

Stormwater Design Management Plan

Bangor Village

Revision 0

21112

Hughes Developments Ltd
Bangor Road, Darfield

June 2026



Shaping the future since 1880

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Introduction

As part of the subdivision resource consents granted by the Selwyn District Council to Hughes Developments Ltd, conditions xx and xx states:

At least 20 working days prior to the commencement of construction works on the Site, the Consent Holder shall submit a finalised SMP prepared by a SQEP to SDC for certification.

The objectives of the SMP are to:

- *manage stormwater during the construction of the Project to ensure that it does not enter the Waterways and is able to discharge to ground without ponding or generating adverse effects on surrounding properties;*
- *manage the implementation of the operational stormwater system for the Project in accordance with the Infrastructure Assessment referenced in Schedule 1 and the conditions of the Project Consents.*

The purpose of the certification of the SMP by SDC is to ensure that the finalised SMP complies with the relevant conditions of this consent.

The finalised SMP must be in general accordance with the Infrastructure Assessment and Draft SMP referenced in Schedule 1 and must include:

- a) *A plan showing existing ground levels on neighbouring properties along with proposed levels on the subdivision sites. Interference with pre-existing stormwater flows needs to be considered so as not to cause ponding or nuisance on neighbouring or developed land.*
- b) *Existing and proposed drainage plan with sub-catchments and flow arrows to show how the drainage will be affected.*
- c) *Calculations to demonstrate compliance with the ECoP and the conditions of CRC xxxxx.*
- d) *Ongoing operation and maintenance requirements.*

This Stormwater Management Plan has been prepared to satisfy the above consent conditions.

Design Criteria

The following design criteria were adopted throughout the design of this stage:

- Stormwater generated from the roofs of individual dwellings must be discharged to ground via soakpits within individual lots and shall be sized in accordance with the New Zealand Building Code Clause E1;
- Soakpits for all individual lots shall:
 - a) store and dispose of the 10% AEP 1 Hour duration storm event as per the NZ Building Code;
 - b) roof stormwater shall discharge via a sealed system that excludes all other stormwater to soakpits;
 - c) have a base that extends into free draining soil strata, have a factor of safety of three incorporated into the soakpit design;
 - d) have a maximum depth of 4 metres below ground level;
 - e) be designed in accordance with the New Zealand Building Code clause E1 or other approved standard (as noted within CRC xxxxxx)
- Stormwater generated from roads, road berms and lot frontages must be collected by sumps fitted with submerged or trapped outlets with a minimum of 60 litres containment;

- The pipe network must be sized to cater for the critical duration 10% AEP rainfall event;
- Stormwater treatment is to be provided through the train of submerged outlets within the system; treatment swales, settlement of sediment within the chambers and filtration through upper soil layers beneath the soakpit;
- The soakpits shall:
 - a) Store and dispose of stormwater arising from all rainfall events up to and including the 2% AEP 24-hour duration rainfall event from the contributing catchment;
 - b) Have a base that extends into free draining soil strata;
 - c) Have a maximum depth to the base of 4.0 metres below the natural ground level;
- The capacity of the combined primary and secondary stormwater system must ensure hydraulic neutrality against the pre-development runoff conditions for all events up to the one percent annual exceedance probability (1% AEP) 24-hour rainfall event through the use of above ground storage within swales, roads and reserves;
- Any flow above a 1% AEP event must be directed to a secondary flow path via the road reserves to direct flows away from buildings;
- Stormwater shall not pond for longer than 48 hours after the cessation of any storm event; and

All soakpits are situated in areas of free draining soil strata. To confirm the soakage trench could dispose of stormwater from the design rainfall event, infiltration testing in accordance with NZBC E1 was undertaken to confirm the infiltration rates at each soakage trench location. A factor of safety of 3 was applied to the infiltration rates to allow for future degradation of the soakage trench.

Stormwater System Design

The as-built stormwater layout is shown with Appendix D. Construction of the proposed stormwater was in compliance with the Selwyn District Council Code of Practice (COP). The Christchurch City Council Construction Standard Specification (CSS) details were used as a supplementary standard.

Stormwater runoff from the completed development Stages X, X area discharges into the kerb and channel or roadside swale, and is conveyed to catchpits. From here stormwater enters separate networks of pipes and manholes which will convey stormwater to the stormwater disposal facilities located within the stages. Due to the local ground conditions and the depth to groundwater of greater than 50m, the favoured mechanism for stormwater disposal in the area is soakage to ground. Stormwater discharged from the catchment area is treated through grassed swales and/or submerged outlet systems before being discharged to ground within soakpits. The depth of these soakpits is limited to 4m below ground level to ensure the maximum possible level of treatment is provided through infiltration of the sandy gravel soil layers extending well beneath the site prior to mixing with groundwater. There are no nearby wells which will be affected by this treated stormwater discharge. Existing flow paths into the site from the upstream catchment have been maintained through the roading network.

Each pipe system has been designed to convey the 10% AEP storm event with pooling no higher than the top of kerb at sump locations. Pipes vary in size between 150mm and 225mm in diameter. All manholes are reinforced concrete which have been benched to minimise hydraulic losses through the system.

The main purpose of the roadside swales is for the conveyance of stormwater to the piped system, however they will provide a level of additional treatment prior to discharge to the piped system and soakpits. The landscape design has been undertaken by Kamo Marsh Landscape Architects to provide plant species suitable for the intended use and location. Biodegradable weed matting has been used within the planted areas of the swales in place of organic mulch to minimise the quantity of organic matter which may be conveyed into the soakpits. This planting plan has been approved by SDC.

Soakage testing has been undertaken at the location of each soakpit to the NZBC E1 testing standard. This soakage testing has yielded results of >6000mm/hr, as such a design soakage rate of 2000mm/hr has been used which includes an allowance for a factor of safety of 3 to allow for future soakage degradation.

It is expected stormwater up to the 10% AEP emanating from hard-stand areas on residential lots will be disposed of within the lot boundaries in accordance with the New Zealand Building Code. It is assumed that 30% of the lot area will discharge via land contours to the roads, this has been used in the design of the vested soakpits. A combined runoff coefficient of 0.55 and HIRDS V4 RCP8.5 rainfall data has been used to calculate runoff flow rates for both the pipe network and soakpits.

This stormwater infrastructure will ensure that all storm durations of 2% AEP are detained within the soakpits and disposed of on site, in accordance with the operational phase discharge consent CRC xxxxxx. Additional above ground storage within the roadways and swales will ensure that the 1% AEP critical duration event is accommodated in accordance with SDC consents RC xxxxxx.

The stormwater catchment plan is attached as Appendix A, Soakpit calculations are attached as Appendix B and the site contours including perimeter levels are attached as Appendix C. These documents provide the necessary information to demonstrate compliance with the consent conditions.

Environment Canterbury Consent CRC xxxxxx can be found in Appendix E.

Maintenance Procedures

It is noted that down contour domestic water supply bores may be sensitive to the discharge of contaminants to groundwater. The nearest bore down contour of the site is BX22/0006 which is located approximately 3.6 km from the nearest point of stormwater discharge. This bore is registered for irrigation use but use for domestic purposes is a possibility. Due to the significant distance between the point of discharge, the expected low contaminant levels in the discharge and the shallow groundwater contour, the risk of contamination at this water source is considered very low. The community supply bore on the northern boundary of the development is located upstream of the discharge from these stages and therefore is considered unaffected.

The maintenance requirements for the contractor to meet during the maintenance period of two years or until vesting in Selwyn District Council include minimum once yearly inspection of all parts of the stormwater system and 6 monthly inspections of stormwater swales, with remediation actions as required. A copy of the minimum inspection requirements and remediation actions are included in Appendix F.

The maintenance personnel engaged by the developer are BG Contracting Limited. They can be contacted on 03-313-7698. Records of their maintenance throughout the defects period will be kept.

The Selwyn District Council has a standard maintenance programme for its stormwater facilities, and it is expected that the stormwater facility will be maintained generally in accordance with that when the facility is handed over to SDC following the 2-year defects period.

Handover Procedure

Two months prior to completion of the maintenance period of this stage, a final inspection of the system will be carried out by a Davie Lovell-Smith Ltd representative and any remedial actions, if required, will be carried out. Once the system is fully complying with the Maintenance Schedule and Operational Discharge Consent, a request for handover will be made.

Appendix A: Stormwater Catchment Plan

Appendix B: Soakpit Sizing Calculations

Appendix C: Design Contours Plan

Appendix D: Stormwater As-Built Plans

Appendix E: ECAN Consent CRC xxxxxx

Appendix F: Maintenance Requirements

Minimum stormwater system maintenance inspections and remediation during maintenance period - to be carried out by the contractor

Note that these are minimum requirements. Should the Contractor be continuing to carry out further work at the site there is extra risk of problems occurring, and it is the Contractors responsibility to remediate problems that may be noticed at any time during the maintenance period.

The contractor is to keep a record of the inspections and remediation actions carried out and provide a copy of these records at the end of the maintenance period.

Task	Minimum frequency of maintenance visit					
	Sumps			Swales		Infiltration and dry basins
	Key sumps	Non-key sumps	To soakage chambers	Urban	Rural-residential	
Removal of debris, and litter likely to adversely affect the operation of the system, within 10 working days of the maintenance visit	Yearly	Two Yearly	Yearly	6 monthly	Yearly	6 monthly
Removal of sediment likely to adversely affect the operation of the system, within 10 working days of the maintenance visit	Yearly	Two Yearly	Yearly	N/A	N/A	N/A
Removal of hydrocarbons that are visible over a total area of greater than 0.5 square metres (swales and basins) or a layer greater than 5 millimetres thick (sumps), within 10 working days of the maintenance visit	N/A	N/A	6 monthly	6 monthly	Yearly	6 monthly
Repair or stabilisation of erosion and scour, within 20 working days of the maintenance visit	N/A	N/A	N/A	6 monthly	Yearly	6 monthly
Replanting, where bare or patchy soil cover or sediment build up is greater than 10 square metres, or a total of five percent of the area of the device, whichever is the lesser, within 10 working days of the maintenance visit	N/A	N/A	N/A	6 monthly	Yearly	6 monthly
Maintenance of vegetation and/or grass so it is in a healthy and uniform state, with the exception of seasonal browning off	N/A	N/A	N/A	6 monthly	Yearly	N/A
Clean out following spills	As needed	As needed	As needed	N/A	N/A	N/A
Mow grass to ensure it is generally at a length between 40 and 150mm	N/A	N/A	N/A	Monthly or as needed	Monthly or as needed	Monthly or as needed
Weed control	N/A	N/A	N/A	6 monthly	Yearly	6 monthly