

# WEED PREVENTION

## A PRACTICAL GUIDE FOR THE AMENITY SECTOR



# Contents of this Guide

Contents	Page
Contents of this Guide	2
Why should you consider Weed Prevention?	3-4
Soil - Where the battle is won or lost	5-6
Freeze-Thaw in Asphalt	7
Pesticides and Water Contamination	8
Detritus and the Law	9-10
Design and Plant Choices	11-12
Maintaining Surfaces for Weed Prevention	13
The effective year-round regime	14
Useful Links	15

# Why should you consider Weed Prevention?



It's a good question.

According to the law of the instrument, when we acquire a new skill, we tend to see opportunities to use it everywhere. This bias is also known as "the law of the hammer", "the golden hammer", or "Maslow's hammer", in reference to psychologist Abraham Maslow's famous quote: "I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail"

As an industry we have been guilty of seeing glyphosate as a „Golden Hammer“ and every weed as if it were a nail. Whereas we may be able to justify the economic use of glyphosate and similar chemicals in agriculture, enabling us to produce more food in less area at a cheaper price, and possibly with a smaller carbon footprint. The same argument cannot be justified in amenity settings, especially given the unknown effect on the environment and suspected links between the use of these chemicals and diseases or disorders in the human population.

Most contracts for weed control in the UK are written around using a weed killer. They specify a number of applications per year and a kill rate. So it's no wonder that most of our customers start their search for an alternative solution looking for a replacement for their existing weedkiller - expecting to simply change the product name in the contract from Roundup, or some other weedkiller to . . . something else - whilst leaving the number of applications and kill rate untouched. I promise you, it won't work. If you go about finding an alternative to weedkiller in this way, you will be disappointed.





So what am I suggesting? Should we carry on using weed killers? Should we lower our standards and accept a lower kill rate? Rewild our pavements? Or increase the number of applications in order to achieve the same result?

No. I'm suggesting that this entire way of looking at weeds is all wrong in an amenity setting. That may initially sound like a controversial position. However, if you follow the argument below, I hope you will see that it contains some common sense.

The first principle we must establish is this;

**Weeds are not some finite list of specific evil plant species that need to be killed wherever they arise. Instead, a weed is a plant of any species that has grown in the wrong place.**

If we didn't want the plant to grow where it is, then that begs the question... Why has it grown there? This is probably the most important and fundamental question we can ask when it comes to weed prevention. Weeds require specific circumstances for their growth. They do not simply appear from nothing, just as they do not disappear and become nothing when they are killed. If we can understand what has contributed to the weed growing in a location, then we can identify ways to restrict its growth in the first place. If weed growth can be minimised then it becomes much more economical to use other means to remove them.



# Soil - Where the battle is won or lost



Weeds are opportunists. They will irrupt into bare or sparsely populated areas of soil, but they have limitations, which can be useful to consider, especially concerning soil depth. Below is an extract from an article by Nishanta Rajakaruna and Robert S. Boyd, in *Encyclopedia of Ecology (Second Edition)*, 2019, which perfectly highlights the importance of removing soil from hard surfaces and why this is the foundation of a successful weed prevention strategy.

„Soil depth can greatly influence the types of plants that can grow in them. Deeper soils generally can provide more water and nutrients to plants than more shallow soils. Furthermore, most plants rely on soil for mechanical support and this is especially true for tall woody plants (e.g., shrubs, trees). A classic example of the influence of soil depth on plant communities is seen on granite rock outcrops in the southeastern United States. As the granite weathers, it can form pools of soil that vary in depth from a few millimeters at the margin to tens of centimeters in the middle. The shallow marginal soils support certain annual plants, whereas deeper soils support herbaceous perennials and still deeper soils are colonized by woody plants. Plant zonation in these soil pools can be striking (Fig. 1).“

Fig. 1. (A) A small soil pool (about 2 m wide) on a granite outcrop in east-central Alabama. Shallow soil at the margins is dominated by lichens. The deepest soil in the center of the pool has been colonized by *Senecio tomentosus*, a yellow-flowered herbaceous perennial species. (B) A larger soil pool on the same granite outcrop shown in (A). Deep soil on the left (behind the children: Jenny and Kristina Boyd) is occupied by woody plants (shrubs and trees). The soil pool becomes more shallow to the right, where striking zonation of smaller plants can be observed. The most shallow soil on the extreme right is occupied by the small red-colored annual *Sedum smallii*. Slightly deeper soil to the left of the *Sedum* zone is dominated by moss (*Polytrichum commune*) and white-flowered annual *Arenaria* species. Still deeper soil between that zone and the woody plants is dominated by perennial grasses along with some *Senecio tomentosus*.“

Figure 1.

(A)



In an urban environment, soil builds up on hard surfaces over time due to deposits of detritus.

The longer this is left before removal, the deeper the soil will become - allowing for more persistent perennial or even woody plants to establish themselves. If we can prevent the soil buildup by removing it with a sweeper or weedbrush, we can restrict the types of weeds that are likely to emerge making them much easier to control.

If we can keep the soil depth no more than a few mm, we can severely restrict the growth of more challenging weeds, such as perennials and invasive plants. This is important if we are looking to reduce our reliance on chemicals such as glyphosate, as alternative treatments such as heat are much more effective on annual plants and plants commonly found in very shallow soils.

On hard surfaces, the presence of soil begs another question. What caused the soil to build up on the hard surface? We can find our answer in a natural process that underpins the methodology of weed prevention.

(B)



The soil cycle (Fig. 2) is a natural process, by which falling detritus from trees, grass clippings, hedges and other organic matter decompose into a nutrient rich soil. Humans take advantage of this process all the time when we create compost for our gardens, and similar materials provide the basis of a great habitat for weeds to flourish on hard surfaces.

Our urban areas are a mixture of organic and man-made elements. A car park will often be surrounded by trees, hedges and grassy areas. Animals, people, traffic, wind and water can also deposit organic material onto a hard surface. Even weeds that have been sprayed will decompose and add to the soil build up.

Wind and water play a further role in taking this material to areas such as kerb edges, walls or the gaps between block paving, where the material will become trapped and accumulate more rapidly. These are the places where soil depth first becomes a real issue and perennial weeds can establish themselves. Unfortunately these places often coincide with the drainage systems put in to carry water away from our hard surface. Soil is a good medium for moisture retention. The damp soil further promotes weeds, but it can also have other consequences. When the weather gets colder, the water retained in the soil freezes, causing it to expand. If this soil has found its way into any defects in our surface, it will cause these defects to become larger, forming cracks and crevasses - you may have come across the freeze-thaw process before. As the crack opens, more detritus can enter and decompose, adding to the problem. Weeds growing in this crack will eventually be able to break through the surface to deeper soil underneath.

Figure 2.





# Freeze-Thaw in Asphalt

Winter is a “hard” time for asphalt pavements, literally. Asphalt pavements are produced and constructed at high temperatures when the asphalt binder is a liquid so it can be easily mixed with the rocks and sand. During the spring, summer, and autumn seasons, asphalt is flexible and stretchy in the warm weather, helping to prevent cracks from forming. However, as temperatures decrease during winter, the asphalt becomes harder and stronger, but also more brittle. Extreme cold temperatures can cause pavements to crack, but the most damage to pavements is caused by freeze-thaw cycles.

## What is a freeze-thaw cycle?

A freeze-thaw cycle is when the temperature fluctuates from above freezing, to below freezing, and then back to above freezing. This is considered one freeze-thaw cycle, and the UK experiences several freeze-thaw cycles each year.

## How do freeze-thaw cycles affect my pavement?

When temperatures are above freezing, rainwater or snowmelt will make its way into any small crack in the pavement. Then, as temperatures drop below freezing, the water within the cracked pavement begins to freeze and expand, causing the crack to expand and grow as well. Water expands approximately 10% when frozen, and has been estimated to exert over 2,000 bar as it expands. In other words, there is no stopping the freezing water from damaging pavements from the inside out. Finally, warming weather re-melts the ice, allowing the water to move deeper into the newly expanded crack, only to freeze and expand again during the next cycle.

Unfortunately, freeze-thaw cycles can do more than expand cracks. Water underneath the pavement is meant to drain away, but during winter it freezes in the base and subgrade materials. Water freezing below the pavement can sometimes cause frost heave to occur. Although not all soils are susceptible, frost heave occurs when water is allowed to freeze and expand in large chunks, called “ice lenses”. The material above these ice lenses is heaved upward with great force, deforming the pavement. Then as temperatures rise, these ice lenses will begin to melt, weakening the base layer and leaving large voids where the ice lenses were formed. Heavy loads can then greatly damage the pavement and even can cause potholes to quickly form.

## What can I do to protect my pavement?

When designing and constructing pavements it is important to consider the drainage of water both above and below the asphalt pavement. If it is blocked by soil and weeds (even dead ones), this will prevent the surface from drying out and make issues more likely. Sloped pavements quickly direct water off the surface of the pavement into a collection basin. Drain-tile piping below the pavement can prevent frost heave from occurring by removing water in the base and subgrade layers.

After construction, sealing of cracks every 2-3 years is the best maintenance practice to preserve pavements. Sealing prevents water from entering cracks during the freeze-thaw cycles and from reaching the base and subgrade layers. Once cracking has become widespread, a mill and overlay is another maintenance/rehabilitation practice to restore the surface of the pavement.

I have sometimes been confronted by people asserting that a weed brush or sweeper has damaged their tarmac surface. In almost every case I have come across the freeze-thaw process has damaged the surface. The sweeper or weed brush has simply cleaned away the mud and loosened pieces of Asphalt, so the damage can be seen. Regular sweeping will minimise the likelihood of freeze-thaw related problems, by allowing the surfaces to dry out more quickly. This in turn will extend the life of your tarmac surface.

# Pesticides and Water Contamination



Using pesticides on a hard surface which is designed to allow water to run off also poses many problems. The Environment Agency outlines some of the problems that water companies face in removing chemicals from our water in its document; "Chemicals - Challenges for the water environment". The Environment agency works with water bodies to reduce chemicals in our water. " Under the WFD water bodies used to supply drinking water are identified as DrWPAs. Water entering supply must meet pesticide standards set by the Drinking Water Directive. Pesticides are the most common reason surface water DrWPAs become, at risk' from meeting the WFD objectives which require:

- that treated water meets the Drinking Water Directive standards
- aim to avoid deterioration in the quality of a DrWPA in order to reduce the level of purification treatment required in the production of drinking water."

Removing chemicals from the drinking water supply often requires additional treatment, which can cost millions of pounds. The work does not end with the water bodies themselves, The Environment agency "have worked alongside Highways England on plans to invest just over £50 million by 2021 to reduce flooding and environmental impacts from the existing Strategic Road Network. A proportion of this will address pollution, including chemical pollution, from highway run-off. Further investment will be made available by Highways England for similar environmental schemes through the next Road Investment Strategy (RIS2) to 2025."

It's amazing just how interwoven all our systems are and how many consequences there are to using chemicals. Spraying in these environments instead of removing the detritus leads to local flooding and surface problems, but the effects can also be seen much further afield - in our water.





# Detritus and the Law



If we can properly understand nature's processes we can work with nature to achieve amenity environments that deliver a balance and harmony between our built environment and the natural world around us. We can use natural processes to our advantage, rather than being in constant conflict with them.

**If we remove the soil and, importantly, the cause of the soil, we short circuit the cycle and avoid the need to use chemicals on our hard surfaces.**

Statutory provision is made for this in The Environmental Protection Act 1990 which imposes duties under section 89(1) and (2) on certain landowners and occupiers to keep specified land clear of litter and refuse, and on local authorities and the Secretary of State to keep clean public highways for which they are responsible.

The code of practice on litter and refuse published by DEFRA April 2006 and modified 2019 - Part 1 Section 5 lists detritus as refuse and litter and must be removed from the highway under section 89 of the act and recommends detritus should be removed from all other hard surfaces as well.

Part 1 of the code goes into some very helpful and robust detail, which I think it is worth going into here;

"5.5 Detritus, which comprises small, broken down particles of synthetic and natural materials, arrive at the site through the same displacement effects associated with mechanical, human, animal and natural actions, most of which also determine the distribution of litter. Detritus includes dust, mud, soil, grit, gravel, stones, rotted leaf and vegetable residues, and fragments of twigs, glass, plastic and other finely divided materials. Leaf and blossom falls are to be regarded as detritus once they have substantially lost their structure and have become mushy or fragmented. A significant and avoidable source of detritus is uncollected grass cuttings and weed growth from seeds germinating in moist detritus."

Figure 3.

"5.6 Large accumulations of detritus, built up over months and years, can contribute to the uncared for impression an area exudes. Detritus on metalled highways must be removed as a requirement of the s.89 duty to keep highways clean and it is also recommended that detritus should be removed alongside litter and refuse by duty bodies from all other hard surfaces as well".

"7.5 Where vegetated and metalled surfaces abut without clear kerb edging, for example a grass verge leading onto a rural road, managers should make a judgement as to the definitive edge of the metalled surface. The extent of detritus is then comprised of the amount of encroachment onto the metalled surface from this definitive edge. It should be regarded as good practice to cut back any vegetation that encroaches upon a metalled surface, and detritus can be managed with an effective sweeping regime. Although a grade A may not be achievable in every circumstance, it is expected that an acceptable grade (grade B) be achieved on the exposed metalled surface of a road or highway. Mud and skim from flooding are separate issues."

A summary of the grading system used can be seen in Fig. 3;



Similar legislation applies in Scotland. This legislation appears to be completely overlooked across the whole of the UK with few exceptions and we are routinely kicking the can down the road by applying unnecessary and unsustainable weed control measures instead of targeting the detritus and soil build up to keep our surfaces in good condition and prevent weeds from emerging.

Chemicals have their place but they have been hijacked to cover the cracks in our pavements, such as in Fig. 4 This information has to underpin a sustainable best practice for maintaining hard surfaces.

Figure 4.



## Design and Plant Choices

Before I go into detail on the maintenance of different surfaces, with a view to preventing weeds. I would like to share a few notes on the importance of the design of our built environment and how this affects the presence of weeds. The picture below in Fig. 5 demonstrates how infrastructure design greatly affects the ability to keep a surface economically maintained.

Figure 5.



The road in Fig. 5 includes a change in the kerb line, including a sharp corner. There are several problems that are apparent here. Firstly, the abrupt corner creates a trap for detritus to build up. It also creates an obstacle to maintaining the road, which is usually done with a sweeping lorry. The lorry is unable to easily get into the corner, and its path can be clearly seen by the edge of the soil build up. If this had been designed with a sweeping curve, the lorry could have easily followed the edge of the road and cleared any build up of soil. The soil has built up to such a degree, it is now spilling over onto the pavement, which cannot be accessed by the lorry.

The weeds in this picture have been sprayed, but that has done nothing to reduce the soil. The soil now acts as a ramp, allowing a wandering vehicle to easily mount the pavement, which poses a greater risk to pedestrians - The very thing this road feature was intended to reduce. Another use of the kerb edge here is to redirect surface water to the drain. Its ability to do this has been greatly impeded by the soil. I would not be surprised if the soil was in fact covering a drain - if not in this instance, I have seen many occasions where that has been the case.

Maintaining overhanging vegetation is also made much easier with the correct design. A maintenance specification may be designed to prevent detritus from building up on hard surfaces. This not only requires thought for the surface but also the surrounding environment which may affect the surface.

The picture below (Fig 6.) shows overgrown vegetation overhanging the path which is resulting in a massive detritus build up. This is blocking drainage channels, feeding the soil build up and providing ideal damp, nutrient rich conditions for weeds to thrive.

Nature needs to be considered when designing a path. It is all very well and good separating nature from a path with a fence, but if the wrong plants are behind the fence, or simply not easily maintained then the result will be as above, with massive encroachment of the hedges and trees into the path.

A well laid hedge of an easily maintained and slow growing species such as native Holly or Honeysuckle can be sourced responsibly and kept looking neat with light clipping once or twice a year. If you want a classic, beautiful ornamental hedge, then an English Holly would work extremely well. An English Holly is suitable for hedge heights of up to four metres. It creates a decorative display, forming an effective privacy screen and windbreak. Its glossy red berries are in beautiful contrast with its dark green leaves and provide a great food source for birds. Because of its slow growth rate, an English Holly hedge plant can take its time to reach your desired hedge height. But some nurseries sell it as a ready-made and instant hedge. An English Holly is pretty versatile as it thrives in sunny and partially shaded locations and can grow in normal or moist soil. It can also cope with urban pollution and the salty winds of coastal areas. To ensure your hedge remains low-maintenance, don't let it get too high and avoid plants that tend to grow upwards rather than outward, as they'll be harder to prune.

Figure 6.



You might think about leaving some grass or ground cover under the hedge and then a clear, sharp kerb edge that is easily swept up to. This would make it simple to keep the path clear of detritus. The grass should ideally be the same height or below the height of the Kerb with as little slope as possible. This will reduce the possibility for soil to migrate from the verge to the hard surface because of water runoff or traffic driving over it. The fence in Fig. 6, which has been damaged in this instance would not be necessary and maintenance over time of the holly would probably be more cost effective than replacing the fence every few years and keeping on top of the adjoining overgrown foliage as is needed in the photograph.

Finally, unmanaged bare soil will colonise naturally with plants. Selective planting of desired species such as ground cover plants will reduce the chance of weed growth in these areas. Below (in Fig. 7) you can see where weeds have populated the soil around a tree.

Figure 7.



The area around the base of the tree could be planted with a low ground cover. Ground cover plants are used to fill in gaps at the front of a border, as well as those tricky spots at the bases of shrubs that are difficult to plant. Ground cover plants are also great for covering tricky sites, such as slopes, which are difficult to access and plant. Some can also be grown as an alternative to a lawn.

As they cover the soil, ground cover plants are great for suppressing weeds. They act like a mulch, so they can help to lock in soil moisture and nutrients. Some can even help with soil erosion on slopes, their roots holding everything together when it rains. Heather, lavender, Ferns or Lily of the valley are all good examples of low growing ground cover plants - needing little maintenance and providing excellent coverage to suit different situations and soil types.

Evergreen hedges and ground cover will drop less leaves than deciduous plants and will provide better cover all year round. However, many deciduous trees have their own advantages for different situations. A suitable method of maintenance must be adopted for all ground cover and hedges. But selecting the correct plant for your purpose is key to minimising the maintenance requirements and reducing weeds.

# Maintaining Surfaces for Weed Prevention



Instead of jumping back onto our redesigned surface and surrounding areas with a knapsack to kill any weeds that come up, we can preempt the emergence of weeds in several ways. Hard surfaces are chosen for their inherent properties, which allow for supporting traffic, easy access, drainage of rainwater, crisp appearance and many other important functional benefits.

Why are weeds a problem? - Well in some ways they aren't really the problem except aesthetically. However, weeds grow in soil, not in hard materials such as rock, brick, tarmac etc. Soil on hard surfaces is a major problem for several reasons and results in weeds that can cause further complications.

## So how can we minimise the soil further with our maintenance regime?

Keep trees and hedges trimmed. - Trees drop masses of organic debris every year, which decomposes and causes much of the soil that emerges on a hard surface. Keeping a trees canopy to a reasonable size and removing dead branches will greatly reduce the volume of material dropped onto hard surfaces near the trees. This is the first step in reducing the soil at source. If suitable species of tree and hedge were selected in the first place, this job will be made significantly easier.

Fill gaps in surfaces to reduce the traps for detritus and soil. Reducing the size of any traps will minimise the effects of freeze thawing and prevent deep pockets of soil where perennial weeds can easily become established. This will allow your surface to perform its duties weed free for much longer.

Sweep away detritus. Once you have minimised the source of detritus and minimised its entrapment points it becomes less burdensome to remove. We can now sweep the organic material from the top. Ideally this is done at convenient points in the year to prevent allowing sufficient time for detritus to decompose into soil, at which point it becomes more time consuming to remove.

Remove the existing soil from the hard surface, This can be done efficiently with a weed brush, but could also be managed with a shovel and broom or in some cases a pressure washer.

As discussed; keeping soil to a minimum restricts the types of weeds that grow to annual plants and mosses. These annual plants and mosses can be removed effectively with a weed brush or controlled by heat with only one or two treatments per year. Trying to kill the weed only (without minimising the soil) will only lead to more organic material on the ground, which will become deeper soil, allowing more perennial weeds to emerge over time that will be more and more difficult to deal with, requiring many treatments per year.

Timing of a maintenance regime is crucial to reducing costs and improving the effectiveness of your maintenance.



## The effective year-round regime

**Winter** - Weed brushing and collection of soil, which will prevent opportunities for weed growth, winter is a great time to do this, as spring is when most plants begin to germinate and grow. Removing the soil before this can happen will drastically reduce the amount of new weeds coming up in spring.

**Spring** - Treatments with heat such as a Thermal weeding lance are most effective at this time of year. A plant leaf only has to be briefly exposed to a temperature of around 80°C to suffer terminal damage. This exposure to severe heat bursts the cells in the plant leaf. This in turn renders the plant incapable of converting light energy into chemical energy (Photosynthesis) effectively causing starvation.

Further thought and research on this subject will reveal this method is most effective on young, fleshy, hungry plants and seeds, rather than old established woody plants, which may have sufficient amounts of stored energy in their stems and roots to overcome temporary food shortages. The earlier in the plant life cycle we treat the plant, the more effective the treatment will be. Whatever you do, don't allow plants to go to seed before they are killed. You will make your job many times harder. Plants have different life cycles, flowering and dropping seeds at different times, so generic treatment times are not always the most suitable regime. Instead an as needed approach can work better where possible.

**Summer** - Sweeping grass cuttings, hedge clippings and other organic debris to prevent this from being allowed to decompose and form more soil. Sometimes these can be moved a short distance onto an organic surface, where they can be utilised as mulch. Doing this as it is produced is far easier than waiting until it has decomposed. Different sweeping equipment is available for different sites, surface types and access requirements.

**Autumn** - Collecting dead leaves and other organic debris that naturally falls from deciduous and annual plants in Autumn to prevent this from being allowed to decompose and form more soil. This could be done by sweeping, vacuuming or blowing material where appropriate. Most south facing surfaces that dry out quickly can be blown or vacuumed effectively. North facing surfaces, which tend to stay damp for longer periods of time often require the mechanical action of a sweeper to properly remove material from the surface. Particular attention should be paid to surfaces under hedges and trees that get a lot of shade, as these will be the first surfaces to get problems with moss. By removing all the soil with a weed brush or sweeper, you can ensure the surface is able to dry out thoroughly, which will have a big impact on moss growth.

Hopefully this guide prompts you into adopting a more preventative approach to weed management, using a more integrated system of solutions, that will improve your amenity environments, benefit nature and reduce your surface maintenance costs at the same time. A true cost comparison of weed control methods should take surface performance into account. After all, the whole point is not to turn weeds brown, but to keep the surface performing well - supporting traffic, proper draining, allowing easy access and looking good. A better maintained surface requires far less interference to directly control weeds.

## Useful Links



Please get in touch with any questions or feedback. We would love to hear about your experience with weed prevention and we are constantly updating our own knowledge and range of equipment to bring you better results.

There are some great sources of further information regarding many of the topics discussed in this guide. You can find some useful links to the guides we have mentioned as well as some useful organisations that promote best practice in weed prevention.

### **The Pesticide Action Network**

<https://www.pan-uk.org/>

<https://www.pan-uk.org/site/wp-content/uploads/Alternatives-to-herbicides-a-guide-for-the-amenity-sector.pdf>

### **The Amenity Forum**

<https://amenityforum.co.uk/>

<https://amenityforum.co.uk/guidance/>

<http://getbritainmoving.uk/amenity-sectors/streets-pavements/>

### **The Royal Horticultural Society**

<https://www.rhs.org.uk/weeds/weeds-on-hard-surfaces>

<https://www.rhs.org.uk/prevention-protection/weeds-non-chemical-control>

<https://www.rhs.org.uk/plants/for-places/ground-cover>

### **Bit Roads**

<https://bitroads.com/About-Us/Blog/entryid/36/how-freeze-thaw-cycles-can-damage-asphalt-pavement>

### **Kersten UK Ltd**

<https://kerstenuk.com/blog>

<https://kerstenuk.com/catalogue-the-surface-maintenance-handbook>

### **The Environment Agency**

<https://www.gov.uk/government/publications/cypermethrin-challenges-for-the-water-environment>

### **Defra**

[https://consult.defra.gov.uk/pesticides-future-strategy/sustainable-use-of-pesticides-national-action-plan/supporting\\_documents/NAPConsultationDocument.pdf](https://consult.defra.gov.uk/pesticides-future-strategy/sustainable-use-of-pesticides-national-action-plan/supporting_documents/NAPConsultationDocument.pdf)

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/834331/pb11577b-cop-litter1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/834331/pb11577b-cop-litter1.pdf)

### **Scottish Government**

<https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/05/code-practice-litter-refuse-scotland-2018/documents/00535494-pdf/00535494-pdf/govscot%3Adocument/00535494.pdf?forceDownload=true>

# **Kersten**

**SITE MAINTENANCE EQUIPMENT**

**KERSTEN (UK) LTD  
PROGRESS HOUSE  
39 BOULTON ROAD  
READING  
RG2 0NH**

**0118 986 9253  
INFO@KERSTENUK.COM**