

Waste Water Disposal from the Toilet Block at Sulby Claddagh, Isle of Man.

Drainage Report

redacted

Issue Date: 31 July 2018

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redacted Waste Water Disposal from the Toilet Block at Sulby
Claddagh, Isle of Man.

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Rev	Description	Issued by	Checked	Date
00	Drainage Report	red	red	31/07/2018

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Author	Signature	Date
redacted	Redacted	31/07/2018

Reviewed	Signature	Date
redacted	Redacted	31/07/2018

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1.0 Introduction

At the request of Redacted acting on behalf of the IOM Government Department of Environment, Food & Agriculture (DEFA), redacted has undertaken inspection of the existing Toilet Block at Sulby Claddagh, to specifically report on waste water disposal from the toilet block.

redacted inspection / observations on the site have been undertaken in the period March - July 2018.

This report records redacted observations and findings with specific respect to waste water disposal from the toilet block.

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2.0 Toilet Block

2.1 Existing Site

Informal seasonal camping is permitted at Sulby Claddagh.

Camping is permitted from 1st May to 30th September annually and Easter weekend.

We understand the maximum permitted camping capacity to be: -

169 Tent emplacements.

84 Motorhome emplacements.

11 Caravan emplacements.

An existing toilet block at Sulby Claddagh provides sanitary facilities for persons camping.

2.2 Existing Toilet Block Facilities

The existing toilet block comprises 2 male, 3 female and 1 disabled wc cubicles, 2 urinals and 7 wash basins. (refer layout drawing in the appendix of this report).

There are no showers or laundry facilities in the toilet block.

Additional facilities for TT and the Festival of Motorcycling, of 3 WC cubicles, 2 urinals and 2 wash basins are we understand, provided.

A 1000 litre storage tank is also provided adjacent the toilet block for chemical toilet waste.

2.3 Existing Drainage

The toilet block discharges waste water from the WC's, urinals and wash basins to two septic tanks, via a 110mm PVC-U below ground pipe system, with tail drains extending from the septic tanks to allow infiltration of waste water into the subsoils.

The below ground drainage system was re-laid in 2012.

The below ground drainage layout is indicated on drawing redacted in the appendix of this report.

No records of the existing septic tank arrangements have been found, but it appears that both septic tanks are of the 'bulb type'.

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2.3 Continued

From IOM Department of Infrastructure staff engaged in emptying the septic tanks, we understand each septic tank has an approximate capacity of 3000 litres.

2.4 CCTV Survey of Below Ground Drainage

Manx Drains undertook CCTV survey of the 110mm PVC-U below ground drainage in May 2018, refer separate Manx Drains report.

Manx Drains survey identified defects to the below ground drainage system, in the form of debris / blockage to the tail drains and deformation / structural damage to pipes, together with backfalls to pipes between the toilet block and septic tanks.

2.5 Maintenance Records

We understand from DEFA that emptying of the two septic tanks takes place approximately six times in each camping season, with surcharging of the below ground drainage system apparent at the time of emptying.

We also understand from DEFA that the chemical toilet tank is emptied approximately eight times in each camping season.

Problems with the below ground drainage system to the toilet block have previously arisen with relaying of the below ground pipework system undertaken in 2012.

A silage spill from Ballamanaugh Farm arose around the toilet block in March 2018, but the spill has now been cleared.

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3.0 Waste Water Disposal

3.1 Existing Flow

From discussions with DEFA, daily records of the number of persons using the camping area are not available.

However, from random observations a maximum of 150 persons camp at the site on any one day during the season, except for the TT and Festival of Motorcycling, when 500-1000 people may camp.

Water consumption per person camping will vary between male and female and reduced WC use may arise with motorhomes / caravans, compared to camping in tents.

For the purposes of this report, we assume a water consumption of 60 litres/person/day.

Published guidance on caravan sites quote 100 litres/person/day (e.g. British Water) but these figures are based on shower and laundry facilities available on site.

The following daily cumulative waste water flows would arise, based on 60 litres/person/day consumption.

Persons Camping	Daily Cumulative Flow
100	6m ³
150	9m ³
500	30m ³
1000	60m ³

3.2 Septic Tank Design

For normal domestic use a 3000 litre septic tank is considered suitable for 5 persons, based on a normal domestic water consumption of 150 litres/person/day.

Hence for the assumed 60 litres/person/day consumption at Sulby Claddagh, two 3000 litre septic tanks would be considered suitable for 25 persons.

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3.3 Tail Drain Design

The existing tail drain length has not been determined on site as debris / blockages prevented CCTV survey of the full tail drain lengths.

CCTV survey recorded 8.5m, 22.1m and 2.5m lengths of tail drains.

For a 150person population based on 60 litres/person/day a typical irrigation trench length of approximately 240m would be recommended for a percolation rate V_p in the range 6-10.

3.4 Infiltration Tests

On 4th May two trial pits were excavated on site and an infiltration test undertaken for each trial pit.

Only one filling and drain down was undertaken for each pit, due to the availability of water on site.

Test results recorded are included in the appendix of this report, with calculated percolation rates of V_p for the sub soils of 7.9 & 8.2.

3.5 Alternative Options for Disposal of Waste Water

Discharge of waste water to the public drainage system is not practicable, as the nearest public drainage system is located approximately 1 KM from the existing toilet block.

A treatment plant located adjacent the toilet block, could be provided to treat the waste water from the toilet block.

Treated effluent from the treatment plant could then, subject to a discharge licence, be discharged to the Sulby River.

The Sulby River is located approximately 100m from the toilet block.

A gravity discharge from the toilet block to the river is feasible.

Storage of waste water on site and disposal off site by tanker is not considered practicable, due to the volumes of waste water and frequency of emptying any tanks on site.

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4.0 Conclusion

The existing two septic tanks and tail drain system do not provide a satisfactory arrangement for disposal of waste water from the existing toilet block.

An alternative method to the existing septic tank/tail drain system of disposal of waste water from the toilet block needs to be provided.

The septic tanks have insufficient capacity for the waste water flows, which arise on the site.

The subsoils are too permeable to prevent contamination of ground water from a septic tank, based on the Building Regulations requirement for the percolation rate of subsoils $V_p > 12$.

The provision of a treatment plant with discharge of effluent to the Sulby River appears to represent a suitable alternative means of waste water disposal.

Defects in the existing below ground drainage pipes have been identified on the CCTV survey.

Discharge of treated effluent to a watercourse requires a Licence to Discharge.

Whilst modelling of the Sulby River will be necessary to confirm water quality issues, it appears likely based on that discussions with DEFA's Environmental Protection Unit, that a licence to discharge to the Sulby River could be obtained.

Effluent quality of 30mg/L BOD, 20mg/LSS and 20mg/L ammonia. must be achieved.

Discharge of effluent from the treatment plant could gravitate and discharge to the Sulby River, which is located 100m from the toilet block.

The treatment plan would need to be a type with recirculation to take account of the variability of discharge from the toilet block.

The treatment plant would be sized on the maximum daily flow.

Due to the very large seasonal variation in maximum daily flows arising from the TT and Festival of Motorcycling, it will be difficult to provide one treatment plant, which can accommodate the variation in use from 0 – 1000 persons, whilst maintaining the required effluent quality.

The maximum variation, which can be accommodated is in the approximate range 0-500 people, based on discussions with Klargestester (suppliers of treatment plants).

Hence temporary additional facilities for the TT and Festival of Motorcycling will be necessary, with storage of waste water on site and disposal of waste water off site.

Chemical toilet waste water cannot be discharged to the treatment plant.

A chemical toilet waste tank will need to be maintained, with off site disposal.

5.0 Recommendations

- Undertake further research to try and establish if accurate numbers of persons using the camping site daily can be established, in particular for TT and the Festival of Motorcycling.
- Submit for a Licence to Discharge to Sulby River based on the 30/20/20 effluent standard.
- Select suitable treatment plants to accommodate different ranges of persons using the camping site with costing for consideration by DEFA.
- Assess the extent of temporary additional facilities for waste water storage and off site disposal for TT and the Festival of Motorcycling.

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6.0 Appendix

Toilet Block Layout Drawing provided by DEFA

Drainage Layout Drawing redacted

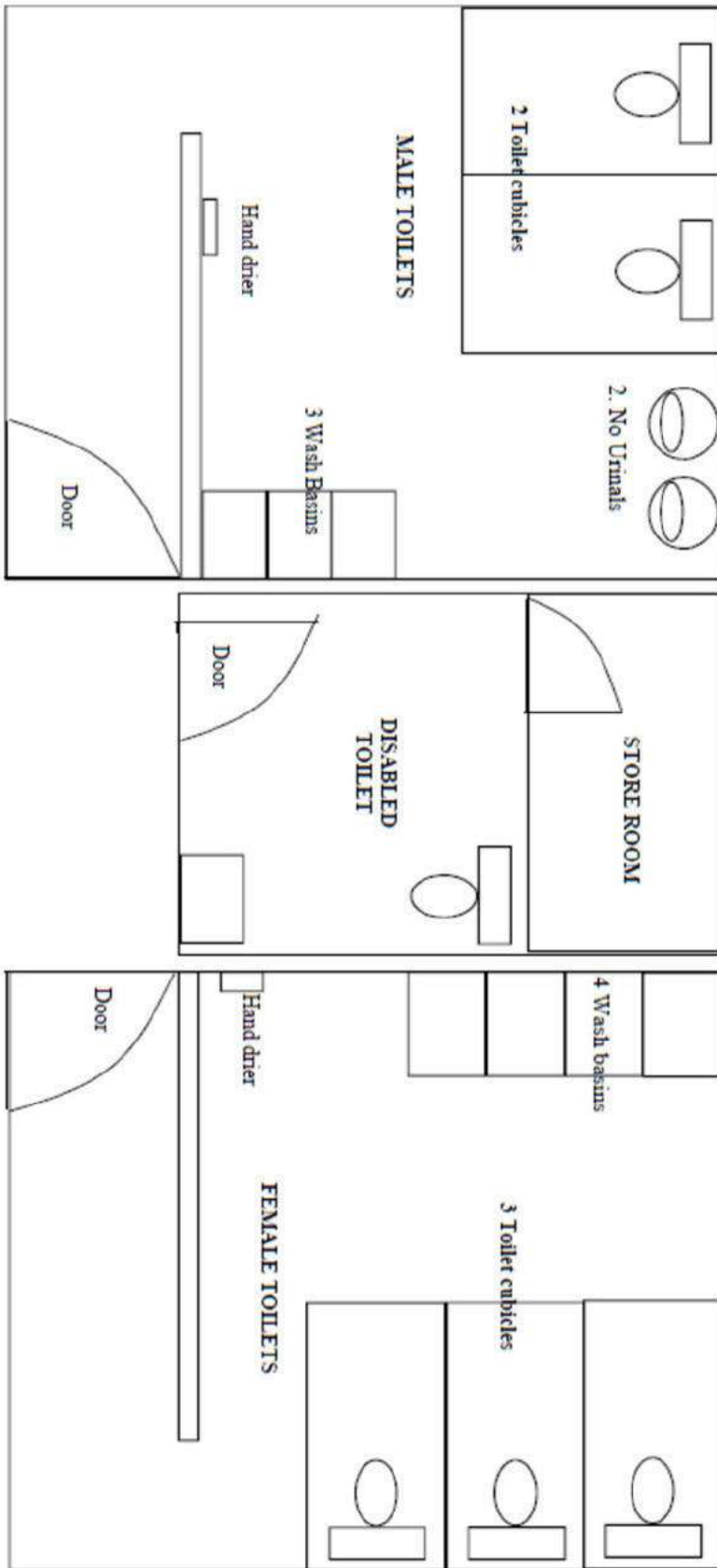
Percolation Test Data

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Sulby Claddagh Toilet Block (Not to Scale)

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Percolation Test

Test undertaken on 4th May 2018

Trial Pit 1 1.5m long x 0.45m long x 2.1m deep

Subsoils Silty Sandy Gravel

Time Depth (below ground level)

Start 900mm

60 mins 1650mm

95 Mins 1700mm

300mins 2000mm

Calculated Infiltration rate = 6.1×10^{-5} m/s (1700 – 900mm depth)Equivalent Percolation V_p = 8.2

Trial Pit 2 1.4m long x 0.45 m x 1.5m deep

Subsoils 300mm thick clayey topsoil

Dark brown silty gravels.

Time Depth below ground level)

Start 700mm

25 mins 900mm

90 mins 1000mm

Calculated Infiltration rate = 6.3×10^{-5} m/s (1000 -700mm depth)Equivalent percolation rate V_P = 7.9

Ground water not encountered in trial pit 1 & 2.

Our Locations

redacted



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