

## **Appendix D: Assessment against Camp Ground Regulations 1985**

**Applicant: Tuffy Investments Limited**  
**Coastwide Surveys**

## 16-023 Hokitika Campground Amenities Calculations By RY 26.2.2016

### Basis: Camping-Ground Regulations 1985

#### Occupancy

2-Bed Units*	6	x	4	=	24
Ensuite Units*	3	x	4	=	12
Cabins	6	x	4	=	24
Deluxe Cabins	3	x	4	=	24
Powered sites	20	x	3.5	=	70
Campsites	28	x	3.5	=	98
<b>TOTAL</b>				<b>=</b>	<b>252</b>

(\* Denotes self-contained accommodation, ie not provided for below,  
which is based on  $252 - 24 - 12 = 216$ , ie 108 Male, 108 Female)

#### Part 3: Ablutions and sanitary fixtures

Male	Pans	4	$(3 + (108 - 100) / 40)$
	Urinals	3	
	WHB	4	
	Showers	4	
Female	Pans	6	$(5 + (108 - 100) / 40)$
	WHB	4	
	Showers	4	

#### Part 4: Refuse disposal

Refuse containers shall be provided not more than 50 metres  
from every camp site.

#### Part 6: Laundry facilities

2 laundry tubs and 1 washing machine for every 200 persons or part thereof

3 tubs, 2 washing machines required

## **Appendix E: Stormwater Management Plan**

**Applicant: Tuffy Investments Limited**  
**Coastwide Surveys**

**TUFFY INVESTMENTS LTD  
HOKITIKA CAMPING GROUND  
DAVIE STREET – HOKITIKA**

**STORMWATER ASSESSMENT/DISPOSAL**

**1.0    INTRODUCTION**

Tuffy Investments Ltd, being the owners of Lot 1 DP 349111 (Davie St. Hokitika), are developing the site as a camping ground. The stormwater that discharges from the site into a Council stormwater drain in Davie Street comes from a number of sources and this report establishes the volumes of stormwater from these sources and how discharge into the Council system will be eliminated.

**2.0    DESCRIPTION**

The catchment has a number of surfaces ranging from impermeable areas such as roofs, driveways, roadways and permeable surfaces such as grass and bush areas etc.

There is no assessment of how these surfaces may change in the future. The following volumes have been established on our assessment of the catchment area as they currently exist.

There are three catchments that have been considered as contributing to the volume to be disposed of.

They are:

- Developed Camp Site
- Heenan Place outlet
- Discharges onto the Camp Property

### 3.0 STORM EVENT

This assessment uses the New Zealand Building Code Section E1/VM1 to establish the volumes of stormwater with the following parameters:

Time of concentration	10 minutes or 1 hour
Probability of occurring annually	10%
Rainfall intensity (NIWA)	97.2mm/hr or 40.4mm/hr

It is noted that for a soak pit disposal system (NZBC E1/9.0.3), a 1 hour duration should be used to establish the size of the soak pits. This will give a smaller discharge rate but will give a larger volume to be disposed of. The intensity for a 1 hour duration is 40.4mm/hr using data provided by NIWA.

### 4.0 DEVELOPED CAMPSITE

The proposed campsite catchment has the following surfaces

Roof areas	1730m <sup>2</sup>	runoff coefficient 0.90
Sealed areas	2100m <sup>2</sup>	runoff coefficient 0.85
Bush areas	1600m <sup>2</sup>	runoff coefficient 0.25
Grassed area	19640m <sup>2</sup>	runoff coefficient 0.30

Based on the rational method NZBC /E1 the generated stormwater using a rainfall intensity of 97.2mm/hr for a 10 minute storm duration gives a volume of:

$$0.260\text{m}^3/\text{sec} \times 600 \text{ secs} = 156.3\text{m}^3.$$

For a soakpit disposal solution this volume becomes:

$$0.108\text{m}^3/\text{sec} \times 3600 \text{ secs} = 388.8\text{m}^3 \text{ which is a larger volume to be disposed of.}$$

## 5.0 HEENAN PLACE OUTLET

Heenan Place discharges stormwater onto the proposed campsite via a 600 diameter drain that is located in a narrow finger of land approximately 27 metres long and varying in width from approximately 3.0 metres to 6.1 metres.

The Heenan Place catchment, again, has a number of surfaces and it extends partially to properties in Airport Drive and Alpine View.

This catchment is comprised of:

Roof Areas	2700m <sup>2</sup>	runoff coefficient	0.90
Sealed Areas (roadway)	1300m <sup>2</sup>	runoff coefficient	0.85
Grassed Areas	36400m <sup>2</sup>	runoff coefficient	0.30

Using a rainfall intensity of 97.2mm/hr (time of concentration 10 minutes) a volume of  $0.39\text{m}^3/\text{sec} \times 600 \text{ secs} = 234\text{m}^3$  is calculated.

For a soakpit disposal solution this volume becomes (1 hour storm duration)

$$0.162\text{m}^3/\text{sec} \times 3600 \text{ secs} = 584\text{m}^3$$

## 6.0 DISCHARGES ONTO CAMP PROPERTY

The discharges onto the camp property are relatively small and minor in terms of stormwater volume.

They are:-

### 1 Heenan Place

There are two pipes one from the driveway and lawn but the landowner has been advised that these existing pipes can remain. A soak pit will be constructed on the campsite property with an easement over it.

#### 5 Heenan Place

Some of this area goes to the street and then to the 600 diameter outlet, there is only a 50 diameter pipe discharging a small quantity directly into the camp property. This will be re-diverted to discharge into the proposed Heenan Place soakage trench. This land area will be vested to Westland District Council.

#### 7 Heenan Place

A little of this area goes to the street and the 600 diameter outlet, but the majority to the camp property where a soak pit (with an easement over) will be constructed on the campsite property.

#### 157 Jollie Street

Stormwater collected from the concrete area goes to the camp property, the house and garage goes to Jollie Street but not to the 600 diameter Heenan Place outlet. A soak pit will be constructed on the campsite property with an easement over it.

In addition overland flow occurs in the north-east corner of this property, a section of the nib wall will be removed to allow overland flow to the campsite property. There will be no soakpit provided for this overland flow.

#### 159 Jollie Street

There is only a small area of ground surface water that discharges to the camp property. The majority of the water goes to Jollie St but not to the 600 diameter Heenan Place outlet. There will be no soak pit or easement provided.

### 161 Jollie Street

The property file shows this as going to the street and then down Jollie so not to the 600 diameter Heenan outlet but these areas discharge to the camp property. A soak pit will be constructed on the campsite property with an easement over it.

The areas associated with these properties are:

Roof/drive areas	490m <sup>2</sup> runoff coefficient	0.90
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Grass areas	2500m <sup>2</sup> runoff coefficient	0.30
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Based on these areas and using a rainfall intensity of 97.2mm/hr the discharge volume onto the campsite property is:

$$0.025\text{m}^3/\text{sec} \times 600 \text{ secs} = 15.0\text{m}^3$$

For a soakpit disposal solution this volume becomes:

$$0.0084\text{m}^3/\text{sec} \times 3600 \text{ secs} = 30.01\text{m}^3$$

There are only 5 properties that will require soakage pit disposal of stormwater, 4 of these will have soakage pits in the camp property and 1 of these will have disposal to the Heenan Place soakage trench.

#### 7.0 GROUND SOAKAGE RATE

A soakage rate for the gravel materials below the pan has been established by test in accordance with E2/VMI Clause 9.0.3. The pan was broken up, a hole formed through it and a test hole (tube) installed, penetrating into the free draining gravels below the pan and testing performed.



The test determined that a permeability (soakage rate) of 1.11 cm/sec is available in the gravels below the pan.

## 8.0 SOAKAGE TRENCH AREAS

Using the established volumes for a soakage disposal system and the established permeability a soakage trench or soakpit area can be calculated.

$$\text{Developed camp site} \quad \frac{388.8 \times 10^6}{1.11 \times 60 \times 60} \times \frac{1}{10^4} = 9.7\text{m}^2$$

$$\text{Heenan Place} \quad \frac{584 \times 10^6}{1.11 \times 60 \times 60} \times \frac{1}{10^4} = 14.6\text{m}^2$$

$$\text{Camp Property discharges} \quad \frac{30.1 \times 10^6}{1.11 \times 60 \times 60} \times \frac{1}{10^4} = 0.75\text{m}^2$$

It should be noted that the adjoining property discharges are relatively small when compared to the developed camp property and the Heenan Place outflow.

It should also be noted that the discharges are spread around the perimeter of the site and there are 4 small soakpits of approx.  $0.6\text{m}^2$  each to take this combined flow.

The 10 minute storm duration has a greater discharge rate and this could have some effect on the size of the soakage area. This effect will depend on the configuration of the system and the volume of storage that the system can provide without flooding occurring. For the larger camp property and Heenan Place catchments, there is considerable storage volume available within the catchment but some adjustment in the calculated soakage areas is prudent.

We would recommend soakage areas be provided as:

Developed camp site	15m <sup>2</sup>
Heenan Place	22m <sup>2</sup>
Camp property discharges	1.6m <sup>2</sup>

#### 9.0 DAVIE STREET

There are two existing stormwater pipes that currently discharge into an open channel just prior to the Davie Street stormwater pipe. The Davie St Stormwater pipe will be extended into the camp property (so that the open drain can be filled) and the two existing stormwater pipes connected into the 600 diameter extension.

#### 10.0 TREATMENT

For the developed camp site, and the adjoining property discharges the stormwater is effectively clean roof runoff with some small grassed area runoffs. The soak pits will therefore experience little if any silt deposits and these soakage areas are shallow and can be easily maintained if necessary.

For the Heenan Place discharge there are open drains and undeveloped land areas that could result in some silt and vegetation contamination of the stormwater. In addition there is a small section of roadway that will, over time, generate silt resulting from vehicle movements.

It is therefore intended to provide a higher level of treatment for the Heenan Place discharge to soakage trench and a Hynds silt trap will be installed prior to discharge to the soakage trench. It is intended that this area of land that the Heenan Place soakage trench is constructed on will be vested to the Westland District Council.

## 11. DETAILS

The following detailed drawings are attached:

- 11.1 Catchment areas including residential property discharges.
- 11.2 Soakpit layout and details for the campsite and adjoining property discharges.
- 11.3 Soakpit/treatment layout for the Heenan Place outlet.

## 12.0 PROPERTY EFFECTS

For the Heenan Place soakage trench the excavation will be undertaken completely on the strip of camp property land that is approximately 3m wide at its narrowest point to 6.1m wide. The excavation is relatively shallow being a soakage trench so there is no interference with the adjoining property boundary fences. There will be some construction noise that will occur over approximately 5 days. Excavated material will be removed from site as it is excavated and free draining backfill will be bought in as required. There will be no stockpiling of material against any existing boundary or boundary fence. All silt runoff will be captured and will not run onto any of the adjoining properties or back to Heenan Place. All the soakpits are shallow and small in areas so they also will have no effect on the surrounding properties during construction.

Following completion of the soakage areas the areas will be grassed. There will be no ongoing effects on any of the surrounding properties.

## 13.0 SOAKAGE TRENCH MAINTENANCE

The Heenan Place soakage trench that is disposing of the stormwater runoff from the Heenan Place Catchment, as shown on the attached drawings, will be vested to the Westland District Council.

A large silt trap will be sited at the lead-in to the soakage trench and this silt trap will need to be cleaned on a regular basis. The cleaning regime will vary depending on the time of the year and amount of rainfall but also on the amount of silt that may develop from the catchment.

We would expect various site developments will generate some silt runoff and heavy rain following a dry period may also generate some silt runoff and heavy rain following a dry period may also generate some silt runoff.

Although winter has a high rainfall the catchment will be well grassed at this time so the cleaning regime will vary depending on what work is being undertaken in the catchment area, the season and the length of dry periods preceding the rainfall event.

We would expect that the silt trap would be inspected regularly (monthly), and that it would need to be cleaned at least once a year and probably in April (towards the end of autumn).

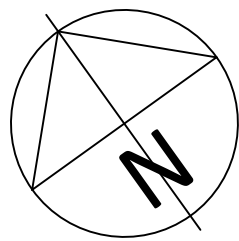
The soakage trench will be fitted with a manhole inspection chamber so that the infiltration pipes can also be checked to ensure they are remaining clean. We would expect the soakage trench would be inspected at the same time the silt trap is checked.

#### 14.0 SOAKPIT MAINTENANCE




The soakpits are located on the campsite property and are fitted with a manhole lid for inspection. The majority of the water that passes to these soakpits is roof water and therefore there is little, if any, silt in the runoff. The soakpits will need to be inspected on an annual basis and if necessary any silt forming on the base removed by suction.


## 15.0 CONCLUSION

The use of soakpits and a soakage trench removes a large volume of stormwater from the Council system and therefore there is considerable benefit for the Hokitika Stormwater infrastructure for such a solution.

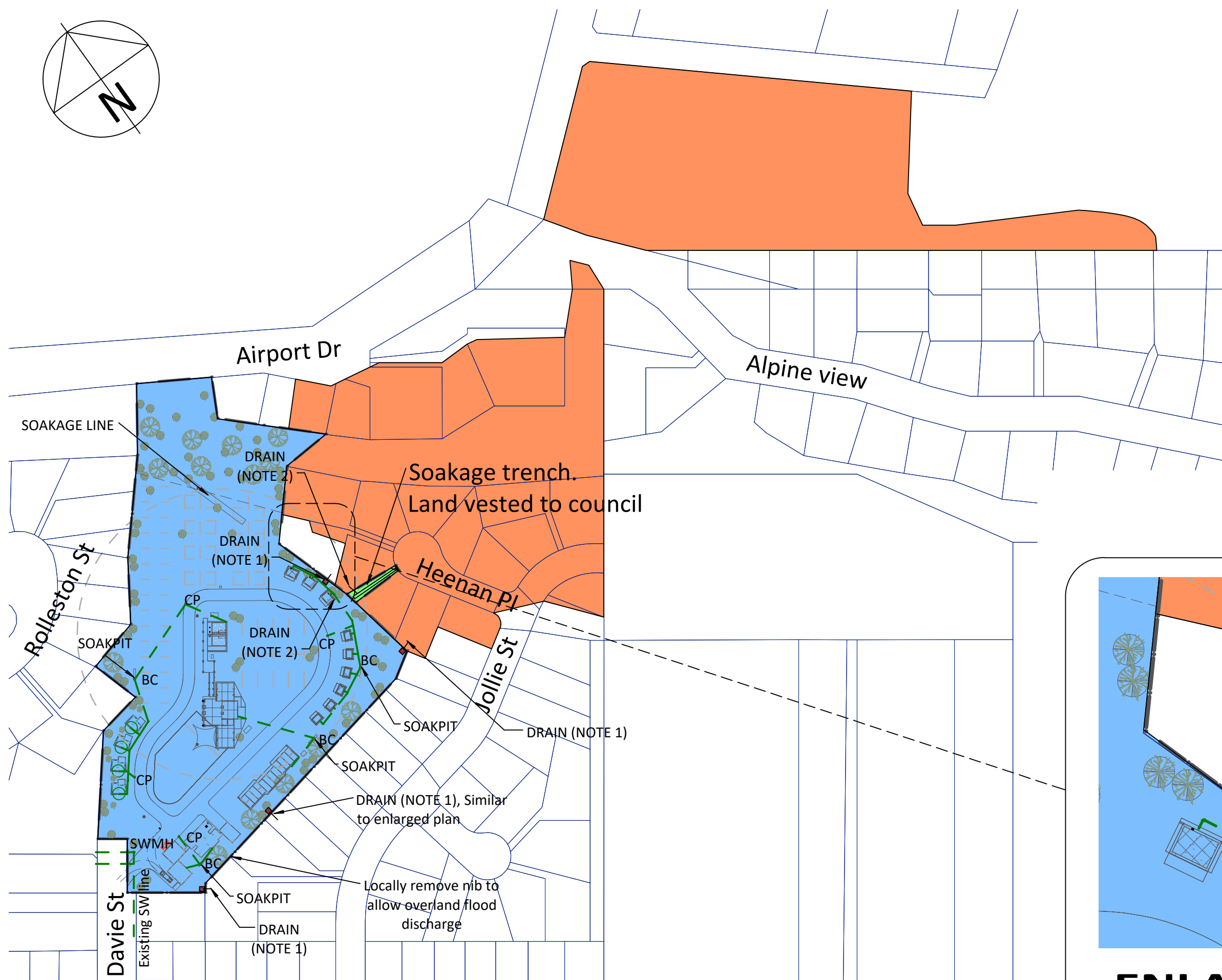


#### CATCHMENT AREA LEGEND

-  = DEVELOPED CAMP SITE
-  = HEENAN PLACE
-  = LAND VESTED TO COUNCIL

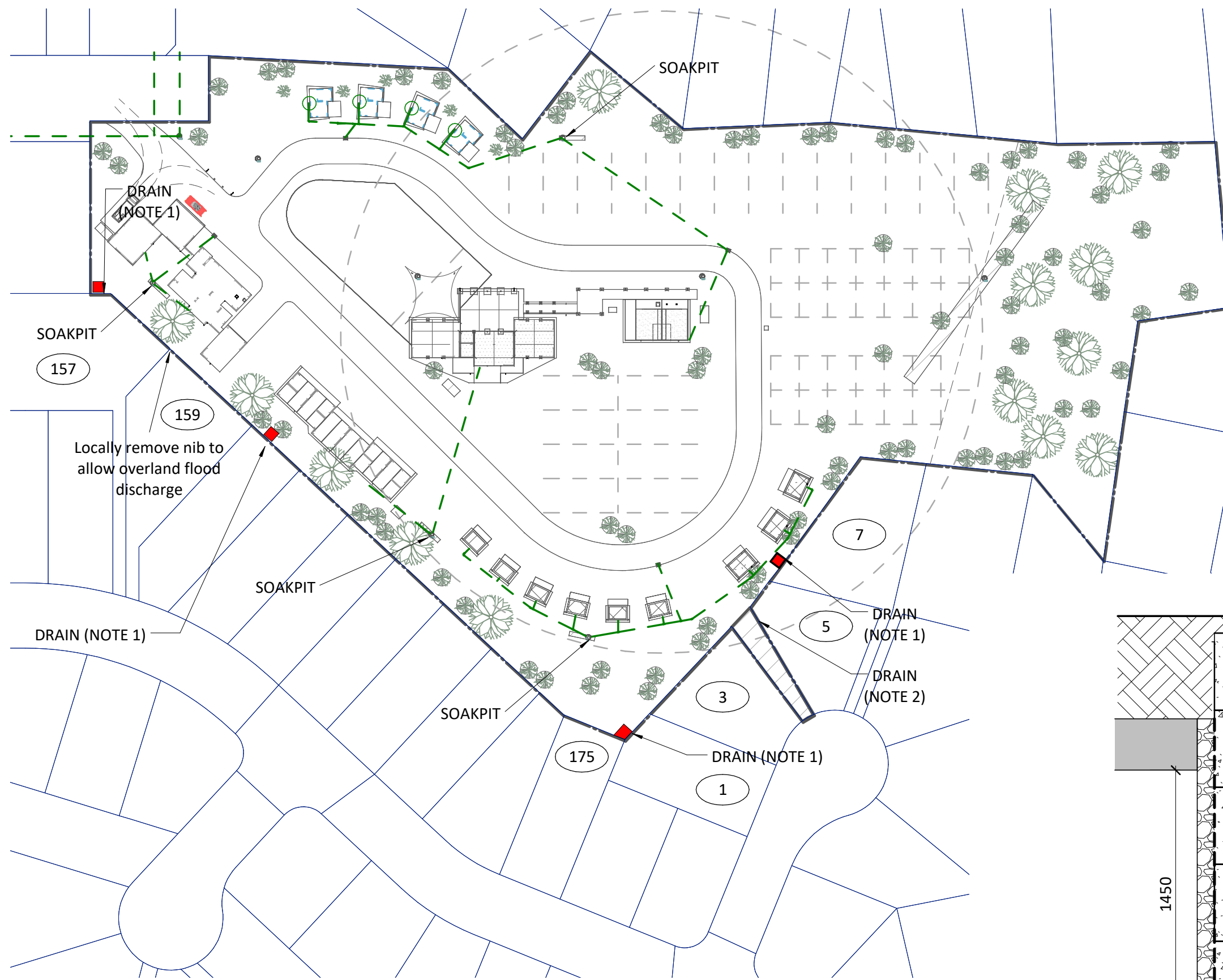
 NOTE 1: DRAIN DISCHARGING INTO CAMP SITE TO BE PROVIDED WITH SOAKPIT AND EASEMENT OVER

NOTE 2: PIPE TO BE DIVERTED INTO HEENAN PLACE SOAKAGE TRENCH

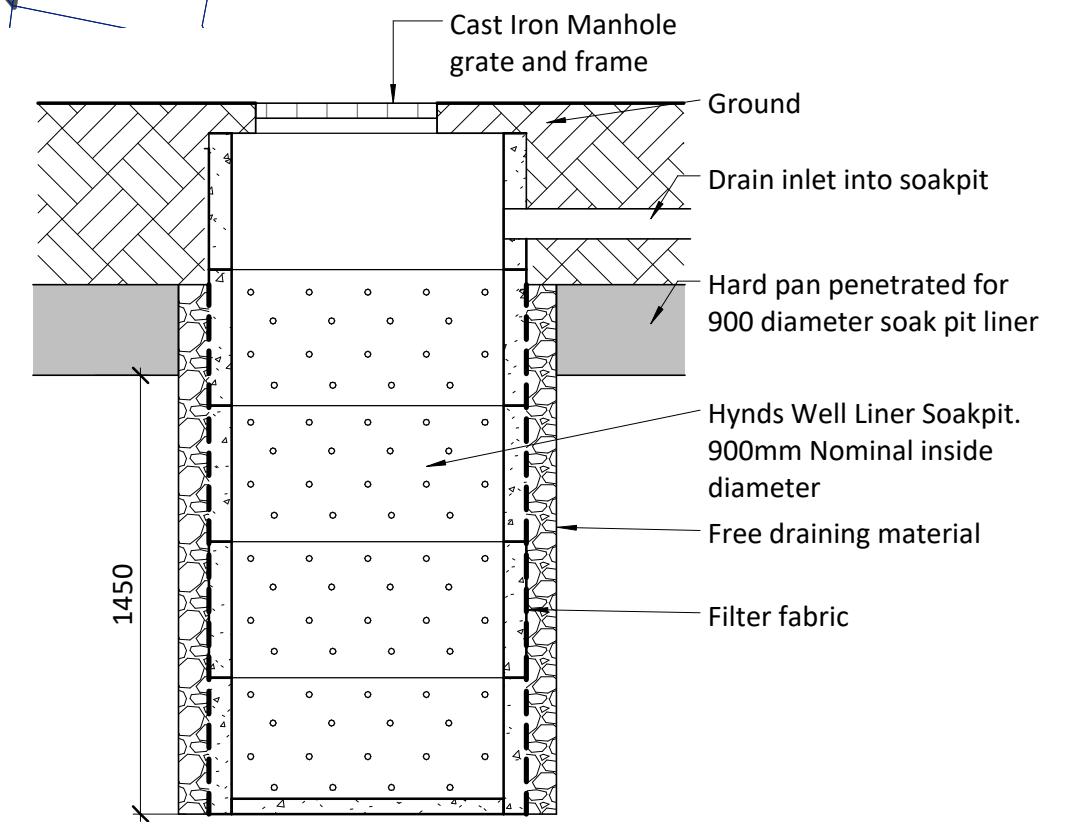


## CATCHMENT PLAN



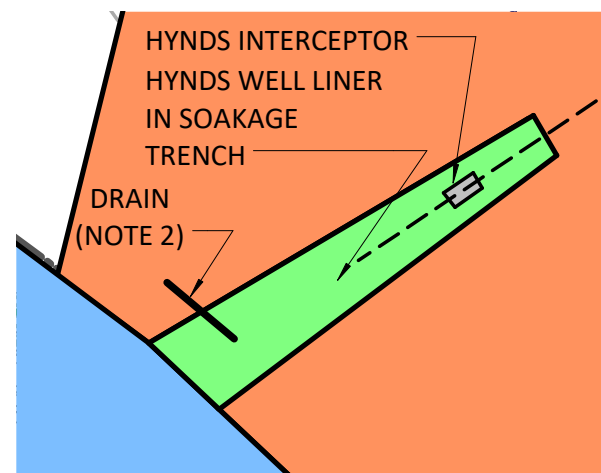


**A ENLARGEMENT**  
Scale 1 : 1000@ A3

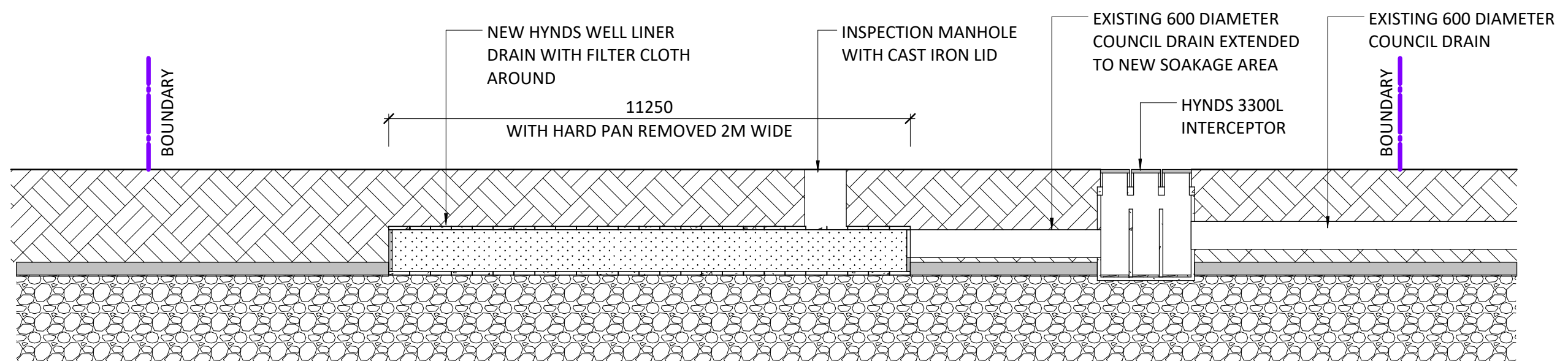


**1 TYPICAL SOAK PIT - 4.0 M<sup>2</sup> DRAINAGE**  
Scale 1 : 25@ A3





## ENLARGEMENT



## A TYPICAL DRAINAGE SECTION

Scale 1 : 100@ A3