August 15, 2018
Our File: 411009

Black, Shoemaker, Robinson & Donaldson Limited
Ontario Land Surveyors
257 Woodlawn Road West, Unit 1
Guelph, ON N1H 8J1

Attention: Ms. Nancy Shoemaker

Re: 2018 Methane Gas Monitoring & Risk Review
Ainley Subdivision, Centre Wellington

Dear Nancy,

As requested, GM BluePlan Engineering Limited (GMBP), has completed a supplemental review of the risk for methane gas from the closed Gerrie Road Landfill to the Ainley Subdivision. Although this issue was historically addressed in 2008, it is our understanding that this review is being completed to support the development of the Ainley Subdivision (not constructed since the 2008 Study) and is required because additional cover material has been added to the landfill since completion of the 2008 studies. It has been considered that the potential for increased methane gas migration may occur due to the decrease in permeability of the cover, which would reduce the ability for methane gas to naturally vent through the top of the landfill, and thus allow increased migration.

Background

During 2008, GMBP (formerly operating as Gamsby and Mannerow Limited) completed several studies that concluded the risks for methane gas migration to the development were considered to be insignificant. Several lines of reasoning were used to conclude that the potential for methane gas migration was limited. A summary of the findings from the previous submissions is provided as follows:

- The landfill has been closed since 1987 [now more than 40 years];
- Peak methane production generally occurs within a few years from landfill closure [then decreases with time];
- The volume of in-place waste is relatively small (approximately 320,000 m^3 or 208,000 tonnes of waste was likely landfilled at the site);
- Fill area is surrounded by shallow water table (approximately 2.0m below ground surface west of old fill area), which provides a limited unsaturated thickness of soil that could permit methane migration;
- The setback distance from fill area to Landfill property boundary is approximately 70m;
- There has been no known impacts to the private residences located approximately 110m southwest from the old fill area (including the proposed development property). The 2006 Annual Monitoring Report states “It [nearest residence] is not considered at risk for methane migration.”;
- To date, methane has not been detected inside any on-site structures;
- Six years of data from 1997 to 2002 indicate no methane migration 30m from old fill area;
- Data from 2004 to 2006 for monitoring point GP-4 (adjacent to the old fill area) indicate methane concentrations of zero or 0.1 as percent volume in air.

Following the initial review, a methane monitoring program was implemented at the development property in 2008. The investigation included methane gas measurements at the Ainley Subdivision property from four (4) monitors and over five (5) sampling events between January and April, 2008. The results indicated that there was no evidence of methane gas migration from the closed landfill to the Ainley Subdivision property.

2018 Review

As a follow-up to the 2008 landfill gas monitoring study, this supplemental review is being conducted to address County comments. The scope of this review is based on consultation with the County.

Methane gas measurements were collected by GM BluePlan environmental staff at the proposed Ainley Subdivision property across from the closed Centre Wellington Landfill site from each of the existing monitors (GM-1 to GM-4) on July 26, 2018 (refer to Figure 1). The methane gas measurements were made in the field using a RKI Eagle I portable gas monitor calibrated to methane as per manufacturer's instructions. Water level readings were also collected from the monitors at the time of the field measurements. At all four (4) locations, the monitors were found to be dry, and the methane gas concentrations were measured as non-detect (i.e. 0 % LEL for methane).

From a risk perspective, the potential for increased migration would only occur where methane gas production is sufficient and the gas migration pathway is evident. For this scenario, the relatively small landfill has been closed for more than 40 years, past its peak methane gas production period. Consistent with a relatively small site with limited waste placement, there has not been evidence of significant methane gas migration or production. 10 years ago, there was no evidence of the presence of significant levels of methane gas in the vicinity of the landfill: the potential for methane gas production is considered to reduce with time. The thin vadose zone and distance of the development from the landfill provides limited migration pathway and would promote venting in the vicinity of the landfill.

Based on the recent monitoring results and review, the risk of subsurface methane gas migration from the landfill property to the proposed Ainley subdivision property is considered to be insignificant.

We trust this meets your requirements at this time. If you have any questions or comments, please contact the undersigned.

Yours truly,

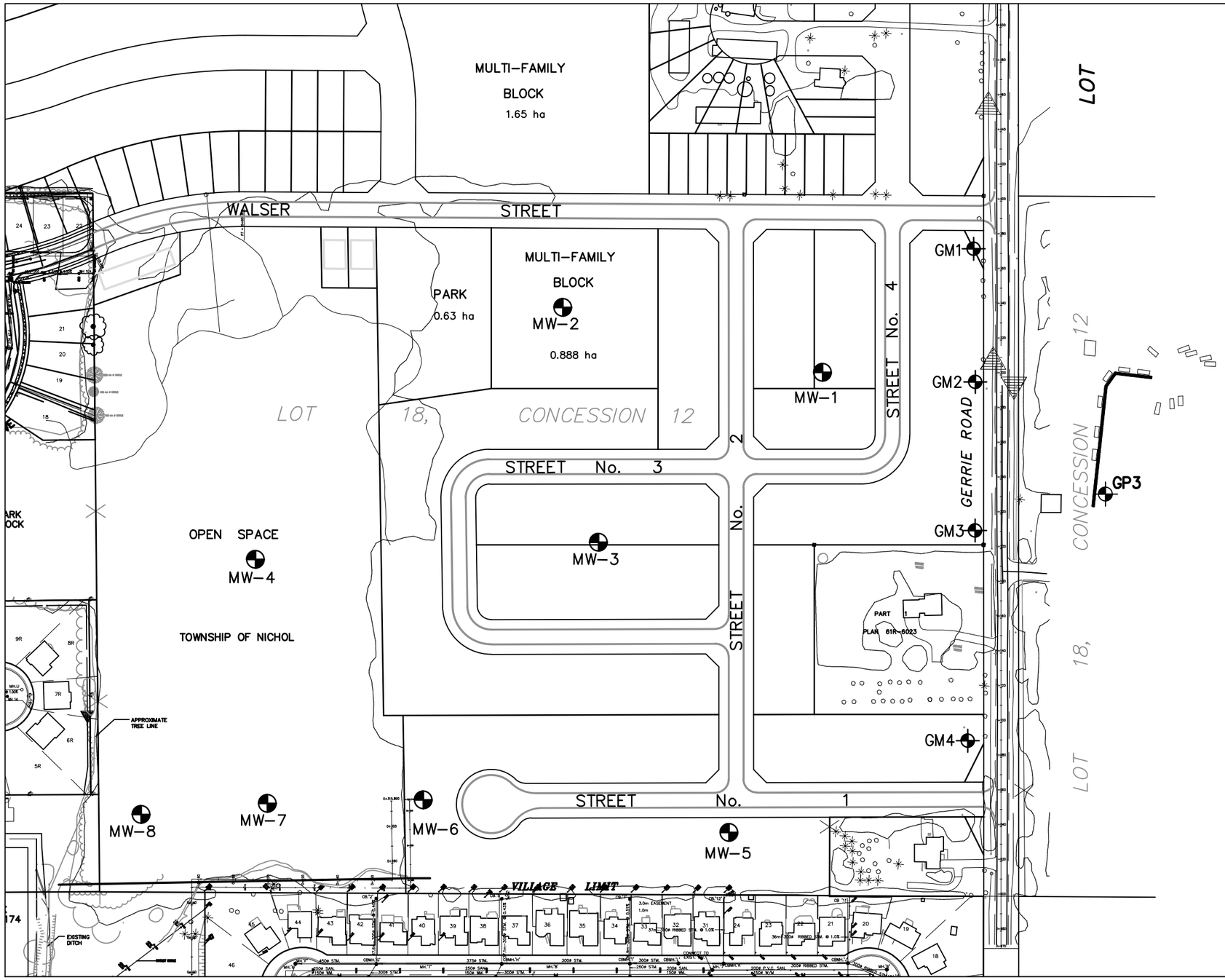
GM BLUEPLAN ENGINEERING LIMITED
Per:

Matthew Nelson, P. Eng., P. Geo.
MN/mz

Encl.

cc. James Keating Construction: Tom Keating
GMBP: Glenn Anderson
File No.: 411009

Ainley Farm Subdivision
Township of Centre Wellington



LEGEND

GM2 — Gas Monitor Location (G&M, 2018)

MW–1 — Approximate Location of Existing Groundwater Monitor

SCALE = 1:2,500
AUG 2018

SITE PLAN

GAS MONITOR LOCATIONS

Figure No. 1

BluePlan ENGINEERING

Plotted On: January 4, 2008 104189_Fig 1_Probe_Locations.dwg