



Litter Monitoring Methodology

Guidance for practitioners

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1 Introduction

The Environmental Protection Act 1990 section 89 places an obligation on land managers to ensure the land they have responsibility for is kept clear of litter and refuse and that roads are kept clean. A systematic and rigorous monitoring process can assist land managers in meeting these duties as it can provide:

- An accurate picture of litter and refuse levels across areas;
- Insight into the litter and refuse types most commonly left on relevant land; and
- A means to target prevention activities and optimise cleansing operations.

Zero Waste Scotland has worked in partnership with Keep Scotland Beautiful (KSB), the Convention of Scottish Local Authorities (COSLA), the Association for Public Service Excellence (APSE), the Improvement Service, and Scottish Local Authorities to trial and develop an updated monitoring system which provides:

- Greater consistency in approach between a large number and range of land managers in Scotland;
- Increased transparency in the method of assigning cleanliness grades to areas;
- Improved accuracy of information collected; and
- Greater granularity of information which is useful for planning and evaluating litter prevention activities.

This document sets out the suggested methodology for land managers to assess the cleanliness of their relevant land while meeting the objectives above. The updated method:

- Is suitable for land managed by all Duty Bodies and Statutory Undertakers;
- Determines grades based on the number and type of items in the transect, rather than a visual assessment alone;
- Relates to zoning designations for land based on footfall/vehicle movement and litter generators, therefore linking cleanliness with the likelihood of being littered;
- Determines cleanliness based on the conditions within an area of defined size, regardless of land use and type, incorporating both hard- and soft-standing.

2 Conducting Monitoring Surveys

Fieldwork can present a number of health and safety risks depending on the location, time of day and circumstances. Surveyors should adhere to their organisation's relevant health and safety policies in all situations.

Zero Waste Scotland are developing monitoring software which is due for release in 2018 which will allow automatic upload of data from mobile devices and a dedicated website to view survey data geographically, run basic analysis of the results, generate standardised reports and export information for further use.

This methodology includes a requirement to conduct a litter count for a sub-section of the each survey area. It is therefore recommended that surveyors use a tally counter which allows simultaneous counts of multiple litter types, such as one of the free mobile applications available from app stores. These should be prepared in advance of survey work being undertaken.

Surveyors should also be provided with a measuring wheel or tape measure to verify area sizes.

3 Survey Areas

All relevant land in Scotland should be zoned based on the footfall, vehicle movements and potential litter sources (separate guidance available from Zero Waste Scotland). Examples of litter sources include primary and secondary schools, fast food outlets, major event locations, public houses, nightclubs and leisure facilities. Once zoned, the land is split into 1,000m² survey areas using a Zero Waste Scotland-produced GIS plugin, where every 1,000m² is a potential monitoring site. A proportion of all potential survey areas will be surveyed to produce a representative picture of cleanliness

standards of land managed by Duty Bodies and Statutory Undertakers in Scotland. Survey areas can be allocated for any of the zone types and may include hard- or soft-standing or both. Information will be collected for the most littered 100m² sub-section of the survey area as well as the full 1,000m².

All reasonable efforts must be made to carry out monitoring in the given area. Reasonable barriers to surveying could include, but are not limited to:

- The survey area is not the responsibility of the land manager;
- Presence of a health and safety risk which cannot be mitigated; and/or
- Lack of a suitable access point.

Where the barrier to surveying is temporary a return visit should be attempted. If the barrier cannot be mitigated a request should be submitted for an alternative area. The surveyor should be satisfied that there is no immediate health and safety risk before undertaking monitoring.

4 Monitoring Litter and Refuse

Surveyors are expected to collect the required information in the order outlined in Figure 1.

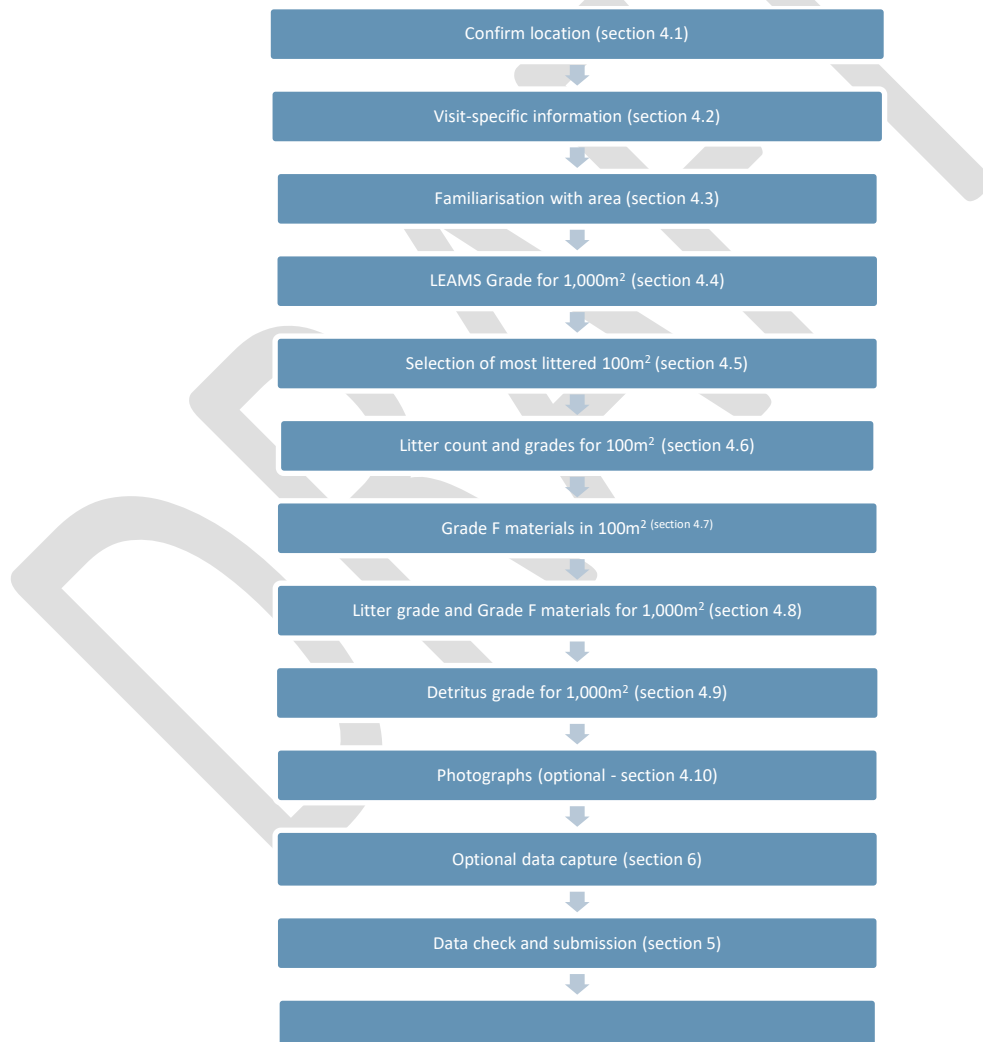


Figure 1: Data Collection Procedure

4.1 Confirmation of Location

Surveyors should cross-check the location information provided to ensure they are monitoring the correct location, familiarising themselves with the approximate boundaries of the 1,000m² area.

4.2 Visit-Specific Information

Surveyors should record the following information relating to the time and circumstances of the survey:

- Name of surveyor(s);
- Time and date of survey;
- Any adverse weather conditions during the survey:
 - Light wind
 - Strong wind
 - Light rain
 - Heavy rain
 - Snowing
 - Snow on ground
 - Frost on ground
- Site (name/description/identifier).

4.3 Area Familiarisation

Surveyors should walk the extent of the 1,000m² before applying grades to ensure they are familiar with the survey area, noting the distribution of litter and refuse, the most littered areas and general environmental quality.

4.4 LEAMS Grade (1,000m²)

Once familiar with the area, Surveyors should assign a LEAMS grade for litter present in the survey area. **Only those Surveyors who have received training from KSB on LEAMS monitoring practices should input a grade.** LEAMS grades are:

- A: No litter or refuse;
- B+: Predominantly free of litter and refuse – up to three small items;
- B: Predominantly free of litter and refuse;
- C: Widespread distribution of litter and refuse with minor accumulations; or
- D: Heavily littered with significant accumulations.

As the grading outlined in Section 4.8 and Figure 4 will replace the above LEAMS grading, capturing this information allows comparisons to be drawn between the two methods and map the grades from one to the other. This is vital for preserving historical trend data.

4.5 Selection of the Most Littered 100m²

The Surveyor should select the most littered 100m² area within the 1,000m². This provides a consistent basis for selecting a survey area. Where there is no obvious area, Surveyors should use their judgement to select a representative area based on distribution of litter, street furniture, surface types e.g. the areas surrounding bins, benches, bus stops etc are more likely to be littered than other sections of path, road or grassed area.

The 100m² area must be a single shape but can be of any dimensions to best encompass the litter found. The Surveyor should be able to access/see all parts of the area to accurately count litter items. Where surveyors are not confident in estimating areas a measuring wheel or tape should be used to verify area size.

Where it provides an explanation for the amount of litter counted, Surveyors should record additional information that would assist in having the area cleaned e.g. if the 100m² consists entirely of bushes and shrubs; if the litter occurs on an embankment or near water where specific health and safety considerations are required for cleansing.

4.6 100m² Litter Count and Grading

4.6.1 100m² Litter Count

The surveyor should walk the 100m² area systematically to allow accurate counting of items. All individual items of litter should be recorded (see Table 1).

Table 1: Litter Categories and Example Materials

Litter Category	Example Litter Types (Including but not limited to)
Smoking-Related	Cigarette butts, matches, matchboxes, cigarette packs and packaging
Cans, Bottles and Cartons	Containers, straws and lids from non-alcoholic and alcoholic drinks but not including those from identifiable fast food / takeaway outlets
Fast Food-Related	Fish & chip wrappers, polystyrene containers, burger wrappers, sandwich cartons, plastic cutlery, takeaway drinks containers such as coffee cups
Confectionery-Related	Sweet wrappers, chewing gum wrappers, crisp packets, lollipop sticks and easily removable chewing gum
Paper Materials	Newspapers, flyers, receipts, scratchcards, lottery tickets, ATM slips, bus/train tickets but not including confectionery wrappers
Dog Fouling	Bagged and unbagged
Other	All litter types not covered above such as plastic film from unidentified sources, carrier bags, food items. The materials included in the Other category should be noted separately where this is appropriate e.g. many items of a single type such as elastic bands, broken polystyrene.

Surveyors should count individual pieces of litter. For example, if a takeaway drinks container has been dropped and could be picked up as a single item it should be counted as such. However, if it has separated into the various components (cup, lid, sleeve, straw) it should be counted as four individual pieces of litter.

The surveyor should tally the number of individual litter items as per the categories above and separate these **by size** into large and small items.

Large items are defined as larger than a credit card and may include, but are not limited to:

- Drinks containers;
- Food packaging;
- Carrier bags;
- Newspapers;
- Crisp packets/large sweet packets;
- Cigarette packaging items; and/or
- Food waste (banana skin, sandwich etc.)

Note dog fouling should always be counted as a large item.

Small items are smaller than a credit card and may include, but are not limited to:

- Cigarette ends;

- Receipts;
- Tickets;
- Individual sweet wrappers;
- Small food waste items; and/or
- Miscellaneous, fragmented paper and plastic material.

Items smaller than a cigarette butt should be disregarded.

Six small items are to be treated as the equivalent of one large item (see Figure 2).

Total Large Items + (Total Small Items / 6) = Total Number of Litter Items

The overall litter grade is calculated by:

Total Cigarette Litter + Total Drinks-Related Litter + = Total Number of Litter Items

The total numbers can be cross-referenced with Figure 3, **Error! Reference source not found.** and Table 2 to determine the grades.

Figure 2: Example Litter Grade Calculation

It is recommended that surveyors use a tally application to maintain an accurate count of litter in a 100m² area. There are a number of freely available mobile apps from app stores. Users should ensure the app allows for multiple categories and include large and small categories for each litter type. A tally counter will be built into the litter monitoring software which will automatically determine the grade for the 100m² survey area.

4.6.2 100m² Litter Grade

The counts for each litter category and the overall area are used to determine grades as stated in Figure 3 and Table 2.

A litter count should be conducted for every 100m² and a grade A – E assigned. Where hazardous or special waste is present, this should be noted **by also assigning a Grade F** (see section 4.74.7). By collecting the litter count data and the presence/absence of Grade F materials this will ensure comparable data is captured for all sites and mitigates the impact of single items on overall area grades.

Figure 3: Litter Grade Guidance for 100m² Area

Litter and Refuse Grade A: No litter or refuse is present on any type of land



Litter and Refuse Grade B: Small amounts of litter and refuse



As a guide, fewer than 5 large items or fewer than 30 small items of litter and refuse

Litter and Refuse Grade C: Moderate amounts of litter and refuse, with small accumulations



As a guide, 5-15 large items or 30-90 small items of litter and refuse

Litter and Refuse Grade D: Significant amounts of litter and refuse, with consistent distribution and accumulations



As a guide, 16-30 large items or 91-180 small items of litter and refuse

Litter and Refuse Grade E: Substantial amounts of litter and refuse with significant accumulations



As a guide, more than 30 large items or more than 180 small items of litter and refuse

Litter and Refuse Grade F: Incidents of flytipping and hazardous/special waste (drug related waste, broken glass, animal carcasses, car parts, chemicals, spillages)



Table 2: Example 100m² Area Grade

Litter Type	Large Count	Small Count	Total Count	Grade
Smoking-Related	0	46	8	C
Cans, Bottles and Cartons	0	0	0	A
Fast Food-Related	0	0	0	A
Confectionary-Related	0	2	0.3	B
Paper Materials	0	0	0	A
Dog Fouling	1	N/A	1	B
Other Litter	0	0	0	A
Total Count	1	48		
Convert Small Items to Large Items	1	(48 / 6)		
100m² Grade	1	8	9	C

4.7 Grade F Materials Within 100m²

Grade F is specifically noted for the presence of special and hazardous waste such as drug related waste, broken glass, chemicals, spillages, car parts, animal carcasses etc. Where there is ambiguity Surveyors should follow their organisational definitions of hazardous materials e.g. where there is a small amount of broken glass the Surveyor should follow organisational procedure regarding the amount and location to decide whether it poses a hazard.

4.7.1 Presence of Flytipping

Surveyors should record the presence of flytipping within the 100m² area by type and volume (see Table 3 and Table 4).

Table 3: Flytipping Waste Type Categories

Flytipping Waste Type	
Animal carcass	Green
Asbestos	Mattress
Black bag commercial	Other commercial waste

Black bag household	Other household waste
Chemical – Drums – Oil or fuel	Side waste
Clinical	Tyres
Construction / Demolition / Excavation	Unidentified
Electrical	Vehicle parts
Furniture	White goods

Table 4: Flytipping Volume Categories

Flytipping Volume	
Single black bag	Transit van load
Single item (e.g. furniture, white good etc)	Tipper lorry load
Car boot or less	Significant multiple loads
Small van load	

Surveyors should follow their organisational guidance on defining flytipping e.g. regarding mis-presentation of household and commercial waste.

4.8 1,000m² Litter Grading

Having determined a grade for the most littered 100m² area, the surveyor should use this knowledge to consider whether this is **representative** of the wider 1,000m² and assign a suitable grade for the overall area. For example:

- Is the 100m² clearly more littered than the rest of the area?
- Is the 100m² area reflective of the litter count and distribution seen in the wider area?
- Do the litter types change across the 1,000m² and would this change the grade assigned?

This might require walking the 1,000m² area again.

4.8.1 1,000m² Grade F Materials

Additional Grade F materials (special and hazardous waste such as drug related waste, broken glass, chemicals, spillages, car parts, animal carcasses etc) should be recorded for the 1,000m². You do not need to log existing items from the 100m² area, these will be captured automatically.

4.9 Detritus Grade (1,000m²)

Detritus can include dust, mud, soil, grit, gravel, stones, rotted vegetation, and fragments of twigs, glass, plastic and other materials which can become finely divided. Leaf and blossom falls are to be regarded as detritus once they have substantially lost their structure and have become mushy or fragmented.

Grades should be recorded on detritus levels where an organisation is responsible for a section of road within the 1,000m² area. Detritus grades are only applicable on hard-standing e.g. grades should not be captured for soft-standing areas.

The prevalence of detritus within each transect should be graded A - D (Figure 4 **Error! Reference source not found.**).

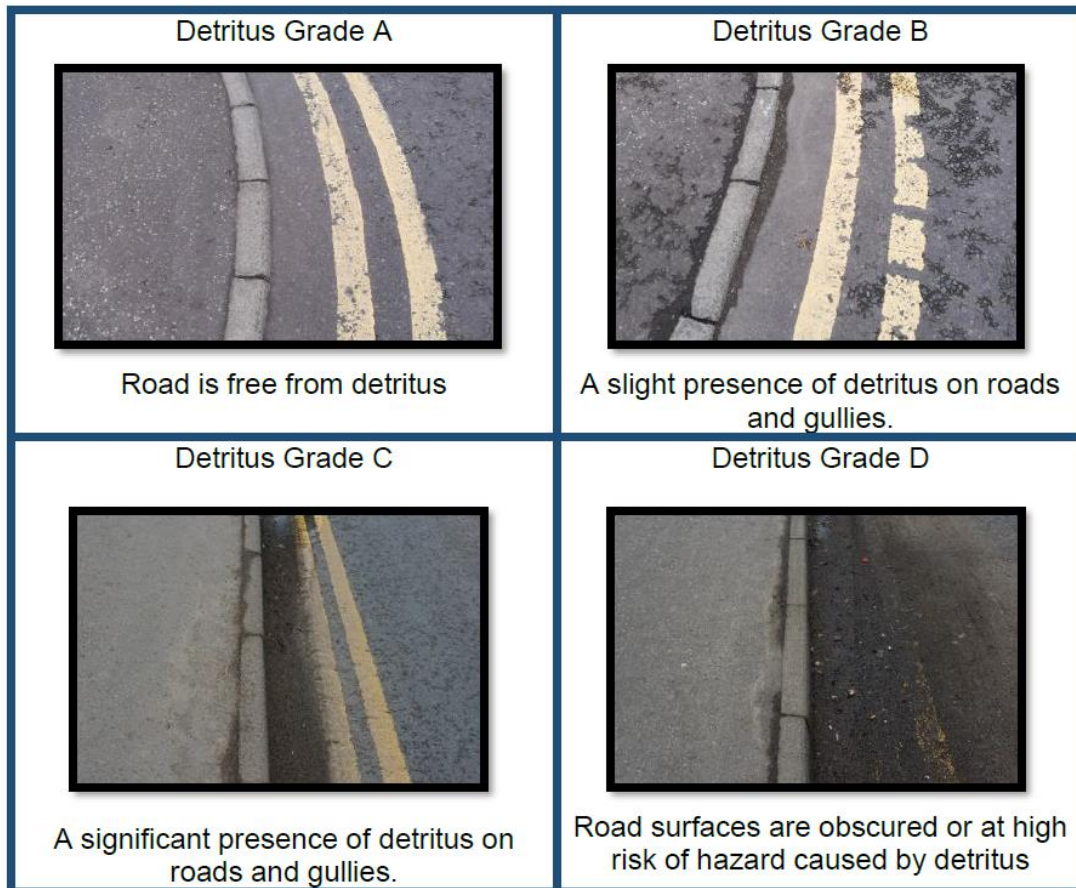


Figure 4: Detritus Grade Descriptions

4.10 Photographs

Photographs are not a mandatory requirement as it is difficult to take pictures of survey areas which accurately and adequately capture the conditions. However, in some circumstances it may be appropriate to photograph site conditions where:

- Street furniture or site features present operational challenges in cleaning an area;
- The cleanliness standard is particularly poor;
- There are particular issues to be addressed such as offensive graffiti;
- Cleanliness standards for your organisation's land are being impacted by a third party e.g. poor containment of waste by commercial premises.

These examples are for illustration only and the requirement to take photographs is a decision for each organisation. Surveyors should be mindful of data protection principles when taking photographs.

5 Data Review and Submission

Data should be reviewed by the surveyor at the end of each monitoring visit and before submission for obvious errors and inconsistencies. Data captured on paper should be entered to the spreadsheet provided by Zero Waste Scotland (available on request). Each organisation should select one individual who will send the compiled data at regular intervals.

Zero Waste Scotland are developing litter monitoring software which will be made available to all Duty Bodies and Statutory Undertakers for in-field data entry and desktop evaluation. Software development is scheduled for completion in 2018.

6 Optional Data Capture

The following sections outline additional information which may be recorded during surveys to provide additional insight to the environmental quality of areas and factors which may be contributing to the litter, flytipping and cleanliness. Data sheets are available on request which include the optional categories listed below.

Recording grades for the environmental quality indicators is optional

6.1 Local Environmental Quality Indicators

Local environmental quality indicators provide additional, contextual information on survey areas and the surrounding environment which may provide insight for prevention activities or engaging other partners and stakeholders, however each organisation should decide whether Surveyors will record this as standard.

Environmental quality indicators may have a direct or indirect impact on litter levels observed in an area. Indicators should be based on the surfaces, equipment, street furniture etc within the 1,000m² transect, except where their presence in the wider environment considerably impacts the survey area.

All environmental quality indicators should be graded as:

- **Grade A** – no presence;
- **Grade B** – small presence;
- **Grade C** – visible, significant presence; or
- **Grade D** – highly visible, widespread, obtrusive and/or offensive presence.

6.1.1 Chewing gum staining

Fresh chewing gum and packaging should be graded as part of the confectionery-related litter category.

6.1.2 Weed growth

Weed growth can impact roads and pathways and can contribute to detritus levels observed as they are likely to trap material at the roadside. The grade for weed growth should only be recorded where there is a hard-standing area within the survey area.

6.1.3 Flyposting

Flyposting is defined as stickers or posters placed in unauthorised places such as buildings, bus shelters, fence posts etc within the survey area.

6.1.4 Graffiti

Graffiti is defined as unauthorised drawing or writing on surrounding buildings or street furniture such as benches, lamp posts, litter bins etc.

6.1.5 Vandalism

Vandalism is defined as wilful and senseless damage of property which adversely affects the quality of life and the environment, e.g. smashed bus shelter windows, broken street seating, and should be considered separate from graffiti.

Further information on local environmental quality can be found on Keep Scotland Beautiful's website: <http://www.keepsotlandbeautiful.org/local-environmental-quality/>.

6.2 Presence and Condition of Litter Bins

Recording the presence and condition of litter bins is optional

Noting the presence and condition of litter bins in and around the survey area can provide additional information on the reason for littering behaviour or particular litter types. Organisations should decide whether this information is to be recorded as standard and inform surveyors appropriately.

Surveyors can note the presence or absence of bins with a Yes or No. Where there are bins present, the surveyor should record:

- Whether the bins are overflowing:
 - Yes
 - No
- Condition:
 - A – Excellent condition (no damage or evidence of tampering);
 - B – Fair condition (small amounts of damage i.e. dents, paint chipping);
 - C – Poor condition (substantial damage i.e. parts missing, slight rust); or
 - D – Urgent repairs required (i.e. fire damage, major rust, danger to public).
- Cleanliness
 - A – Excellent condition (a clean bin);
 - B – Fair condition (i.e. small amounts of dirt and grime);
 - C – Poor condition (i.e. substantial dirt and grime); or
 - D – Urgent cleaning required (i.e. severely covered in dirt and grime).
- Whether this is:
 - General waste bin;
 - Dog litter bin; and
 - Recycle on the go-style bin where materials are intended for recycling.

6.3 Land Audit Management System (LAMS)

Recording information on the following LAMS indicators is optional

Each organisation should decide whether information is being collected on the following, optional LAMS indicators, with reference to the appropriate Assessment Cards:

- Grounds maintenance grade:
 - A – Excellent standard;
 - B – Acceptable standard;
 - C – Unacceptable standard; or
 - D – Poor standard.

- Ground conditions:
 - 1 – Firm/dry;
 - 2 – Suitable;
 - 3 – Soft/light marking;
 - 4 – Heavy surface marking; or
 - 5 – Waterlogged.

- Water courses:
 - 1 – Clean, free flowing;
 - 2 – Small litter presence;
 - 3 – Heavy litter presence;
 - 4 – Overgrown; or
 - 5 – Dammed.

LAMS is operated by the Association for Public Service Excellence (APSE) and any questions on this methodology, grading or use of the data should be directed to APSE at performance.networks@apse.org.uk.

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