37 Newell Street Severance

Stormwater Management Design Brief

Project Location:
37 Newell Street
Ayr, Ontario

Prepared For:
Dryden, Smith & Head
Planning Consultants
54 Cedar Street North
Kitchener, Ontario

Prepared by:
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PASSION, DETERMINATION, RESOLVE

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1.0 Introduction

GRIT Engineering Inc. (GRIT) was retained by Dryden, Smith & Head Planning Consultants Ltd. to review the private stormwater management for a proposed severance as part of the consent application requirements set forth by the Township of North Dumfries.

The subject site (Site) is located at 37 Newell Street in the Township of North Dumfries, Ontario. The site consists of a residential dwelling, parking area, an undeveloped grassed area and is approximately 0.176 hectares in size. The site is bounded by Newell Street to the north, James Street to the east and residential area to the south and west (Zone 4 Urban Residential).

This Stormwater Management Design Brief provides background and proposed design information to address the on-site stormwater requirements as part of the consent application requirements for the property. This report is to be read in conjunction with all other submitted documents, including the engineering design drawings – provided separately – which provide the proposed design and construction details.

2.0 Stormwater Management Brief

The Township of North Dumfries has indicated that a stormwater management brief is required for the site.

2.1 Design Approach

With the conversion of the existing grassed area into two (2) proposed dwellings and parking area, significantly reducing permeable surfaces, a comprehensive new stormwater management system is required. This system will comprise of four (4) infiltration galleries designed to collaboratively manage runoff.

2.2 Infiltration Target

Soakaway pits require a percolation rate of at least 15mm/hr and the depth from the bottom of the soakaway pit to the estimated seasonally high-water table should be greater than or equal to 1 meter (MOE, 2003). It is assumed that the infiltration rate is at least 15 mm/hr and soils are coarser than a loam (MOE, 2003). Pits must be over 4m from foundations, ensuring drainage away from buildings, complying with the Stormwater Management Planning and Design Manual, March 2003.

2.3 Infiltration Design

The proposed grading has been designed to follow existing drainage patterns and will direct overland flows to the proposed infiltration galleries to capture site runoff, ensuring it remains controlled.

Two (2) infiltration galleries fronting James Street, in the eastern portion of the site, are proposed to be 2.00 m wide by 4.00 m long and 1.5 m deep. The remaining two (2) infiltration galleries are proposed in the rear yards of the proposed dwellings, the western portion of the site, and are 2.00 m wide, 6.00 m long and 1.5 m deep. Each infiltration gallery is proposed to be lined with non-woven geotextile to prevent migration of fines into the gallery and filled with 19 mm clear stone with a void ratio of 0.4. The gallery has a total storage capacity of 5.06m3. The gallery is designed to have a minimum cover of 1.80 m to prevent frost penetration and provide year-round use.

GRIT's site analysis determined the gallery's drawdown time at roughly 9.37 and 12.97 hours for a 20mm storage depth and a 15 mm/hour infiltration rate for each size of infiltration gallery. The result is within the acceptable threshold set by the SMPDM, which recommends a maximum of 24 hours. Details on sizing and drawdown calculations can be found in Appendix A of this brief and on GRIT Engineering Sheet C300 – provided separately.

Minor perched groundwater inflow may occur for excavations throughout the site. It is anticipated that conventional sump pumping techniques will suffice to control the inflow. To ensure stability, it will be necessary to flatten or support the excavation side slopes. where groundwater seepage occurs. Every excavation that a worker may be required to enter shall be kept reasonably free of water (O. Reg. 213/91, s. 230).

3.0 Conclusions

The design and calculations in Section 3 and in Appendix A demonstrate compliance with the above requirements. We trust this report satisfies Township of North Dumfries requirements. If there are any questions regarding the report, please do not hesitate to contact our office.

4.0 Statement of Conditions and Limitations

This document was prepared for *Dryden, Smith & Head Planning Consultants* (the Client) and the *Township of North Dumfries* and has been prepared in a manner consistent with that level of care and skill ordinarily exercised by other members of the engineering profession currently practicing in the same or similar locality, under the same or similar conditions, subject to the time limits and financial, physical, or other constraints applicable to the Services.

The recommendations and conclusions provided in this document are applicable only to the specific site, development, design objectives, and purposes that are described in the text and are based on the information that was available and provided to GRIT Engineering Inc. at the time this document was prepared. This document is not intended to be exhaustive in scope and it shall be recognized that the passage of time may alter the opinions, recommendations, and conclusions that are contained in this document. The design is limited to the documents reference and any other drawings or documents prepared by GRIT Engineering Inc. provided separately. GRIT Engineering Inc. accepts no responsibility or liability for the accuracy of any information provided by others.

The information, opinions, conclusions, and recommendations expressed in the document, or any portion thereof, are for the sole benefit of the Client. The document may not be used by a third party without the expressed written consent of GRIT Engineering Inc. and the Client. Any third-party use of the document without express written consent denies any claims in Contract, Tort, and/or any other cause of action in law against GRIT Engineering Inc. and the Client.

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Any referenced benchmarks or other know elevations provided in this document should be verified by a registered surveyor prior to use for any other purposes such as planning, development, layout, and/or construction.

Yours respectfully,

GRIT Engineering Inc.

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GRIT ENGINEERING INC

Appendix A
Infiltration Gallery Calculations

STORMWATER MANAGEMENT
SOAKAWAY PIT CALCULATIONS

Project	37 Newell Street Severance
Project Number	GE23-0652-1
Project Address	37 Newell Steet, Ayr, Ontario
Client	Dryden, Smith & Head Planning Consultants Ltd.
Date	July 25, 2024

Volume Storage Calculation

Drainage Area=	253.00	m^2
Target Storage Depth[1]=	20	mm
Storage Volume Required=	5.06	m^3

Soakaway Pit Design

Depth of Soakaway Pit=	1.50	m
Soakaway Pit Width=	2.00	m
Soakaway Pit Length=	4.00	m
19mm Clear Stone Void Ratio=	0.4	
Soakaway Pit Volume=	4.80	m^3
Infiltration Rate[1]=	15.00	mm/hour
Infiltration Rate=	0.00000417	m/s
Contact Area to Soil=	26.00	m^2
Infiltration Volume Rate=	0.00010833	m^3/s
Infiltration Volume Rate=	0.11	L/s
Infiltration Volume Rate=	0.390	m^3/hour
Drawdown Time=	**12.97**	**hours < 48 hours**

References

1. Ministry of Environment, Conservation, and Parks *Stormwater Management Planning & Design Manual* (2003) Section 4.5.6.

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Volume Storage Calculation

Drainage Area=	253.00	m^2
Target Storage Depth[1]=	20	mm
Storage Volume Required=	5.06	m^3

Soakaway Pit Design

Depth of Soakaway Pit=	1.50	m
Soakaway Pit Width=	2.00	m
Soakaway Pit Length=	6.00	m
19mm Clear Stone Void Ratio=	0.4	
Soakaway Pit Volume=	7.20	m^3
Infiltration Rate[1]=	15.00	mm/hour
Infiltration Rate=	0.00000417	m/s
Contact Area to Soil=	36.00	m^2
Infiltration Volume Rate=	0.00015000	m^3/s
Infiltration Volume Rate=	0.15	L/s
Infiltration Volume Rate=	0.540	m^3/hour
Drawdown Time=	**9.37**	**hours < 48 hours**

References

1. Ministry of Environment, Conservation, and Parks *Stormwater Management Planning & Design Manual* (2003) Section 4.5.6.