

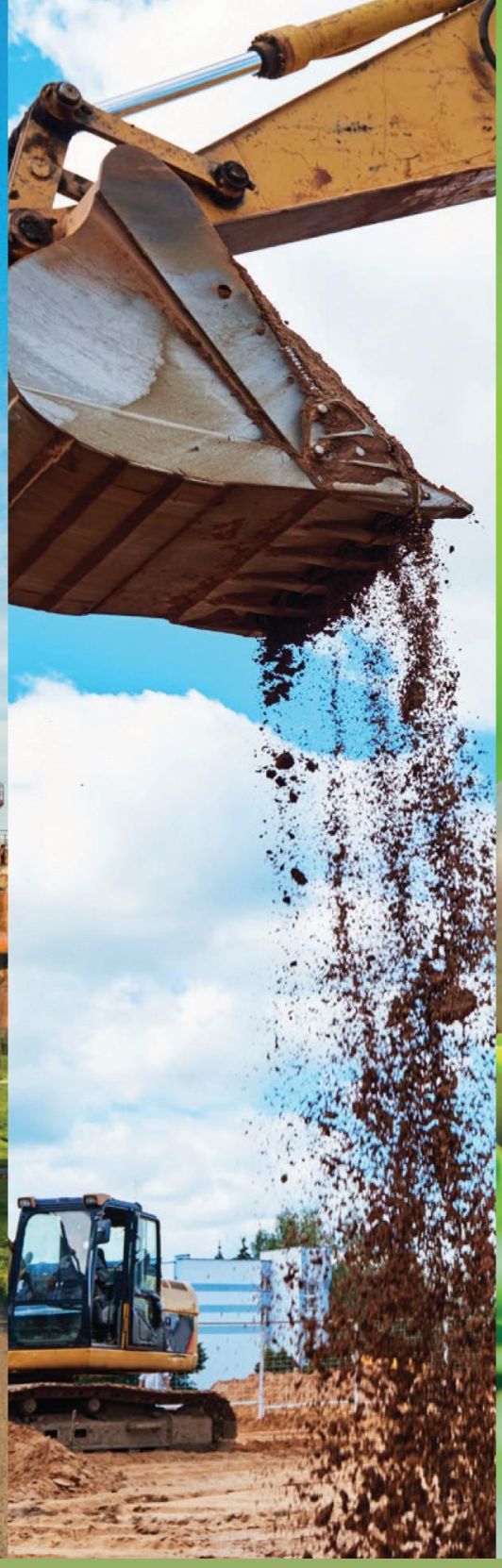


Waste Soil Classification and Disposal Options

Everything you wanted to know, but were afraid to ask

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What we'll cover here

You probably have a lot of different questions in your head right now. This document will attempt to answer most of them, but if we fail to do so, all you have to do is give us a shout!

- **Classification of Waste**
  - **Is it Waste?**
  - **Identify Waste Code**
  - **Is Further Assessment needed to confirm Waste Code?**
  - **Waste Assessment**
    - **Determine Hazardous Properties**
    - **Assessment of Oil Contaminants in Soil**
    - **Assessment of Wastes containing Asbestos**
- **Waste Acceptance Criteria (WAC) for disposal**
- **Inert Waste**
- **Off-Site Disposal Options**
- **Final Thoughts...**

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Introduction

If you are confused by how, where and when to use WM3, WAC, WAP, GAC and LCRM; it's only natural that you will have lots of questions about the what's, the why's and the how's of waste soil classification. Happily, this simple guide has been written just for you! We hope it will give you an insight into the processes involved and dispel the myths surrounding soil classification and what soil can be disposed of and where.

Background

It is important to understand that the investigation and remediation of contaminated land is **risk based**, taking into consideration factors such as the source of the contamination, receptors, site end use, etc. - whereas the assessment of contaminated soil for off-site removal is **hazard based**.

Why? ...well the European Commission (EC) deem that when you intend to remove soil from a site it becomes a waste;

- "Waste" is defined in Article 1(a) of the Waste Framework Directive (75/156/EEC and 91/156/EEC) as "**any substance or object** (in the categories set out in Annex 1) **which the holder discards or intends, or is required to discard**."

In other words, if you want to get rid of your soil, you are judged to be discarding it and hence it becomes classified as a waste, even if you want to give it away free!

You have a 'duty of care' to classify any waste you produce. As a rule of thumb, nearly all domestic, commercial and industrial wastes needs to be classified, and only once the waste is classified can you:

- Collect, dispose or recover the waste
- Identify applicable controls for the waste movement
- Complete waste documents and records
- Identify suitably organised waste management options
- Prevent harm to humans and the environment

Please note that anyone who undertakes the 'disposal operation' for you or 'waste recovery' (for example, treatment of the soil), is required under Articles 9 and 10 of the Framework Directive on Waste (Council Directive 75/442/EEC) to obtain a permit from the competent authority. If you employ someone to undertake the removal or treatment work on your behalf all **responsibility for the waste** including where it ends up, **continues to be yours**.

The Environment Agency (EA), in England, Natural Resources Wales, The Scottish Environment Protection Agency (SEPA) and The Northern Ireland Environment Agency are the competent authorities for the regulation of waste management activities.

The **hazard based** assessment essentially determines whether a waste contains substances with properties which are at concentrations that make them harmful to human health or the environment. (Technical Guidance WM3)

The Hazardous Waste Directive (HWD) (Council Directive 91/689/EC) is the regulatory framework for this assessment process. It defines a Hazardous Waste as a waste because it possesses one or more of the **hazardous properties**, as set out in the HWD, Annex III, Table 2.1. Hence, when a soil has substances within it containing properties exceeding specific thresholds it is classified as being of a **Hazardous** nature and when not, by default, it is classified as **Non-Hazardous**. Sufficient information to support the assessment and demonstrate that the waste has no hazardous properties must be made available for a waste to be classified as Non-Hazardous.

The process of assessment, subsequent classification and choice of disposal location are all discussed in the following sections...

Classification of Waste

Classification is determined using the WM3 Technical Guidance document, so let's make sure you're referring to the correct version. Version 1 of WM3 was published in May 2013 and was superseded by v1.1 in May 2018. In January 2021 it was revised again to Version 1.1.GB for use in England, Wales and Scotland, then to Version 1.2.GB in October 2021. There is a specific version for use in Northern Ireland, (currently v1.1.NI)[1].

Is it Waste (or to be considered with separate legislation)?

The logical starting point is to consider whether your material is actually a waste, there is no need to classify if it's not a waste:

- Eng/Wales/NI: https://www.gov.uk/government/publications/legal-definition-of-waste-guidance
- Scotland: https://www.sepa.org.uk/media/154077/is_it_waste.pdf

Examples of exclusions (not a waste or covered by different legislation) are gaseous emissions to air, unexcavated contaminated land, radioactive waste, decommissioned explosives, waste waters, animal by-products/carcasses, non-hazardous sediments from surface waters and mineral prospecting waste.

For our example, we are assuming there is a need to remove the soils from a building site containing contaminated land – this is considered a waste and will therefore require classification.

[1] The main differences between GB and NI versions are concerned with the GB and EU CLP (Classification, Labelling and Packaging of Substances Regulations), for example the GB version referring to Mandatory Classification Lists (MCL) under the GB CLP, whilst NI uses 'Table 3 of Annex VI'.

Identify Waste Code or Codes which *may* apply

The **List of Waste** (LoW) is the legal classification system used for classifying waste and identifying if a waste is hazardous waste.

The first step is to determine which entry or entries in the LoW your material is most akin to; this will then identify what **assessment** is needed to **confirm** the LoW code (and thus classification).

The LoW is divided into 20 chapters, most of these are industry-based but some are based on materials and processes. The chapters are presented in Table A1.1 of Appendix A in WM3.

Each chapter has a two-digit code between 01 and 20. The chapters have one or more sub-chapters (which suffix another two-digit code to the chapter code) and within these there are codes for individual wastes (associated with an additional two-digit code suffix). Each waste is therefore assigned a six-figure reference.

The names of the chapter, sub-chapter and individual waste scope descriptions are important as the classification is only valid if it satisfies all three. The full LoW are presented from page A9 of Appendix A in WM3.

To classify a waste, one or more six-digit LoW codes need to be selected. To add further complexity, codes should be chosen according to the hierarchy of chapter numbers:

1. 01 to 12 and 17 to 20. Excluding entries ending with 99;
2. 13 to 15;
3. 16;
4. 01 to 12 and 17 to 20. Entries ending with 99.

For contaminated land, the main soils codes are;

17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)		
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**		
17 05 03*	soil and stones containing hazardous substances	MH	
17 05 04	soil and stones other than those mentioned in 17 05 03	MN	

Figure 1 Excerpt from LoW Table (WM3, Appendix A)

Is Further Assessment needed to confirm Waste Code or Codes?

You will now have tentatively selected one or more waste codes which satisfy the chapter, sub-chapter and individual waste scope descriptions. The next step is to confirm the waste code(s) - the method of confirmation depends on the **Entry Type**.

Entry Types

Each code has an 'Entry Type' presented in the LoW table and entries are colour coded according to the following codes (and colours):

- AH: 'absolute hazardous' (red)
- AN: 'absolute non-hazardous' (black)
- MH: 'mirror hazardous' (blue)
- MN: 'mirror non-hazardous' (green)

To emphasise the hazardous nature of AH and MH types, they have an asterisk (*) next to them.

Reviewing our example classifications presented above in Figure 1, we can see that our '17 05 03*' and '17 05 04' wastes are classified as mirror hazardous and mirror non-hazardous respectively. The entry types are described below.

'Absolute Hazardous' (AH)

Are automatically considered hazardous unless the waste description in the table contains a 'specific' or 'general' reference to 'hazardous substances'. Concentrations of hazardous substances do not need to be determined, however any hazardous properties and composition will need to be established to enable a hazardous waste consignment note to be completed.

If you have tentatively identified a code with an 'AH' Entry Type, it must be used. No further assessment is required as it cannot provide evidence that the code should not be used.

'Absolute Non-hazardous' (AN)

Automatically not hazardous. It is worth double-checking linked codes in the waste description (if any) before settling on an 'AN' LoW code.

No further assessment is typically required.

'Mirror Hazardous' (MH) and 'Mirror Non-hazardous' (MN)

For 'mirror' waste descriptions, **additional assessment is required** to determine whether they are to be classified as hazardous wastes (MH) or not (MN).

With only one exception, all waste codes for chapter 17 (Construction and Demolition Wastes, Including Excavated Soil From Contaminated Sites) are "mirror entries". In our above example (Figure 1), if classified as being hazardous the waste would be identified as '17 05 03*', otherwise '17 05 04'.

Waste Assessment

Further assessment of the waste is therefore required if it belongs to a LoW code with Entry Type of 'Mirror Hazardous' (MH) or 'Mirror Non-hazardous' (MN). We need to determine whether the waste has an associated Hazardous Property.

Determine Hazardous Properties

We are continuing our example to classify waste excavated from contaminated land. The determination of hazardous properties from other waste streams can vary from the summary methodology below.

Chemical Composition

The assessment of waste compounds starts by ascertaining the chemical composition of the soil. For contaminated land, this will generally have been undertaken by your consultant during the site investigation stage. It is derived from the analysis of soil samples taken at various locations and depths across the site and/or from within stockpile(s). These samples will have been sent to a laboratory for a 'full suite' of analysis, which is based on the commonly found organics and inorganics within soil. This analysis request may vary depending on the former/present use of the site and other relevant or mitigating factors. It is crucial that the analysis used for classification relates directly to the soil for disposal - if not, some additional sampling and analysis may be required.

The number of samples taken will vary according to the volume of soil, site details and history, etc. and the calculation of this is another complex area covered in Appendix D of WM3 which we will not dwell on here!

The results from the individual sample analysis are known as a 'data set' and inform as to the presence and concentrations of the commonly found ions within soil. Our example data set for two samples is presented as Figure 2 below:

	Arsenic	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Sulphate	Zinc	TPH	pH	Asbestos
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	-	-
TP1	530	<1	782	<1	400	1,540	<1	297	3	0.24	1,446	565	7.2	No detect
BH1	25	<1	<1	35	564	1,352	<1	86	5	0.21	354	1,568	6.9	No detect

Figure 2 Example contaminated soil data set

It is important to note that this is not a WAC (Waste Acceptance Criteria) test. The WAC test and the chemical composition data sets of soils are two completely different pieces of information and must be treated separately. We will discuss WAC later.

Worst-case Substances

The analysis has identified the ion (cation and anion) concentrations within the soil, but has not identified the **worst-case substances** that could plausibly be associated with the waste soil. This will change on a site-by-site basis. For the metals in our example data set, we have identified the worst-case substances shown in Figure 3.

To determine these, consideration needs to be given as to the:

- properties of the soil that may affect speciation;
- the history of the site and likely contaminants associated with its use; and
- the chemical properties of possible substances likely to be present.

Substances that are not consistent with the history of the site and the analysis, or that have chemical properties which mean that they cannot exist in the waste, can in some circumstances be discounted. For our example for instance, it could be argued that lead sulphate rather than lead chromate would be more likely.

	Worst Case Metal Species
Arsenic	Arsenic trioxide
Boron	Diboron trioxide or boric oxide
Cadmium	Cadmium oxide
Chromium	Chromium(VI) compounds
Copper	Dicopper oxide or copper (I) oxide
Lead	Lead chromate
Mercury	Mercury dichloride
Nickel	Nickel chromate
Selenium	Nickel selenate
Zinc	Zinc chromate

Figure 3 Worst Case Metal Species

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Presence of 'Hazardous Substances' or 'Persistent Organic Pollutants' (POPs)?

Now the composition of the waste has been determined, checks need to be made for the presence of **hazardous substances** and **persistent organic pollutants (POPs)**.

A **hazardous substance** is a substance that is assigned a hazard statement code when classified using the retained Regulation on the Classification, Labelling and Packaging of Substances and Mixtures (The GB CLP Regulation).

For classification purposes, precedence is given to substances listed on the Mandatory Classification List (MCL) under the GB CLP Regulation. The MCL is regularly updated can be found on the Health and Safety Executive's website http://www.hse.gov.uk/chemical-classification.

The hazard statement code(s) and other information for one of our example worst-case substances, lead chromate, is summarised below as Figure 4.

		Classification		
Index No	**Chemical Name**	**Hazard Class and Category Code(s)**	**Hazard statement Code(s)**	**Notes**
082-004-00-2	lead chromate	Carc. 1B	H350	1
		Repr. 1A	H360Df	
		STOT RE 2	H373	
		Aquatic Acute 1	H400	
		Aquatic Chronic 1	H410	

Figure 4 Summary of key information from MCL entry for lead chromate

The MCL is not an exhaustive list of substances. Where a specific substance is not on the MCL, an appropriate group entry should be selected - in the case of lead for example, this would be 'lead compounds with the exception of those specified elsewhere in this Annex' (Index No 082-001-00-6).

There are fifteen substances (or groups of substances) listed in WM3 as **POPs**, comprising mainly of pesticide/herbicides, combustion products and PCBs:

- polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)
- DDT (1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane)
- chlordane
- hexachlorocyclohexanes (including lindane)
- dieldrin
- endrin
- heptachlor
- hexaclorobenzene
- chlordecone
- aldrine
- pentachlorobenzene
- mirex,
- toxaphene
- hexabromobiphenyl
- polychlorinated biphenyls (PCB's)

If any of these are present in the waste, they are included in the waste classification process. Table C16.1 in WM3 presents concentration limits for these substances – if representative concentrations exceed those limits, the waste is considered hazardous.

If at this stage in the classification process your composition has revealed no hazardous substances and no POPs above concentration limits, then congratulations - you can assign a classification code to your waste. This would be unexpected in the case of waste from contaminated land.

Assess the Hazardous Properties

Having obtained the appropriate hazard statement codes for any hazardous substances in the waste, Table 2.1 in WM3 is used to cross-reference which of the 15 hazardous properties (numbered HP 1 to HP 15) apply to each code. For our lead chromate example, these are shown in Figure 5.

Substance	Hazard Statement Code(s)	Hazardous Properties	Threshold
Lead chromate	H350	HP 7	Ind. 0.1%
	H360Df	HP 10	Ind. 0.3%
	H373	HP 5	Ind. 10%
	H400	HP 14	Apx. C14
	H410	HP 14	Apx. C14

Ind.: concentration of individual hazardous substance compared to threshold

Apx.: see threshold equations in listed appendix

Figure 5 Hazard Properties for lead chromate

For lead chromate, Hazard Properties 5, 7 and 10 all require the substance concentration (expressed as a percentage) to be individually compared to thresholds (calculation of compound concentrations is presented in the next section). Note 1 is associated with the substance in the MCL requiring only the lead cation to be used for assessment calculations and not the compound, as such the concentrations for TP1 (1,540mg/kg) and BH1 (1,352 mg/kg) as percentages are 0.154% and 0.135% respectively. These are both above the individual thresholds for HP 7 only. Both samples would therefore be considered hazardous based on lead concentrations alone with regard to HP 7. The assessment does not end at the point however – we still need to consider HP 14 and the remaining substances reported in our composition testing, that way we ensure that all appropriate hazard properties can be listed on the hazardous waste consignment note.

HP 14 refers us to Appendix C14 for information regarding the thresholds, here it is specified that:

- if the sum of percentage concentrations of all substances with a H400 Hazard Statement Code is ≥ 25%, the sample is considered hazardous (any concentration equal to or below 0.1% can be disregarded from the calculation).
- if the sum of percentage concentrations of all substances with a H410, H411 and H412 Hazard Statement Code is ≥ 25%, the sample is considered hazardous. In this case the sum of all H410 concentrations are multiplied by 100 and for H411 by 10. H410 concentrations below 0.1% are disregarded, as are concentrations below 1% for H411 and H412.
- if the sum of percentage concentrations of all substances with a H410, H411, H412 and H413 Hazard Statement Code is ≥ 25%, the sample is considered hazardous (any H410 concentration equal to or below 0.1% can be disregarded from the calculation, as can H411, H412 and H413 concentrations below 1%).

Applying the above rules to lead chromate (remembering that we only need to consider the lead cation concentration) we find:

- The individual H400 concentrations are both less than the 25% threshold. However, this is a cumulative threshold target and any other H400 concentrations for other substances in our sample would also need to be incorporated – we have undertaken this separately and found the sample H400 cumulative total to be below the threshold.
- The individual H410 concentrations, after application of the x100 multiplier, are below the 25% threshold target. However, after combining the H410 concentrations for other substances in the sample we find that the 25% threshold is exceeded in TP1 due to the combination of lead cation (0.154 x 100 = 15.4%) and zinc chromate (0.401 x 100 = 40.1%) with a total of 55.5%.

- The individual H410 concentrations are both less than the 25% threshold. However, this is a cumulative threshold target and any other H410 concentrations for other substances in our sample would also need to be incorporated – we have undertaken this separately and found the sample H410, H411, H412 and H413 cumulative totals to be below the threshold.

This is not a definitive work-through of the HP 14 Ecotoxicity hazard property, anyone undertaking a classification should familiarise themselves with all the hazard property appendices in WM3.

The same process is then undertaken for the remaining substances identified in our chemical composition testing. Providing the laboratory limits of detection adopted during testing were fit for purpose, concentrations reported as below these limits can usually be disregarded in the classification process.

Calculating the compound concentration

The following is an example of how to calculate the worst-case compound concentration for the selenium anion (5 mg/kg) in our example data set.

1. The analysis indicates that 5 mg/kg of selenium is present in the waste material sampled as BH1.
2. The actual worst case selenium compound in the material is suspected (in this case) to be nickel selenate, with a chemical formula of $NiSeO_4$
3. The atomic weight of selenium is 78.96, nickel 58.69 and oxygen 16.00.
4. The concentration of nickel selenate in the soil is therefore ((78.96 + 58.69 + (4x 16.00)) ÷ 78.96) x 5 = 12.77 mg/kg
5. To convert mg/kg to a percentage, divide by 10,000. Our calculated concentration of 12.77 mg/kg = 0.00128%

Assessment of Oil Contaminants in Soil

The WM3 guidance presents a number of approaches valid for the assessment of differing types of oil or oil contaminated wastes (Chapter 3, Section 4) and describes oil as "hydrocarbon mixtures which are often complex and may have additives or other minor constituents".

Oil substances such as petrol and diesel are classified as Absolute Hazardous in their own right (13 07 02* and 13 07 01* respectively) and therefore are always hazardous if disposed of as an isolated waste stream (e.g. a drum of fuel). With the exception of edible oils and some biodiesel, this applies to all oil wastes regardless of whether that oil has any hazardous properties.

However, as constituents within another waste such as soil, the oil contaminant is *not the main constituent of the waste* and so is not an absolute entry but instead may cause that soil to be classed as a mirror entry. To determine whether this is the case, the concentrations must therefore be assessed against thresholds relating to the hazardous properties involved.

The assessment of oil wastes is therefore a similar process to any other waste and it should be undertaken in a series of steps in order to correctly classify the waste. The first step is to identify the contaminant. This can be simple if for example you have the empty container next to the contaminated soil with the product name on the side, or you know for certain that it was (for example) a diesel spill. In an ideal situation an MSDS sheet will be available for the product and the hazard properties will be clearly stated. Or you can use a more generic class of product, such as with diesel, which has a known composition and set of risk phrases which can be used for the classification process.

Where an unknown oil contaminant is encountered, you'll have to look at the results of the analysis derived from samples of the soil and ask your laboratory to identify what the contaminant is. Most laboratories will be

able to perform this "finger-print" service, although it's not unusual for it to be impossible to accurately identify the constituents within an environmental sample due to a combination of degradation, weathering or chemical interaction.

For our example we compare the reported TPH concentrations (representing total petroleum hydrocarbons, C6 to C40) to threshold concentration limits set out in Appendix C for each hazardous property[2]:

- If the concentration of TPH is ≥ 10%, the waste will be HP 5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity
- If the concentration of TPH is ≥ 3%, the waste will be HP 10 toxic for reproduction.
- If the concentration of TPH is ≥ 2.5%, the waste will be HP 14 Ecotoxic.
- If the concentration of TPH is ≥ 0.1%, the waste will be HP 7 Carcinogenic **and** HP 11 Mutagenic unless the concentration of benzo(a)pyrene is <0.01% of the concentration of the TPH

Our reported TPH concentration for BH1 (1,568 mg/kg) results in the following hazard properties: HP 7, HP 11 and assumed HP 3.

[2] The assessor is reminded that some hazard statements will require concentrations to be cumulative for other substances considered in the classification

Assessment of Wastes containing Asbestos

Asbestos is a naturally occurring silicate mineral and may be found in wastes in a fibrous or bonded form. There is a single entry on the MCL for asbestos, which identifies two associated hazard statement codes – all asbestos is therefore classified in the same way under GB CLP Regulations.

Asbestos in soils is a slightly unusual case for waste classification in that it doesn't have a category of its own, instead there are two LoW codes (Figure 6) which are used to classify the substance for disposal purposes.

17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)		
17 06	**insulation materials and asbestos-containing construction materials**		
17 06 01*	insulation materials containing asbestos	MH	
17 06 05*	construction materials containing asbestos	MH	

Figure 6 Commonly adopted LoW codes for asbestos

Asbestos in soil and stones is commonly identified under '17 06 05*'. Unlike in a risk assessment for human health, all forms of asbestos (white, brown and blue) are classified the same way for waste classification purposes:

- Considered hazardous if asbestos, present as free fibres, amounts to ≥0.1% of the waste as a whole.

Asbestos containing materials (ACM) such as bonded asbestos tiles are classified as hazardous if the concentration of asbestos fibres in a single piece is 0.1% or greater of the ACM. Where technically and economically feasible, this should be separated from other wastes such as soils and disposed of separately. The asbestos is then disposed of as hazardous waste and the soil can be disposed of as non-hazardous (subject to classification of the soil).

The position becomes more difficult when the bonded asbestos contains >0.1% asbestos and cannot be separated from the soil. The regulatory position is that this then becomes a mixed waste and is beyond the scope of this guide – see WM3 or talk to your consultant.

Our example data set included screening for asbestos, but none was detected in either sample and thus not considered further regarding our classification.

Assign Classification Code and describe the Hazardous Properties

The results from both of our samples (TP1 and BH1) have resulted in the wastes they represent being classified hazardous with a LoW code of '17 05 03*'. Receivers of the waste (typically a landfill or soil treatment centre) will want to review any laboratory data results and classification justification. For the sake of brevity, we have summarised our classification of the BH1 sample, including the description of Hazardous Properties.

Classification of sample:	**BH1**
LoW code:	Chapter 17: Construction and Demolition Wastes (including excavated soil from contaminated sites) **17 05 03*** (Soil and stones containing hazardous substances)
Hazard Properties: (proven)	**HP 7: Carcinogenic** "waste which induces cancer or increases its incidence" Carc 1B, H350 from: • Lead chromate • TPH (C6-C40)
	HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell" Muta. 1B, H340 from: • TPH (C6-C40)
Hazard Properties: (other)	**HP 2: Oxidising** "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials" Ox. Sol. 1, H271 from: • Chromium (VI) oxide
	HP 3: Flammable "liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C" Flam. Liq. 3, H226 from: • TPH (C6-C40)

Waste Acceptance Criteria (WAC) for disposal

WAC testing (Waste Acceptance Criteria BSEN12457) is primarily a compliance test of either a pass or fail against the regulatory limit values set for wastes being accepted at landfill sites.

The test involves extracting a representative sample of a waste and subjecting it to leaching in water under predetermined test conditions.

WAC is not a waste classification. As this eBook has already discussed, wastes can only be classified as being either Hazardous or Non-Hazardous. However, WAC testing is extremely important when considering landfill as the preferred disposal route.

What the WAC does is to inform as to the limit values for leaching acceptable at engineered inert and hazardous landfill sites. However, just for an added element of confusion, in simple terms there are no leaching limit values for non-hazardous landfill sites. Waste producers will therefore have to provide WAC analysis for a soil to be accepted into an Inert landfill site and a Hazardous landfill site, but depending upon their licence/permit conditions a Non-Hazardous landfill site can usually accept wastes that are not hazardous i.e. if a soil is not classified as hazardous, it does not need to undergo WAC testing.

Inert Waste

Whether a waste is described as 'Inert' has nothing to do with the Waste Classification process described in WM3 guidance and summarised in the above sections.

The question of describing waste as inert is a somewhat thorny issue primarily because of the tax implications relating to the description of wastes. Basically, if a waste is described as inert, many people will interpret this as meaning that the lower rate of tax is applicable. The wording of the legislation on this point is open to interpretation and at the time of writing this matter is not known to have been resolved by HMRC.

The description of a waste as inert, is based upon the European Landfill Directive 'Council Directive 1999/31/EC of 26 April 1999'. Which in turn informs regulations of the devolved UK nations, that define inert waste as waste which:-

- does not undergo any significant physical, chemical or biological transformations;
- does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and
- has insignificant total leachability and pollutant content and ecotoxicity of its leachate are insignificant and, in particular, does not endanger the quality of any surface water or groundwater

The regulations provide lists of wastes which are intrinsically inert. If a waste is intrinsically inert then it follows that it must also be non-hazardous.

Soil does feature on these lists in the form of '17 05 04' but you must still justify your classification in line with WM3 guidance. Because a LoW code is always required and there is no specific code for inert material, **if the soil is inert it must be classified as non-hazardous**. This is often a source of confusion because the terms are quite distinct and not interchangeable but it's a mouthful to describe a soil as 'inert, non-hazardous' so it's common to hear soils described as inert without the additional non-hazardous. As a result, the misinterpretation that the two terms are mutually exclusive has arisen. It should also be noted that due to the generally high organic matter content, topsoil is usually not inert.

Off-Site Disposal Options

The key off-site disposal routes for contaminated land wastes are **landfill** and **soil treatment centres**. There are alternative routes such as **Paragraph 9 or 19 exempt** sites (Scotland) or **U1 exempt** sites (England and Wales) – more on these later.

A **landfill site** is a facility which has been granted a permit to dispose of certain waste streams according to the licence specifically granted for that site. The EU Landfill Directive requires that landfill sites are classified as hazardous, non-hazardous, or inert. The wastes permitted at each type of site is based on **waste classification** and **WAC testing results** – these are discussed below and summarised in Figure 7.

If a waste has been classified as being;

- **Non-Hazardous** and it has leachability characteristics that are **below** the limits for **inert** WAC then it can be disposed of at an Inert site. It can also be disposed of at a Non-Hazardous or Hazardous landfill site but this will cost you a lot more.
- **Non-Hazardous** then it can be disposed of at a Non-Hazardous landfill site. WAC testing is not required since there are no WAC limits for Non-Hazardous landfill. Of course, the waste could still be deposited at a Hazardous site, providing it is below the Hazardous WAC limits, and you're willing to pay the higher gate fees.
- **Hazardous** and it has leachability characteristics that are below the limits for hazardous WAC then it can be disposed of at a Hazardous landfill site.
- **Hazardous** and it has leachability characteristics that are **above** the limits for **hazardous** WAC then pre-treatment will be required before it can be disposed of at a Hazardous landfill site or indeed reclassified. If you do pre-treat, it may be possible to reclassify the material as the treatment may have significantly reduced the contaminants of concern.

Non-Hazardous		Hazardous	
Below inert WAC limit values	Above inert WAC limit values	Below hazardous WAC limit values	Above hazardous WAC limit values
INERT landfill	NON-HAZARDOUS* landfill	HAZARDOUS landfill	PRE-TREATMENT**

* Individual sites may have certain limit values predetermined in their licence.
** After pre-treatment the material characteristics may have changed to an extent which allows for it to be re-classified as a Non-Hazardous waste.

Figure 7 Summary matrix for landfill disposal and WAC testing requirements

Soil treatment centres offer an alternative to landfilling and as such are exempt from landfill tax, potentially offering substantial costs savings over landfill. Treatments can vary in scope from simple sorting to complex chemical and/or physical processing. Treatment will usually aim to reduce hazardous wastes to non-hazardous. The composition of the wastes accepted can differ considerably between centres, so knowledge (or plenty of time) is key. Your waste broker should explore the use of such centres when formulating the best disposal route for your waste.

Waste License exempt sites are not Inert Landfill sites. They are sites which have been granted an exemption from holding a waste management licence as they solely have a requirement for material for the construction, maintenance or improvement of buildings, roads, railways, airports, docks or other transport or recreational facilities. Essentially, they are only intended to accept material that does not contain any contaminants such as virgin sub-soils or aggregates. They need to have a requirement for a given amount of material, at a specific location for a dedicated reason. Simply filling a hole in the ground does not count unless the end use is for one of the above reasons. In England and Wales they are referred to as U1 exemptions, and in Scotland as Paragraph 9 and Paragraph 19 exemptions. Similar parallel legislation applies in Northern Ireland. The overall intention of the legislation is the same even though the exact wording and parameters vary somewhat.

Contaminated soil can be deposited at exempt sites but suitable evidence must be produced that shows that the soil will not cause pollution or harm. The only simple way of achieving this is to undertake a detailed risk assessment that considers the risk to humans, the site and any neighbouring receptors whilst considering the waste in question.

Final Thoughts...

We hope that our streamlined run-through the WM3 guidance in respect to classifying wastes associated with contaminated land has provided a useful insight into the process. There are many nuances to the process and potential pitfalls we hope you'll avoid. For instance, did you notice that even in our abbreviated summary we had to deal with the following?

- The hierarchy of LoW chapter numbers;
- Soil sampling strategy;
- Lead compounds being assessed as the lead cation only;
- Choices of worst-case substances;
- Conservative assumption that the reported total chromium result was 100% the more toxic hexavalent chromium; and
- The more complex methodology for dealing with oily wastes.

We've also touched upon inert wastes which are not part of the guidance and WAC testing (again separate from guidance and not to be used when classifying your wastes). Then, when deciding on *where* your wastes are to be disposed, we're faced with more decisions and legislation – getting it wrong can have huge cost implications.

Finally, we're often asked whether waste soils classified as hazardous can be mixed up with some non-hazardous material to reduce the overall hazardous concentrations. The simple answer is "no!", this is a prohibited activity and producers have a duty to separate mixed waste, remember the catchy mantra of "**Dilution is not the solution for pollution**".

We're always happy to be contacted should you have any queries or require further information. Soilutions are a knowledgeable & licensed waste broker as well as an established environmental consultancy.

soilutions

We will clear it up, contact us today.

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