
soakage design manual

PREFACE

This Soakage Design Manual has been prepared to provide assistance in areas of Auckland City where stormwater runoff must be controlled by ground soakage. The information will be useful for Auckland City residents, land developers and the professionals who advise them.

The development of many parts of Auckland City has relied heavily on the use of ground soakage for stormwater disposal. While this practice was often adopted for necessity (rather than for environmental benefit), it has also helped to maintain a valuable groundwater resource and to reduce the pollution of Auckland's marine receiving waters. The use of stormwater soakage is in agreement with modern international "best practice" which emphasises the importance of "at source" controls such as stormwater soakage.

The first edition of the "Stormwater Soakage Design Manual" was produced in 1991 (and later reprinted in 1994). This 2003 version of the Soakage Manual builds on the earlier editions and has been produced as part of Auckland City's "On-site Stormwater Management" (OSM) project. The OSM project has focused on ways of controlling the increased quantity of stormwater generated by intensified development (both in soakage areas and areas serviced by reticulated stormwater networks).

DISCLAIMER

The information regarding stormwater soakage systems in this Manual has been prepared for the purpose of assisting applicants to deal with the typical stormwater soakage situations which occur in the Auckland City area. This Manual represents a significant amount of analysis about the problems of stormwater management in Auckland City, and can help you in dealing with the adverse effects of stormwater on your own and neighbouring properties.

The Manual is a useful consolidated summary of information about common stormwater soakage issues and the regulatory requirements for sites within Auckland City. In particular, the Manual details a suggested design approach complete with worksheets and design charts to assist applicants to determine which stormwater soakage system should be adopted.

However, you as the applicant are responsible for the application of the Manual to your site and making the decision regarding which soakage system is adopted as required. While this Manual can assist you, the Council is not responsible for any consequences or effects of any system that may be installed solely as a result of the application of the Manual. The Council encourages applicants to obtain specific advice (in addition to the general advice contained in this Manual) to confirm that the stormwater soakage system you choose is efficient and adequate for your site and that it is installed correctly.

The information in the Manual regarding resource consents and building consents is in summary only for the convenience of the reader. It is the responsibility of the reader to always check and confirm the regulatory requirements in the provisions in the relevant planning document as appropriate e.g. Proposed District Plan (Central Area), the Auckland City District Plan (Isthmus), the Auckland City District Plan (Hauraki Gulf Islands) and the Auckland Region Plans.

AUCKLAND CITY COUNCIL

SOAKAGE DESIGN MANUAL

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Note: The following list of companies is not a comprehensive summary of all the firms that can assist with the supply of materials or services for soakage systems, and is not intended to imply that the products and services provided by these firms are superior to other companies. Nevertheless, these companies have provided helpful information and input, and their contributions are gratefully acknowledged:

Firth Industries (Porous Paving)
Formpave Ltd (Porous Paving)
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W Stevenson & Sons Ltd (No-Fines Base Course)
B and B Plumbers (Soakhole Cleaning and Replacement)
Liquid Waste (Soakhole Cleaning)
Winstone Aggregates (50/20 Scoria)
Ihumatao Quarries Ltd (50/20 Scoria and 50/150 Scoria)
Niederer Drilling (Soakage Bore Drilling)
Ingal Environmental Services (Pre-treatment Systems)

LIST OF ABBREVIATIONS

ACC	Auckland City Council
ACE	Auckland City Environments
AEP	*Annual Exceedance Probability
ARC	Auckland Regional Council
IANZ	International Accreditation New Zealand
L	Litre
LIM	*Land Information Memorandum
MPD	Maximum probable development
m	Metre
OSM	*On-Site Stormwater Management
O&M	Operation and Maintenance
PIM	*Project Information Memorandum
RMA	Resource Management Act, 1991
[no.]	Document reference, as listed in Appendix A
[comment]	Additional note to aid the Manual user

* the "List of Definitions" (below and overleaf) explains the terminology

LIST OF DEFINITIONS

Note: definitions apply to the context in which they are used in this Manual

Annual exceedance probability	The probability, expressed as a percentage, that a flood of a given magnitude will be equalled or exceeded in any one year: 1% AEP corresponds to a 1 in 100 year return period storm. 2% AEP corresponds to a 1 in 50 year return period storm. 10% AEP corresponds to a 1 in 10 year return period storm. 50% AEP corresponds to a 1 in 2 year return period storm.
Catchment	Area contributing flow at a point on a drainage system
Catch-pit	Small chamber incorporating a sediment trap that runoff flows through
Contours	Lines on a drawing that join points of equal elevation

Equivalent impervious area	The area of impervious surface that would contribute the same amount of runoff as an area made up of both pervious and impervious surfaces.
Filter-strip	Broad grassed surface conveying runoff
Flood frequency	The probability that a flood discharge rate will be equalled or exceeded in any year (refer also “annual exceedance probability” above)
Groundwater	Water stored and/or moving under the ground surface
Impermeable/impervious surface	Surface through which water cannot pass (eg roof, concrete)
Infiltration	The passage of water through soil to reach groundwater
Land Information Memorandum	A report detailing all information about a property that is known by the Council. This includes hazards, drainage plans and information on rates, permits and zones. The report is normally requested by people considering purchasing a property.
On-site stormwater management	The detention and/or retention of runoff on a site before discharging it to a disposal system
Orifice	A hole of a specified size designed to discharge flow at a pre-determined rate (it is normally machine-drilled in a plate and attached at the entry to a pipe)
OSM device	An on-site stormwater management system, designed to meet water quantity and/or quality goals, which utilises detention and/or retention of runoff before discharging it to a disposal system
Overland flow path	Route taken by flood runoff not able to be contained in the main pipe or channel stormwater conveyance system
Paved area	Any impervious ground-level area, such as driveways or patios
Pervious area	Any area covered in vegetation or garden.
Permeable surface	Surface through which water passes by infiltration
Porosity	Represents the proportion of water in a saturated gravel or soil. Multiply by the total

	volume of gravel/soil to give the volume of storage
Porous pavement	A paved surface through which water can infiltrate
Porous paved area	Any area covered in porous paving.
Project Information Memorandum	A report prepared by the Council for an owner considering a building project. The report contains information on hazards, public drainage systems and other services (e.g. electricity).
Rainwater tank	A tank that stores roof runoff (normally for re-use and flow attenuation purposes)
Rain garden	Device that receives and filters runoff and then disposes of the water by infiltration
Runoff	The flow of water across the ground or an artificial surface generated by rain falling on it
Soakage pit (or trench)	Sub-surface structure into which runoff is conveyed for disposal by infiltration
Time of concentration	Time taken for rain falling at the head of the catchment to reach a designated point as runoff
Watercourse	Natural or artificial channel which conveys runoff