

## NC DEQ Brownfields Program Methane Assessment Protocol July 2020 – Rev. December 2020

This Methane Assessment Protocol will be utilized in conjunction with the *NC DEQ Brownfields Program Threshold Criteria for Methane Site Development (September 2020)* to make site specific appropriate reuse determinations for properties participating in the Brownfields Program.

Should site conditions (e.g. elevated methane in groundwater) and/or history (historical fill operations, stump dump, etc.) warrant soil gas investigations for methane (CH<sub>4</sub>), shallow soil gas testing and multiple depth gas probe testing shall be conducted in accordance with the *LADBS Site Testing Standards for Methane* (Jan. 2014). The investigation shall begin with shallow soil gas testing and based on the sample results, site history, fill depth and materials; move to multiple depth gas probe testing if warranted. The Prospective Developer has the option to conduct these two tests concurrently but may be required to conduct additional testing dependent on results.

### Initial Shallow Soil Gas Test

1. Soil gas testing shall be conducted at a minimum of 5 feet below ground surface (ft BGS) in accordance with *NCDEQ Vapor Intrusion Guidance* (March 2018) and at a frequency of one sample point per 10,000 square feet (sq ft) of site area (LADBS, 2014). If groundwater is encountered at a depth shallower than 5 ft BGS, then the sample shall be taken at least 2 ft above the water table (NCDEQ VI Guidance, 2018).
2. Soil gas point construction shall be installed in accordance with either of the two options presented in the *LADBS Site Testing Standards for Methane* (Jan. 2014). **Note soil gas points shall be installed in a permanent manner and shall include air tight valves at sample collection end for pressure measurement screening purposes (Refer to Figure 1). Note these valves shall remain in the closed position until such time as valves are connected to measuring instrumentation.**
3. Soil gas points shall be allowed to equilibrate for the appropriate amount of time (California EPA Active Soil Gas Investigation Advisory, 2012) dependent on the degree of disturbance caused by the installation method: 2-HRs for Direct Push Technology (DPT) installed points and 48-HRs for auger type installation methods.
4. Static and Differential Pressure readings (in. H<sub>2</sub>O) using a LandGEM 5000 Landfill Gas Meter must be collected at the beginning of the sampling event, in accordance with procedures outlined in Appendix E of the *Reference Handbook for Site-Specific Assessment of Subsurface Vapor Intrusion to Indoor Air* (EPRI, 2005), prior to purging of any gas from the point for sample collection. Note: Field notes, instrument logs, and digital date/time stamp of pressure readings compared to methane readings will need to be provided.
5. Following pressure measurements and prior to landfill gas screening, all sample points should be leak checked and purged in accordance with *NCDEQ Vapor Intrusion Guidance* (March 2018). Following, Sample Points should be purged and screened with a Landfill Gas Meter in accordance with *Section 6 the NCDEQ Solid Waste Landfill Gas Monitoring Guidance* (Nov. 2010).
6. The stabilized readings from landfill gas screening of CH<sub>4</sub> (%bv, %LEL, and ppm), O<sub>2</sub>, CO<sub>2</sub>, H<sub>2</sub>S, and barometric pressure (NCDEQ Solid Waste Section Landfill Gas Monitoring

Guidance, 2010) from each sample point shall be collected following the initial pressure measurement.

7. One pressure measurement and one landfill gas screening shall be conducted per day for each sample location with a minimum of 24-hours separating each event at various times of day. Pressure measurements and landfill gas screenings as outlined above shall be conducted on two sequential days totaling 2 pressure measurements and landfill gas screenings per location. Additional sampling data may be necessary following the initial screening based on site specific conditions, methane, and pressure detected.
8. The stabilized/peak concentration of methane (%bv, %LEL, and ppm) for each point shall be reported to NCDEQ Brownfields.

**If the depth of methane generating material is deeper than 5ft below ground surface (or is unknown), proceed to Gas Probe Test.**

#### Gas Probe Test

1. One gas probe set, consisting of three probes at 5 ft BGS, 10 ft BGS, and 20 ft BGS (not below water table) shall be installed per 20,000 sq ft of site area.
2. Soil gas point construction shall be installed in accordance with either of the two options presented in the *LADBS Site Testing Standards for Methane* (January 2014) and as outlined above.
3. Steps 3 – 6 of the Shallow Gas Test presented above should be followed for each gas probe set.
4. **Two sequential measurements (Pressures and CH<sub>4</sub> concentration) shall be collected daily for two consecutive days with a minimum of a 24-hours separating each event at various times of day.**
5. The stabilized/peak concentration of methane (%bv, %LEL, and ppm) for each point shall be reported to NCDEQ Brownfields.

**Note:** The above sets forth minimum requirements for sampling. Further delineation and evaluation may be required based on apparent localized impacts of methane, planned site redevelopment, etc.

Results of the methane assessment will be used by NCDEQ Brownfields to make decisions for particular Brownfields Property redevelopments (all concentrations and pressures refer to soil gas measurements). ***It is the preference of the NC DEQ Brownfields Program that known methane generating sites be redeveloped with minimal hardscape/building footprint.***



*Figure 1: Air tight valve*