straight simple</td>
<td>Y. High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Surface drainage</td>
<td>Poor</td>
<td>High</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flood potential</td>
<td>Site floods in 75-100 yrs</td>
<td>Mod.</td>
<td>Low</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Heavy rain events</td>
<td>Infrequent</td>
<td>Mod.</td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspect (Southern heml.)</td>
<td>East</td>
<td>Y. High</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency of strong winds</td>
<td>Common</td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Wastewater volume</td>
<td>L/day</td>
<td>480</td>
<td>Mod.</td>
<td>Low</td>
<td>Moderate</td>
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<td></td>
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<tr>
<td></td>
<td>SAR of septic tank effluent</td>
<td>1.3</td>
<td>Mod.</td>
<td>Low</td>
<td>No change</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>SAR of sludge</td>
<td>2.5</td>
<td>Mod.</td>
<td>Moderate</td>
<td>No change</td>
<td></td>
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<tr>
<td></td>
<td>Soil thickness</td>
<td>m</td>
<td>1.2</td>
<td>High</td>
<td>Very low</td>
<td>Moderate</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Depth to bedrock</td>
<td>m</td>
<td>3.3</td>
<td>Mod.</td>
<td>Very low</td>
<td>Low</td>
<td></td>
<td>Other factors increase impact</td>
</tr>
<tr>
<td></td>
<td>Surfacrrock:outcrop</td>
<td>%</td>
<td>0</td>
<td>Y. High</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cobble in soil</td>
<td>%</td>
<td>4</td>
<td>Y. High</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil pH</td>
<td>7.3</td>
<td>Guess</td>
<td>Very low</td>
<td></td>
<td></td>
<td></td>
<td>Other factors lessen impact</td>
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<tr>
<td></td>
<td>Soil bulk density</td>
<td>g/m³</td>
<td>1.5</td>
<td>Guess</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Soil dispersion</td>
<td>Emerson No.</td>
<td>7</td>
<td>High</td>
<td>Very low</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Adopted permeability</td>
<td>m/day</td>
<td>0.06</td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long Term Accept Rate</td>
<td>L/day/ha</td>
<td>m²</td>
<td>11</td>
<td>Mod.</td>
<td>Low</td>
<td>Moderate</td>
<td>Other factors increase impact</td>
</tr>
</tbody>
</table>

Comments
The surface drainage is average. AN AKMS with irrigation will be used to reduce this alert.
Environmental Sensitivity Issues for On-site Wastewater Management

Sustainable Environmental Assessment & Management (SEAM)
Land suitability and system sizing for on-site wastewater management
Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report
Wastewater Site Assessment 2 bedroom ancillary dwelling

Assessment for: A Du Flessis
Unit 442, Marcel Avenue, Randwick NSW 2031
Assessed site(s): 52 Hayes Road, Adventure Bay 7190
Local authority: Kingborough Council
Ref. No: 19026b
Assess. Date: 30-May-13
Stels inspected: JF-13-03-25-07
Assessed by: James Wood

Environmental sensitivity issues that may exist or be revealed in relationship to applied wastewater systems include sensitivity of the area to localized scouring due to high velocity of the on-site wastewater, which requires special consideration in the system design. Treatment options should be assessed and reflected in the TRENCH plan.

<table>
<thead>
<tr>
<th>Alert</th>
<th>Factor Description</th>
<th>Units</th>
<th>Value</th>
<th>Coefficient Level</th>
<th>Trench Level</th>
<th>Amended Level</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>A</td>
<td>Calcium exchange capacity</td>
<td>mmol/100g</td>
<td>90</td>
<td>Mod.</td>
<td>Low</td>
<td>High</td>
<td>Other factors increase impact factor not assessed</td>
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<tr>
<td></td>
<td>Phosphorus capacity</td>
<td>kg/week</td>
<td>1</td>
<td>Mod.</td>
<td>Moderate</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Annual rainfall excess</td>
<td>mm</td>
<td>157</td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Annual nutrient load</td>
<td>kg</td>
<td>8.2</td>
<td>High</td>
<td>High</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Groundwater level</td>
<td>Aquifer sensitivity</td>
<td></td>
<td>Guess</td>
<td>Low</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Min. separation dist. required</td>
<td>m</td>
<td>2</td>
<td>High</td>
<td>Moderate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk to adjacent bores</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Surface water env.</td>
<td>Aquifer sensitivity</td>
<td></td>
<td>High</td>
<td>Very low</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>Dist. to nearest other feature</td>
<td>m</td>
<td>120</td>
<td>High</td>
<td>High</td>
<td>Very low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk of slope instability</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Distance to landslip</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Comments:
Both the depth to water table and distance to surface water alerts will be reduced by the use of an AMTS with irrigation. Treating the wastewater reduces the viral dieback distance to only 2m, reducing the risk significantly.
Assessment Report from Trench 3™ modelling program

Sustainable Environmental Assessment & Management (SEAM)
Land suitability and system sizing for on-site wastewater management
Trench 3.0 (Northern Institute of Environmental Health)

Assessment Report
Wastewater Site Assessment 2 bedroom ancillary dwelling

Assessment for: ADu Plessis
Unit: 4 (4) Marcel Avenue, Randwick NSW 2031

Assessed site(s): 32 Hayes Road, Adventure Bay

Site inspected: 07-May-19

Local authority: Kingborough Council
Assessed by: James Wood

Wastewater Characteristics
Wastewater volume [L/doug] used for this assessment = 480
Septic tank wastewater volume [L/doug] = 150
Sullage volume [L/doug] = 320
Total nitrogen [kg/year] generated by wastewater = 0.1
Total phosphorus [kg/year] generated by wastewater = 2.1

Climatic assumptions for site (Evapotranspiration estimated using mean max daily temperature)

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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</thead>
<tbody>
<tr>
<td>Rainfall (mm)</td>
<td>54</td>
<td>54</td>
<td>41</td>
<td>71</td>
<td>71</td>
<td>52</td>
<td>55</td>
<td>56</td>
<td>61</td>
<td>72</td>
<td>72</td>
<td>74</td>
</tr>
<tr>
<td>Adopted rainfall (mm)</td>
<td>53</td>
<td>53</td>
<td>89</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Potential evapotranspiration (ET, mm)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Evapotranspiration (ET, mm)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
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<td>70</td>
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<td>70</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>

Assumed evapotranspiration less than rainfall (mm) = 0.1

Soil characteristics
Texture = Heavy Clay
Category = S
Thickness (m) = 1.2
Adopted permeability (m/day) = 0.06
Adopted LTAR [L/sq m/day] = 10
Min. depth (m) to water = 1

Proposed disposal and treatment methods

All wastewater will be disposed of on the site

The preferred method of on-site secondary treatment:
In-ground

The preferred type of in-ground secondary treatment:
None

Site modifications or specific designs:
Not needed

Suggested dimensions for on-site secondary treatment system

Total length (m) = 16
Width (m) = 16
Depth (m) = 0.2
Total disposal area [sq m] required = 480
Comprising a Primary Area [sq m] of: 240
and a Secondary (backup) Area [sq m] of: 240

Sufficient area is available on site

See full report for details
AS1547:2012 – Loading Certificate
52 Hayes Road, Adventure Bay 7150 – Proposed 2 Bedroom Visitor Accommodation

- System capacity (number of persons and daily flow)

The system has been based on tank water, with up to 4 persons per day, with each person generating up to 120L of wastewater per day. This creates a total daily peak wastewater loading of 480L per day.

- Summary of design criteria

This report is to calculate and design a wastewater disposal system that can dispose of all the effluent generated by 4 persons at a proposed 2 bedroom ancillary dwelling at 52 Hayes Road, Adventure Bay 7150.

- The location of and use of the ‘reserve area’

There is plenty of available space for a 100% reserve area.

- Use of water efficient fittings, fixtures, or appliances

The report has been based on figures using tank water without any water saving devises. Figures used have been obtained from Table H1 – Typical Domestic Wastewater Design Flow Allowances (Australia). This figure is 120L per person per day (tank water supply). Notwithstanding, water saving devices are recommended – see Maintenance Guide in Attachment A

- Allowable variation from design flows (peak loading events)

The wastewater figures used for this report have been based on the maximum number of persons to be using the proposed dwelling at any one time (4 persons).

- Consequences of changes in loading (due to varying wastewater characteristics)

With the system designed for the maximum wastewater loading, there is expected to be no issues with wastewater disposal for the site.

- Consequences of overloading the system

If the system is continuously overloaded (e.g. higher than 480L per day for many days) then there is a chance that the disposal area could fail. If this occurs or is expected to occur, the disposal area could be enlarged by an extra 50% if required.
• Consequences of underloading the system

If flows are lower than expected the consequences are expected to be minimal on the irrigation area. Long term under loading of the system may also result in vegetation die off in the irrigation areas and additional watering may be required. The system should be placed in safe mode when unoccupied for long periods. Under such circumstances additional maintenance of the system may be required when reactivated.

• Lack of maintenance / monitoring consequences:

The system may not be maintained including the irrigation areas for reasons such as lack of endeavour, sale of the house and new owners not familiar with the maintenance including grease trap and lint trap or neglecting reporting the lack of irrigation area maintenance.

In such circumstance issues of under loading or overloading and condition of the irrigation area are likely to require monitoring and maintenance. This situation may result in unacceptable health and environmental risks. In such instances, compliance can be regulated by the Local Authority Environmental Health Officer through a range of regulatory tools to ensure compliance.

• Other considerations:

Owners/occupiers should be made aware of the importance of maintaining their onsite waste water management system including the irrigation area the maintenance contract for the system (See Attachment with maintenance details).

J. M. Wood

Building Services Designer Hydraulic Accreditation # CC1984 K
RECOMMENDED SYSTEM DESIGN(S)
This report is to assess and design a wastewater disposal system that will effectively dispose of the wastewater from a proposed 2 Bedroom Visitor Accommodation at 52 Hayes Road, Adventure Bay, Bruny Island.

The total wastewater loading is based on 2 bedrooms capable of accommodating up to 4 persons. With each person generating up to 120L of wastewater per day, the total wastewater loading is expected to be: \[ 4 \times 120L = 480L \text{ per day.} \]

Proposed Wastewater System Design
Due to the heavy clay soils, as well as the close proximity of the nearby surface water, it is proposed to utilise an Aerated Wastewater Treatment System (AWTS) with irrigation.

The area required for irrigation is calculated using the following:
\[ A = \frac{Q}{DIR}; \quad A = \frac{480}{2}; \quad A = 240m^2 \]

Collect the wastewater in a new AWTS and pump the wastewater into a new subsurface irrigation field of 240m².

Specifications:
- Minimum pump capacity to be 25m head at the highest point of the irrigation line
- Vacuum breaker to be installed. Wastewater to be returned to the wastewater unit
- 120 – 130 micron inline filter to be installed
- A surface water cut off drain is to be installed upslope of the irrigation field
- Disposal area to be kept free of vehicular access
- Disposal area to be kept free of animals
- Disposal area to be dosed with gypsum at a rate of 1 kg / 3m² prior to applying top soil and irrigation lines
- For subsurface irrigation the area is to be dressed with 100mm of good sandy loam topsoils and planted out with grass seed once complete

Notes:
- If the soil varies significantly than that illustrated in this report please contact the designer immediately
- If bedrock is encountered during the excavation of the beds the designer is to be contacted immediately
- If ground water is encountered during the excavation of the beds the designer is to be contacted immediately

See cross sections over page
Subsurface Irrigation

In-Line Drippers
100-150mm deep

NOTE:
Minimum soil depth to be 300mm, uppermost 100mm to be sandy loam topsoil (this may need to imported).

Depth of dripper lines to be 100mm below surface.

Dripper lines to be 2m apart.

CUT-OFF DRAIN DETAIL
Subsurface irrigation area of 240m², nominally 16m x 15m

See separate report
NOTE
All plumbing work to be carried out by a licensed plumber.
All work to be in accordance with the Plumbing Code 2014, Plumbing Regs. 2008 & AS 3500. Surface irrigation areas to be mulched with 150 mm of organic material and planted with shrubs. Subsurface irrigation areas to be installed in accordance with AS/NZ 1547-2012. The responsibility for the installation rests with the owner and their agent. An as constructed drawing of the system to be provided on completion. There are many factors affecting the successful operation of an on-site wastewater system and it is likely that at some time in the future additional work may be required to maintain the system operational and nuisance free.
I/We authorise the Kingborough Council to make copies of the report for internal office use. Attached with the report or included with the application are original copies of all required certifications from suitably qualified persons.

The design of this on-site wastewater system is suitable for the property referred to in this report and the application.

**DEVELOPER**

**PREPARED BY:** James Wood

**NAME OF ORGANISATION:**
Sustainable Environmental Assessment and Management (SEAM)

**ADDRESS:**
49c Stewart Street, Devonport 7310
160 New Town Rd, NEW TOWN
PO Box 2064, Lower Sandy Bay TASMANIA 7005

**CONTACT DETAILS:**
Ph: (03) 6228 1600
Fax: (03) 6228 1700
Mob: 0419 330 686

**SIGNED:**

**DATE:** 30th May 2019