epa
Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Guidelines for the identification and proper management of hazardous fractions in construction and demolition waste

THE CIRCULAR ECONOMY PROGRAMME
The Driving Force for Ireland's Move to a Circular Economy

Introduction

The correct classification of construction and demolition (C&D) waste is the foundation for ensuring that its characterisation, storage, collection, transportation, and treatment/disposal is carried out in a manner that provides protection for the environment and human health, and in compliance with legal requirements. Identifying and separating hazardous waste also allows the remaining non-hazardous waste to be more safely and effectively recycled, which contributes to more circular management of resources.

These guidelines will assist with the identification, characterisation, and proper management of hazardous materials in C&D waste within Ireland. They are primarily intended for people responsible for managing waste on development sites.

The Environmental Protection Agency's (EPA) current National Hazardous Waste Management Plan (NWHMP) covers a six-year period from 2021 to 2027. The purpose of this Plan is to protect the environment and human health in Ireland through best practice management of hazardous wastes.

These guidelines have been developed in response to Key Action 14.3 and will help you properly manage hazardous C&D waste and outline the laws that apply to it. By doing this you can reduce the volume of C&D waste you produce, save money and make sure you are not liable to prosecution.

The construction and demolition sector is the second largest source of hazardous waste in Ireland after industrial facilities. In 2021, 106,664 tonnes of hazardous C&D waste were generated (including contaminated soil). The volume of construction and demolition work has continued to increase and with this, the volume of hazardous waste produced.

Waste which requires special management due to the presence of alien species (e.g. Japanese Knotweed) falls outside the scope of this guidance.

Read more

NHWMP 2021-2027 Recommendation 14

"Promote best practice in the management of commercial hazardous waste streams."

Key Action 14.3:
Develop training to promote awareness on identification and proper management of hazardous fractions in C&D waste.

Contents

What are the risks from hazardous construction & demolition waste?

The incorrect characterisation, management and disposal of these materials can result in land, air, and water pollution, posing a serious health and environmental hazard.

Mismanagement of hazardous C&D waste could also have significant financial and legal consequences, and damage the reputation of your business.

Hazardous C&D waste can be harmful to individuals who come into direct contact with it, or via indirect contact through leaching or other emissions of hazardous substances into the environment. Some of the health hazards do not occur immediately and can take years to develop, by which time it is often too late to treat them.

Health impacts from the exposure to hazardous materials can include:

- Mesothelioma (cancer of lung linings) from exposure to asbestos containing materials
- Increased cancer risks and several other health hazards from exposure to Persistent Organic Pollutants (POPs)
- Inhalation of dust and harmful particulates which can cause several respiratory and cardiovascular health problems
- Skin problems from direct contact with hazardous materials

Some hazardous materials accumulate in the environment and so even small releases of these can cause harm, and can have impacts far from where they are emitted. Management of hazardous materials is therefore essential, regardless of the volume of waste.

How do I manage hazardous construction & demolition waste?

General principles

You have legal obligations in relation to waste management.

The Waste Management Act imposes a general duty of care on holders of waste, under which a person may not hold, transport, recover or dispose of waste in a manner that causes, or is likely to cause, environmental pollution. If you do not take reasonable steps to identify and segregate hazardous waste, you may be in breach of this duty of care. The European waste framework directive has been transposed into Irish law by the European Communities (Waste Directive) Regulations 2011.

You should follow these principles for managing hazardous C&D waste:

- Identify hazardous waste.
- Segregate and temporarily store it separately from non-hazardous waste.
- Only use a company with a valid waste collection permit to collect hazardous waste.
- Satisfy yourself that this company has the necessary authorisations and facilities to properly manage the waste you consign to them (this applies to both haulage and waste treatment/disposal). This is part of your duty of care.
- Ensure that you receive and retain records of what hazardous wastes you have generated, who has collected them, and where they have been taken.
- Develop site-specific management and control plans and procedures for your project. Identifying likely hazardous waste prior to starting construction and demolition projects can help you plan better, and therefore minimise cost and risk.
- Use Safety Data Sheets (SDSs) to determine hazardous properties and disposal requirements. Further information on SDS can be found here.

You should document the procedures for managing hazardous waste in your Resource & Waste Management Plan.

Guidance on preparing a Resource & Waste Management Plan is available here.

Burning of waste on site

NEVER BURN WASTE ON SITE.

The burning of wastes – either indoors or outdoors – is illegal. Only appropriately authorised facilities can burn waste under controlled conditions. Burning of hazardous waste is particularly dangerous.

Onsite storage

You should plan waste collections to minimise the amount of hazardous C&D waste kept on site. If you keep waste on site for more than six months, it will no longer be considered as "temporary storage" and additional legal requirements are likely to apply.

If you keep hazardous waste on your site, even for a short period of time, you must:

- Ensure that it is stored safely and securely to prevent pollution
- Ensure that it is packaged and labelled correctly
- Keep different types of hazardous waste separate
- Keep hazardous and non-hazardous waste separate
- Keep liquid hazardous waste in a dedicated area, with a bund or barrier to contain any spills or leaks
- Store flammable materials away from other materials and protect from accidental ignition
- Regularly check storage areas for leaks, deteriorating containers or other potential risks
- Display written instructions for storing and disposing of each type of hazardous waste
- Maintain an inventory of the hazardous wastes kept on your premises, and where they are stored – this will help the emergency services to deal with any incident effectively and safely

You must assess risks posed by any hazardous substances that you store on your site, including hazardous waste, and take steps to control those risks.

Make sure your staff are properly trained to deal with spills of the hazardous materials that you store on your site. This should include instructions on what to do if there is a spill, the type of personal protection equipment required and how to correctly dispose of contaminated clean-up materials.

Collection and transport

Hazardous waste leaving your site must be packaged and labelled appropriately and (where necessary) in compliance with relevant health and safety requirements.

This will include labels which clearly identify the hazardous properties of the waste, and containers which are suitable for the waste and will minimise the risk of spillage. Further advice is available in Section 18 of the Health and Safety Authority's guidance on carriage of dangerous goods by road.

Your hazardous waste management company should be able to support you with this, although you still have a duty of care to meet the legal requirements.

Keep records when you have hazardous wastes taken from your site to prove that you have managed them properly. The following five points are very important to know:

1. Make sure you have a copy of the relevant waste collection permit from the company that collects the hazardous wastes from your site. You should get them to send it to you at the start of the project. If they have a waste collection permit they must manage your wastes correctly and it also protects you if they do anything wrong with your wastes.
2. If you give your hazardous wastes to someone without the appropriate waste collection permit, then you are breaking the law and may be liable to prosecution. Contact the Environment section of your local authority for a list of companies permitted to collect hazardous waste in your county, or look up the National Waste Collection Permit Office for details.
3. Each docket should be accompanied by a form called a Waste Transfer Form, available from your authorised waste collector. You can also register with Dublin City Council if you want to create the Waste Transfer Form yourself but you still must ensure an authorised waste collector is used for each collection. Please contact wtf@dublincity.ie if you wish to register an account.
4. If hazardous waste is being exported directly from the site of generation, please ensure the shipment is properly notified in advance to Dublin City Council's National TFS Office and that all authorisations have been granted. Further information is available at mailto:wtf@dublincity.ie
5. For hazardous wastes you must keep your records for a minimum of three years and the waste transfer form must contain information on the volume/quantity of waste removed.

How is hazardous waste defined and classified?

Classification

As a waste producer, you are legally obliged to classify your waste. The waste classification system applies across the European Union and is the basis for all national and international waste reporting obligations.

You must assign the correct List of Waste (LoW) code to the waste. The LoW code identifies the source of the waste (i.e. what types of activities have generated it), and whether it is hazardous or not.

The classification of waste is a multi-stage process: the EPA has developed a methodology and template for the identification and assessment of a waste's hazardous properties (HPs) and assigning the appropriate LoW code to the waste, available here.

There are two ways of classifying hazardous waste:

1. Some types of wastes are always hazardous – these are called "absolute entries" in the LoW.
2. Other types of waste will be hazardous if they contain hazardous substances above certain thresholds.

These are called "mirror entries" in the LoW.
These mirror entries are harder to classify, because you need to understand what substances are present and at what concentrations, and then compare these to threshold limits.

Table 1 lists the hazardous properties that can lead to a waste being classified as hazardous.

Definition

According to the EPA definition, **"a waste is hazardous when it can harm human health or the environment because it is explosive, oxidising, flammable, irritant, toxic, carcinogenic, corrosive, infectious, mutagenic, sensitising, or eco-toxic."**

Classification

Table 1: Hazardous Properties

HP1	**"Explosive":** waste which is capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic waste, explosive organic peroxide waste and explosive self-reactive waste is included
HP2	**"Oxidising":** waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials
HP3	**"Flammable":** this includes flammable liquid waste, flammable pyrophoric liquid and solid waste, flammable solid waste, flammable gaseous waste, water reactive waste and other flammable waste
HP4	**"Irritant":** waste which on application can cause skin irritation or damage to the eye
HP5	**"Harmful":** waste which can cause specific target organ toxicity either from a single or repeated exposure, or which cause acute toxic effects following aspiration
HP6	**"Toxic":** waste which can cause acute toxic effects following oral or dermal administration, or inhalation exposure
HP7	**"Carcinogenic":** waste which induces cancer or increase its incidence
HP8	**"Corrosive":** waste which on application, can cause skin corrosion
HP9	**"Infectious":** waste containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms
HP10	**"Toxic for reproduction":** waste which has adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring
HP11	**"Mutagenic":** waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell
HP12	**"Release of an acute toxic gas":** waste which releases acute toxic gases (Acute Tox. 1, 2 or 3) in contact with water or an acid
HP13	**"Sensitising":** waste which contains one or more substances known to cause sensitising effects to the skin or the respiratory organs
HP14	**"Ecotoxic":** waste which presents or may present immediate or delayed risks for one or more sectors of the environment
HP15	Waste capable of exhibiting a hazardous property listed above not directly displayed by the original waste

Hazardous Waste LoW Entries

This section presents the LoW codes that may apply to hazardous waste from construction and demolition projects.

Some are "absolute entries", whilst others are "mirror entries".

- If your waste is an "absolute entry", no further testing is required – it is hazardous waste.
- If your waste is not an "absolute entry", but it may contain or be contaminated with hazardous substances, then it might still be hazardous waste as a "mirror entry". To determine whether the waste contains hazardous substances at the levels which would make the waste hazardous, you need to apply the EPA Waste Classification guidelines referenced on **Page 6**.

Most waste from construction and demolition activities should be classified as one of the codes in the "17" chapter of the EPA Waste Classification guidelines, covering C&D wastes (including excavated soil from contaminated sites) shown in **Table 2**.

However, some types of waste likely to be found on construction and demolition sites may match with specific codes set out in other chapters of the LoW (e.g. those shown in **Table 3**).

Table 2: List of Waste Absolute and Mirror Hazardous Entries (EPA Waste Classification guidelines: Chapter 17, construction and demolition)

Code	Description	Mirror or Absolute
17 01 06*	Mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing hazardous substances	Mirror
17 02 04*	Glass, plastic and wood containing or contaminated with dangerous substances	Mirror
17 03 01*	Bituminous mixtures containing coal tar	Mirror
17 03 03*	Coal tar and tarred products	Absolute
17 04 09*	Metal waste contaminated with hazardous substances	Mirror
17 04 10*	Cables containing oil, coal tar and other hazardous substances	Mirror
17 05 03*	Soil and stones containing hazardous substances	Mirror
17 05 05*	Dredging spoil containing hazardous substances	Mirror
17 05 07*	Track ballast containing hazardous substances	Mirror
17 06 01*	Insulation materials containing asbestos	Mirror
17 06 03*	Other insulation materials consisting of or containing hazardous substances	Mirror
17 06 05*	Construction materials containing asbestos	Mirror
17 08 01*	Gypsum-based construction materials contaminated with hazardous substances	Mirror
17 09 01*	C&D wastes containing mercury	Mirror

Table 3: Absolute and Mirror Hazardous Entries Likely to be Present on construction Sites (EPA Waste Classification guidelines: Other Chapters)

Code	Description	Mirror or Absolute
13 01	**Waste hydraulic oils**	
13 01 01*	Hydraulic oils, containing PCBs Absolute	Absolute
13 01 04*	Chlorinated emulsions	Absolute
13 01 05*	Non-chlorinated emulsions	Absolute
13 01 09*	Mineral-based chlorinated hydraulic oils	Absolute
13 01 10*	Mineral-based non-chlorinated hydraulic oils	Absolute
13 01 11*	Synthetic hydraulic oils	Absolute
13 01 12*	Readily biodegradable hydraulic oils	Absolute
13 01 13*	Other hydraulic oils	Absolute
13 02	**Waste engine, gear and lubricating oils**	
13 02 04*	Mineral-based chlorinated engine, gear and lubricating oils	Absolute
13 02 05*	Mineral-based non-chlorinated engine, gear and lubricating oils	Absolute
13 02 06*	Synthetic engine, gear and lubricating oils	Absolute
13 02 07*	Readily biodegradable engine, gear and lubricating oils	Absolute
13 02 08*	Other engine, gear and lubricating oils	Absolute
13 05	**Oil/water separator contents**	
13 05 01*	Solids from grit chambers and oil/water separators	Absolute
13 05 02*	Sludges from oil/water separators	Absolute
13 05 03*	Interceptor sludges	Absolute
13 05 06*	Oil from oil/water separators	Absolute
13 05 07*	Oily water from oil/water separators	Absolute
13 05 08*	Mixtures of wastes from grit chambers and oil/water separators	Absolute

Code	Description	Mirror or Absolute
13 07	**Wastes of liquid fuels**	
13 07 01*	Fuel oil and diesel	Absolute
13 07 02*	Petrol	Absolute
13 07 03*	Other fuels (including mixtures)	Absolute
14 06	**Waste organic solvents, refrigerants and foam/aerosol propellants**	
14 06 01*	Chlorofluorocarbons, HCFC, HFC	Absolute
14 06 02*	Other halogenated solvents and solvent mixtures	Absolute
14 06 03*	Other solvents and solvent mixtures	Absolute
14 06 04*	Sludges or solid wastes containing halogenated solvents	Absolute
14 06 05*	Sludges or solid wastes containing other solvents	Absolute
16 01	**End-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance**	
16 01 07*	Oil filters	Absolute
16 01 08*	Components containing mercury	Mirror
16 01 09*	Components containing PCBs	Mirror
16 01 10*	Explosive components (for example air bags)	Absolute
16 01 11*	Brake pads containing asbestos	Mirror
16 01 13*	Brake fluids	Absolute
16 01 14*	Antifreeze fluids containing dangerous substances	Mirror
16 02	**Wastes from electrical and electronic equipment**	
16 02 09*	Transformers and capacitors containing PCBs	Mirror
16 02 10*	Discarded equipment containing or contaminated by PCBs other than those mentioned in 16 02 09	Mirror
16 02 11*	Discarded equipment containing chlorofluorocarbons, HCFC, HFC	Mirror
16 02 12*	Discarded equipment containing free asbestos	Mirror
16 02 13*	Discarded equipment containing hazardous components other than those mentioned in 16 02 09 to 16 02 12	Mirror
16 02 15*	Hazardous components removed from discarded equipment	Absolute

Code	Description	Mirror or Absolute
16 05	**Gases in pressure containers and discarded chemicals**	
16 05 04*	Gases in pressure containers (including halons) containing dangerous substances	Mirror
16 05 06*	Laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	Mirror
16 05 07*	Discarded inorganic chemicals consisting of or containing dangerous substances	Mirror
16 05 08*	Discarded organic chemicals consisting of or containing dangerous substances	Mirror
13 07	**Wastes of liquid fuels**	
13 07 01*	Fuel oil and diesel	Absolute
13 07 02*	Petrol	Absolute
13 07 03*	Other fuels (including mixtures)	Absolute
14 06	**Waste organic solvents, refrigerants and foam/ aerosol propellants**	
14 06 01*	Chlorofluorocarbons, HCFC, HFC	Absolute
14 06 02*	Other halogenated solvents and solvent mixtures	Absolute
14 06 03*	Other solvents and solvent mixtures	Absolute
14 06 04*	Sludges or solid wastes containing halogenated solvents	Absolute
14 06 05	Sludges or solid wastes containing other solvents	Absolute
16 06	**Batteries and accumulators**	
16 06 01*	Lead batteries	Absolute
16 06 02*	Ni-cd batteries	Absolute
16 06 03*	Mercury-containing batteries	Absolute
16 06 06*	Separately collected electrolyte from batteries and accumulators	Absolute

What types of hazardous materials are likely to be present in construction & demolition waste?

C&D waste is generated from a wide range of activities and contains many different substances, some of which are hazardous. The lists below are indicative and not exhaustive.

Common hazardous wastes generated from construction and demolition projects could include:

- Adhesives
- Asbestos containing materials (ACMs), e.g. cemented asbestos sheeting
- Coal tar (e.g. road surfacing)
- Concrete additives
- Contaminated packaging (e.g. empty concrete additive packaging)
- Fluorescent light tubes
- Lead-acid batteries
- Paints and varnishes
- Oils and fuels and materials contaminated with oils and fuels
- Preservatives
- Silicone/sealant tubes
- Solvents
- Treated timber

The following wastes may be hazardous, depending on the types and concentrations of hazardous materials they contain:

- Contaminated masonry/concrete
- Contaminated production equipment (e.g. chemical production equipment contaminated with production residues)
- Contaminated soils
- Plastic roofing and cladding materials
- Carpets and floor coverings
- Waste electrical and electronic equipment (WEEE)
- Insulating materials (non-asbestos) – this could include both polyurethane and polystyrene foams as well as other materials

Many other wastes may be hazardous. You have a legal responsibility to identify and classify hazardous waste accurately.

Asbestos

If you suspect asbestos or asbestos containing materials may be present on site, you must follow the Health and Safety Authority guidance available here. Best practice guidance for handling asbestos can be found here.

POPs

Persistent Organic Pollutants (POPs) are a group of organic chemicals that remain stable over long periods of time and are toxic to humans, animals and the environment. Further information about POPs can be found on the EPA's website and on the website of the international Basel Convention.

Some wastes generated from construction and demolition projects will contain POPs: these may include the following (this list is not exhaustive):

- Electrical equipment containing PCBs (polychlorinated biphenyls)
- Firefighting foam containing PFAS (per- and polyfluoroalkyl substances)
- Flame retardant insulating materials containing HBCD (hexambomocyclododecane)
- Plastics or insulating materials containing BFRs (brominated flame retardants)
- Upholstered domestic seating with POPs in flame retardant materials or foam (e.g. decabromodiphenyl ether (decaBDE))

Background information on PCBs in open applications Ireland (e.g. in sealants, paints, etc., as opposed to "closed applications" like electrical transformers) is available here.

You must assess whether soil is likely to be contaminated, and if contamination is present, you must classify it using the EPA waste classification guidance. Further advice on management of contaminated land is also available here.

Other Contaminated Materials

If you are carrying out a demolition or strip-out of a building that has previously been used for manufacturing chemicals or pharmaceuticals, then hazardous substances may be present in the waste due to contamination (e.g. chemical residues in concrete or dust contaminated with hazardous production chemicals accumulated in ventilation ducts).

You must assess whether contamination is present, and if so, whether it is at a level that renders the waste hazardous. This is likely to require sampling and analysis, and then comparing the results to published thresholds in Appendix 2 of the EPA's Waste Classification Guidance. Other sources of guidance are available but may need to be purchased (e.g. the International Society for Pharmaceutical Engineering's Good Practice Guide: Decommissioning Pharma Equipment & Facilities).

You may be able to separately remove the contaminated material (e.g. dust) if it can be undertaken safely: this will reduce the amount of hazardous waste that you need to dispose of.

> All waste containing POPs above the relevant thresholds is classified as POPs waste; and should be classified and labelled as such; and requires managing in a way that will destroy the POPs content of the waste. Some (but not all) POPs waste will also be classified as hazardous waste – refer to the flow chart at the end of this Guidance for further details.

Substances of Very High Concern

REACH is a European Regulation and is an acronym for the Registration, Evaluation, Authorisation and Restriction of Chemicals. REACH applies to all chemical substances that are manufactured, imported, placed on the market or used within the European Community, either on their own, in mixtures or in articles with intended release.

The Health and Safety Authority is the lead Competent and Enforcement Authority for REACH in Ireland. The European Chemicals Agency (ECHA) is the body responsible for the administration of REACH in the EU.

Certain substances which may have serious or irreversible effects on human health or the environment can be identified as Substances of Very High Concern (SVHC) under REACH. The Candidate List is a list of all agreed SVHCs. It is periodically updated and the latest version can be found on the ECHA website.

SCIP is the database for information on Substances of Concern In articles as such or in complex objects (Products) established under the Waste Framework Directive and can be accessed here.

Companies supplying articles containing SVHCs on the Candidate List in a concentration above 0.1% weight by weight (w/w) on the EU market have to submit information on these articles to the ECHA. The SCIP database ensures that the information on articles containing Candidate List substances is available throughout the whole lifecycle of products and materials, including at the waste stage.

The information in the database is then made available to waste operators and consumers. If a product containing more than 0.1% SVHC becomes waste, it is likely to be hazardous. If you think a product may contain SVHCs, you can search the database here.

How can I identify and separate hazardous and POPs waste from non-hazardous construction & demolition waste?

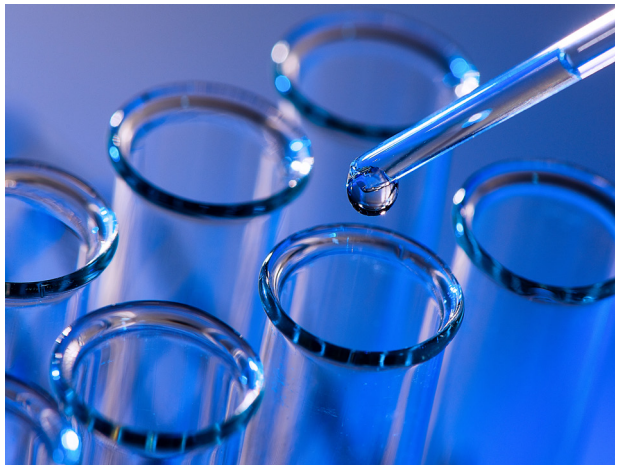
Introduction

There are two main ways to identify hazardous and POPs waste:

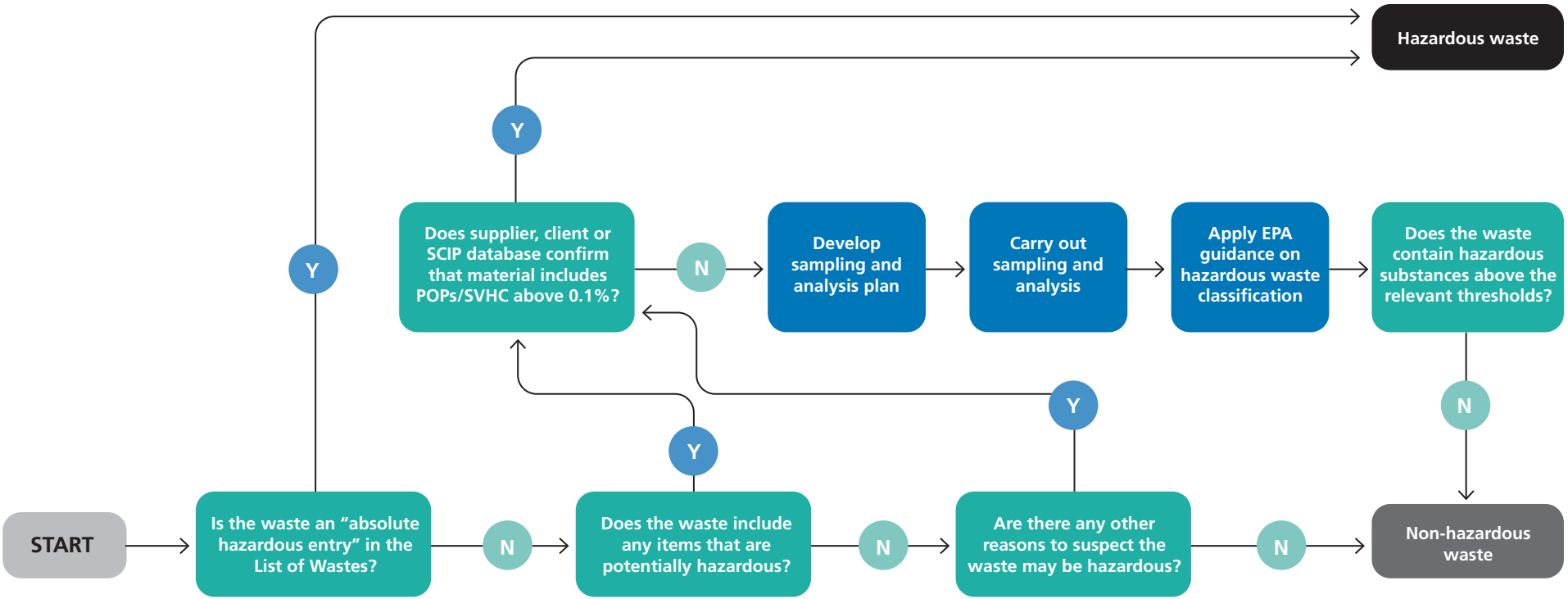
1. By inspection. You can look at the item or material and categorise it by its physical appearance or the information on any labels. For example, a tin of solvent-based paint or a lead-acid battery. This will generally apply to "absolute entry" hazardous wastes **(see Tables 2 and 3)**.

2. By analysis. Not all hazardous properties can be determined by inspection. You may need to analyse the waste to determine what hazardous substances and POPs are present and at what concentration. This will generally apply to "mirror entry" hazardous wastes. Most analysis is carried out by a laboratory, although there are some options that can be used on site to give real-time results (e.g. portable X-ray Fluorescence meters can potentially be used to screen for certain metals and POPs).

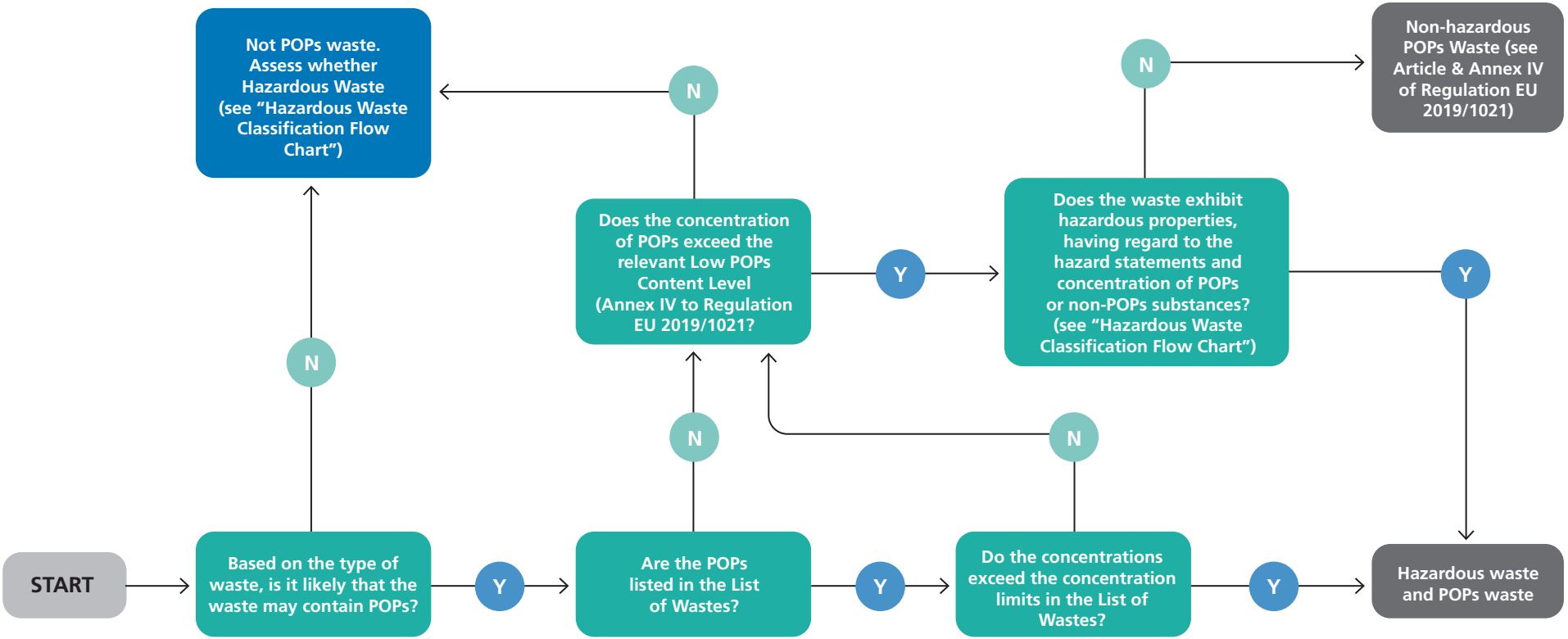
The flow charts below set out the steps you can follow to identify and separate hazardous and POPs wastes at the various stages in the construction project cycle. All POPs waste requires managing in a way that will destroy the POPs content of the waste, but not all POPs waste will be classified as hazardous.



Hazardous Waste Classification Flow Chart



POPs Waste Classification Flow Chart



Construction stages

At each stage of construction and demolition project cycle, hazardous waste must be managed appropriately.

Brownfield sites need particular care taken for hazardous waste as there may be unidentified wastes on site.