



Valuation of mineral-bearing land and waste management sites

Global

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RICS standards framework

RICS' standards setting is governed and overseen by the Standards and Regulation Board (SRB). The SRB's aims are to operate in the public interest, and to develop the technical and ethical competence of the profession and its ability to deliver ethical practice to high standards globally.

The [RICS Rules of Conduct](#) set high-level professional requirements for the global chartered surveying profession. These are supported by more detailed standards and information relating to professional conduct and technical competency.

The SRB focuses on the conduct and competence of RICS members, to set standards that are proportionate, in the public interest and based on risk. Its approach is to foster a supportive atmosphere that encourages a strong, diverse, inclusive, effective and sustainable surveying profession.

As well as developing its own standards, RICS works collaboratively with other bodies at a national and international level to develop documents relevant to professional practice, such as cross-sector guidance, codes and standards. The application of these collaborative documents by RICS members will be defined either within the document itself or in associated RICS-published documents.

Document definitions

Document type	Definition
RICS professional standards	<p>Set requirements or expectations for RICS members and regulated firms about how they provide services or the outcomes of their actions.</p> <p>RICS professional standards are principles-based and focused on outcomes and good practice. Any requirements included set a baseline expectation for competent delivery or ethical behaviour.</p> <p>They include practices and behaviours intended to protect clients and other stakeholders, as well as ensuring their reasonable expectations of ethics, integrity, technical competence and diligence are met. Members must comply with an RICS professional standard. They may include:</p> <ul style="list-style-type: none"> • mandatory requirements, which use the word ‘must’ and must be complied with, and/or • recommended best practice, which uses the word ‘should’. It is recognised that there may be acceptable alternatives to best practice that achieve the same or a better outcome. <p>In regulatory or disciplinary proceedings, RICS will take into account relevant professional standards when deciding whether an RICS member or regulated firm acted appropriately and with reasonable competence. It is also likely that during any legal proceedings a judge, adjudicator or equivalent will take RICS professional standards into account.</p>
RICS practice information	<p>Information to support the practice, knowledge and performance of RICS members and regulated firms, and the demand for professional services.</p> <p>Practice information includes definitions, processes, toolkits, checklists, insights, research and technical information or advice. It also includes documents that aim to provide common benchmarks or approaches across a sector to help build efficient and consistent practice.</p> <p>This information is not mandatory and does not set requirements for RICS members or make explicit recommendations.</p>

1 RICS Valuation Standards (the 'Red Book')

1.1 RICS (the Royal Institution of Chartered Surveyors) is the leading organisation of its kind in the world for professionals in property, land, construction and related environmental issues. As part of our role we help to set, maintain and regulate standards – as well as providing impartial advice to governments and policymakers.

1.2 To ensure that our members are able to provide the quality of advice and level of integrity required by the market, RICS qualifications are only awarded to individuals who meet the most rigorous requirements for both education and experience and who are prepared to maintain high standards in the public interest.

1.3 Members who qualify as valuers are entitled to use the designation 'Chartered Valuation Surveyor' and, in addition to compliance with the general Rules of Conduct applicable to all members, must also comply with the RICS Valuation – Professional Standards, generally referred to as the 'Red Book'.

1.4 This professional standard describes the standard of work that is expected of a reasonable, competent valuer experienced in the subject (minerals and waste) to which this professional standard relates.

1.5 RICS has in place a regulatory framework. Where a valuer undertakes work that has to comply with the Red Book that valuer is also required to register with RICS and is entitled to use the designation 'RICS Registered Valuer' on their business stationery and marketing material. Registration enables RICS to monitor compliance with the valuation standards and take appropriate action where breaches of those standards have been identified.

2 Introduction and general principles

2.1 This professional standard is a global revision of the first edition published in 2011. This global document identifies additional matters that valuers need to take into account when applying the principles of RICS Valuation – Professional Standards global January 2014 (the 'Red Book') VPS 4, Bases of value, assumptions and special assumptions, to the valuation of natural resource wasting assets, such as mineral deposits, landfill and waste disposal sites.

2.2 This professional standard is effective from 1 July 2016.

2.3 In certain states there may be legally enforceable codes for the technical assessment and valuation of natural resources. Valuers should ensure that they follow these codes. Valuers may also need to consider the application of VPS 4 and of this professional standard in conjunction with any other relevant national and/or international standards.

2.4 It is important to emphasise that any valuer undertaking a valuation of a wasting asset must be suitably qualified to complete the task and demonstrate relevant professional experience in the type of resource being valued (see Red Book PS 2, Ethics, competency, objectivity and disclosures, paragraph 3, Member qualification). These assets and associated businesses are of a specialised nature, and the valuer must be able to demonstrate to the commissioning party sufficient competence to complete the valuation exercise. In certain states there may be a legal requirement to hold specific qualifications and licences to value assets of this nature.

2.5 The technical terminology used in relation to in-situ reserves/resources and landfill void space will differ from state to state. The valuer needs to be familiar with the local statutory definition of the natural resource wasting asset being valued, as this may determine the approach and methodology to be adopted for the valuation exercise.

2.6 The purposes for which valuations of wasting assets are required can vary widely.

They may include:

- financial reporting
- sales and acquisitions
- company mergers
- public and/or private funding
- lending
- rent or royalty review
- taxation and litigation

- insurance.

The importance of absolute clarity about the purpose of valuation cannot be over-emphasised.

2.7 Having ascertained the purpose of the valuation, the valuer should consider and adopt a suitable method(s) for valuing the mineral resource or void space. The approach should, according to the exact circumstances of the case, have appropriate regard to the actions and requirements of participants acquiring, selling, renting or regularly valuing such wasting assets in the marketplace.

2.8 It is essential that, having regard to the purpose and scope of the valuation request, a distinction is appropriately made between valuing the resource/void space as an asset in isolation and valuing it as (part of) an operational going concern. In addition, the different methodologies that may be applied to valuing each asset or liability should be distinguished. Inevitably, the approach will be informed and, where appropriate, determined by the actions and requirements of those operating within the marketplace of the subject resource or void space.

3 Wasting assets

3.1 While extractive industries operate throughout the world, the valuer should always have careful regard to the legislative and operational requirements relevant to the jurisdiction within which the asset to be valued is located. The valuer should also be alert to, and have appropriate regard to, the specific valuation requirements of the jurisdiction to which the client company is subject. For example, the valuer will need to have proper regard to the international market in terms of demand, and price and currency trading issues, when assessing the value of a mineral resource.

3.2 The valuer should also be aware that in some instances a valuation could result in a negative figure when associated costs or liabilities have been taken into account.

3.3 Wasting assets are defined as assets with a finite life which, when consumed, cannot be renewed in the existing physical location in which they occur.

(See a range of definitions at <https://financial-dictionary.thefreedictionary.com/wasting+asset>)

Examples of such assets are natural resources such as coal or oil, along with landfill void space. These assets share the characteristic that their annual income varies according to the level of input/output, processing costs, selling price and liabilities. This, in turn, has an impact on the remaining economic life of the asset and, therefore, its market value (as defined in Red Book VPS 4, Bases of value, assumptions and special assumptions).

3.4 The valuer should obtain all the information available that will assist in establishing the remaining economic life of the asset. This will entail a review of a geological/ geotechnical appraisal of the natural resource, which will not only determine the quality and quantity of the in-situ material available for extraction, but will also inform the valuer as to the likely tonnages of saleable materials to be achieved after an appropriate 'added value' processing of the natural resource has taken place.

3.5 Geological appraisals of in-situ reserves/resources should be based on a recognised reporting code adopted in the jurisdiction where the natural resource being valued is located.

3.6 The operational life of landfill void space is usually calculated by using topographical surveys and three-dimensional modelling techniques that determine the quantity of the void available for backfilling, net of all required engineering materials used to prepare the void for waste disposal. An allowance will also be required for settlement.

The total operational life of the void will depend on factors such as:

- the type of waste being landfilled
- operational compaction rates of the waste being achieved

- the type and quantities of daily cover being used and
- the final restoration/rehabilitation profile of the void.

These factors will vary on a site-by-site basis.

The operational life of the landfill may also be increased if a front-end materials recycling or treatment facility is incorporated into the waste management business, where waste streams that can be recycled are diverted away from landfilling.

3.7 Valuers are reminded that the extent of their investigations and the nature and source(s) of the information relied on are matters to be explicitly covered in valuation reports (see Red Book VPS 3, Valuation reports).

3.8 In the light of their investigations and analysis of data supplied or collected, the valuer will need to agree with the client any assumptions or special assumptions that may be appropriate to the valuation, which must again be explicitly covered in valuation reports (see again Red Book VPS 3, Valuation reports).

Examples include:

- an assumption that accurate and reliable information has been provided by the client, or a third party, as to the extent or quality of an exploitable natural resource and/or available void space
- an assumption as to future annual saleable production yields for materials extracted, or rates of backfilling waste
- a special assumption that, at the date of valuation, all planning permissions, environmental permits or development approvals for both waste and natural resources are in place
- a special assumption that an anticipated future event that will have an impact on the supply or demand for the natural resource or landfill void space will have occurred, such as achieving or failing to achieve future planning permissions, environmental permits or development approvals
- a special assumption as to whether the remaining void space should be stated as before or after settlement has taken place.

4 Natural resources

4.1 Although natural resources are physically part of the land area within which they are situated, they may be owned or leased with the surface, or held under a separate title with varying rights of working. They may be worked by underground mining, open pit/cut mining, quarrying, boreholes (as with oil and gas and brine pumping), or by way of treatment in situ (as with underground gasification of coal). Natural resources beneath oceans and lakes may also be worked by dredging.

4.2 Different jurisdictions have different laws relating to the ownership of natural resources. Ownership will depend on the state's definition of its natural resources and may be severed from the surface, or may be owned by the state. The question of ownership should be addressed together with any relevant common law or statutory constraints, for instance, matters relating to working rights and rights to withdraw support. Under such circumstances the valuer will need to outline clearly the nature of the interests being valued and define the different ownerships relating to the surface interest, the natural resources in all the land (there may be other minerals owned by third parties) and the operator's interest. Where any of these interests encumber each other and affect their end value, an appropriate comment should be made. In most valuations advice is given when title is confirmed by the client's solicitors.

4.3 The value of most natural resources will be intrinsically linked to market supply and demand, proximity to the marketplace, ease of extraction and processing. The valuer should not only be familiar with the technical aspects of the extraction process, but also have a clear understanding of the micro- and macro-economics that underpin the demand for the product. This may include short-term volatility in market demand, supply and pricing. The financial breakdown of a natural resource operation is also required, such as the ex-pit selling price, operational costs (including plant and equipment depreciation), environmental liabilities (including withdrawal of support, restoration costs or provisions) and the margins (preferably on a product-by-product basis) that are being achieved at current production levels. Most of this information will be essential if the valuer has been instructed to value the natural resource as an operational going concern.

4.4 Workings associated with natural resource mine development, such as mine shafts, open pit and quarry voids, tailings and dams, can often become liabilities, particularly once they are no longer in use. Such sites may be unmarketable, or may result in a negative value for the whole or part of the property being valued (see Red Book VPS 3, Valuation reports, paragraph 7(m)). Much will depend on the ongoing or future restoration/rehabilitation programme associated with the operation. Increasingly, modern planning permissions and development approvals require a comprehensive restoration plan to accompany extraction, providing a beneficial residual after-use that may either supply an income for the landowner, or provide a capital sum if sold for alternative forms of development. Any residual value

(including value for future alternative uses) attributed to the total value of a property following the exhaustion of the wasting asset should be identified separately.

4.5 Material considerations may include all or some of the following:

- interest being valued – surface, natural resource and/or operation
- ownership of other minerals and right to disturb
- rights to work and withdraw support
- tenure – freehold, leasehold or other jurisdictional equivalents
- type of natural resource being extracted
- annual quantity and quality of materials being, or proposed to be, extracted
- production yields achieved, or to be achieved, after processing
- saleable outputs of the operation
- geology and hydrogeology of the natural resource
- planning, permitting and licensing relevant to the property
- financials – ex-pit/site selling prices, operational costs and/or surplus trading profits (margins)
- market feasibility study for all saleable products
- rehabilitation/restoration requirements and obligations
- residual income or alternative end use value
- subsidence or withdrawal of support liabilities and/or
- discharge liabilities.

This list of material considerations is by no means exhaustive and will vary for each independent natural resource valuation exercise.

5 Waste management sites

5.1 Waste management sites may be categorised under four broad headings, which relate to the way in which waste is accepted, processed/recycled and then disposed of. They are:

- a **waste collection** – such as waste transfer stations and civic amenity sites
- b **waste treatment, non-energy generating** – such as material recycling facilities, green waste composting facilities, liquid waste treatment plants and alternative waste treatment plants
- c **energy from waste plants** – such as thermal, mechanical or biological and
- d **waste disposal** – landfill/land raise sites and underground storage.

Some waste management sites accommodate a combination of these operations.

5.2 Usually only landfill, land raise, underground storage and landfill gas fields can be defined as wasting assets, since waste collection, waste treatment and certain energy from waste plants will, in most instances and if properly maintained, operate indefinitely in the same way as any other commercial/industrial site. However, both waste collection and treatment and certain energy from waste plants generate a residual waste product that can only be disposed of to landfill. Therefore sometimes the life of a waste collection, treatment or energy operation from a waste plant site may be linked to that of an associated landfill site.

5.3 As with natural resources, the value of landfill void space is intrinsically linked to market demand, and to proximity to waste collection and/or other types of waste management facilities reliant on suitable void space for the disposal of residual wastes. The valuer should not only be familiar with the technical aspects of the landfill operation, but also have a clear understanding of the micro- and macro-economics that underpin the demand for landfill void space within a particular locality or region. The financial breakdown of the landfill operation is also required, including items such as:

- gate charges for the different waste streams that the landfill facility is licensed to accept
- operational costs inclusive of plant and equipment depreciation and
- the margins achieved on a void space-consumed basis.

Most of this information will be essential if the valuer has been instructed to value the landfill as an operational going concern. A major source of waste product arises from municipal collection. This is often disposed of via commercial contracts, which are often long-term. The availability of waste resources arising from such contracts can have a significant impact on the value of a waste management site – so valuers should have regard to this issue when preparing valuations.

5.4 In many jurisdictions, there is both existing and emerging legislation governing the handling, treatment and disposal of waste materials, given increasing environmental awareness and sensitivity. Such legislation defines different waste types and regulates the appropriate licensing for those waste streams. Governments have also introduced financial incentives to divert waste away from landfill and encourage waste producers to generate less and recycle more waste. These incentives generally take the form of landfill taxes or levies, which are charged at the gate on the acceptance of the waste. Such a levy may be retained by the landfill operator if the waste can be recycled and diverted away from landfill.

The revenues generated from such activity can be significant. The appropriate local statutory licensing requirements for such facilities may also have a significant impact on value.

5.5 Depending on the types of waste that have been accepted into the landfill site during its operational life, completed and restored landfill sites may not be marketable because of liabilities and actual or perceived hazards (stigma) arising from that current or historical use. Such liabilities or hazards may result in a negative value for the whole, or part, of the property. The valuer should make the necessary enquiries to ascertain the specification and quality of the restoration completed at the property being valued. The valuer should also identify the level of aftercare management that has been put in place by either the landowner or the operator of the completed landfill/land raise and the mechanism by which this is funded. For example, funds may be available in an escrow account (or jurisdictional equivalent). In certain circumstances, landfill aftercare management costs can be significant and therefore should be incorporated into the valuation of these types of wasting assets.

5.6 Electricity generation from landfill gas is a common practice. The revenue derived from this can be a valuable asset, subject to the suitability of the gas being produced for electricity generation. Landfill gas is formed from the decomposition of certain types of waste in landfill sites, hence landfill gas is a wasting asset as it will eventually stop being created in the landfill site at commercially viable levels. However, its life may be longer than that of the landfill operation from which it is derived.

5.7 Material considerations may include:

- interest being valued – surface, void space and/or operations with associated facilities
- tenure – freehold, leasehold or other jurisdictional equivalents of land and void space
- amount of approved landfill void
- type(s) of waste licensed to be accepted at the facility
- annual quantities of waste materials being, or proposed to be, landfilled
- compaction ratios of the waste landfilled (if applicable)
- eology and hydrogeology of the void
- engineering requirements to prepare the void space for waste disposal
- planning, permitting and licensing
- environmental consents

- financials – waste gate charges, operational costs and/or surplus trading profits (margins)
- statutory taxes or levies on the wastes being accepted at the facility
- market feasibility study for all waste arisings
- rehabilitation/restoration requirements
- discharge requirements
- aftercare management scheme and associated ongoing costs and/or
- residual income or alternative end use value
- the existence and remaining operational life of competing sites.

This list of material considerations is by no means exhaustive and will vary for each independent landfill/land raise valuation exercise. It is also important that postrestoration environmental obligations (whether national or international, or both) are adequately factored into the valuation of these developments.

6 Associated buildings, plant and equipment

6.1 Valuations of natural resources and waste management assets often include ancillary buildings and site improvements, along with plant and equipment. The buildings normally fall into the category of specialised properties, with little or no comparable market transactional or rental evidence that can be relied on for valuation purposes. These assets are often valued using the depreciated replacement cost method.

6.2 Both mobile and fixed plant and equipment employed at a mine, quarry or landfill operation can be substantial and, in certain circumstances, will be highly specialised. Certain items of plant and machinery located at base metal or industrial mineral operations may be designed and built specifically for those operations and therefore may be unique. Red Book VPGA 5, Valuation of plant and equipment, provides general guidance on the valuation of plant and equipment. To comply with Red Book PS 2, paragraph 3, Member qualification, the valuer should be able to demonstrate to the commissioning party sufficient competence to provide the valuation of the plant and equipment associated with such wasting assets.

6.3 Not all mobile and/or fixed plant and equipment will have useful remaining lives that match those of the natural resource or void space being valued. It is usual for certain items of heavy plant to be replaced at regular intervals throughout the life of the wasting asset, even after repair and maintenance have been completed on a regular basis. Such replacement costs are usually predetermined throughout the operational life of the wasting asset and, depending on the basis of valuation, are factored into the reported value. This is particularly relevant when valuing the wasting asset as a going concern, where elements such as future plant replacement costs and depreciation are to be reflected.

6.4 In general terms the buildings, plant and other related infrastructure works relating to a mine, quarry or landfill development will have lives limited to that of the wasting assets that they serve. However, extractive industry and waste management land and buildings can often be put to other uses once their primary use has been exhausted. Where this is likely, it may be appropriate to place a value on the site of the buildings and plant in addition to the value of the natural resource or waste disposal void space. This approach would be appropriate if the valuer has been instructed to value only the assets of the operation, such as the land, resource/void space, buildings, plant and equipment. Where the valuation is of a going concern, the separate value of the buildings, plant and equipment would not be provided unless the client requests otherwise.

6.5 As wasting asset operations usually comprise various property types, the assets that have been valued and how their value is incorporated into the total value should be clearly identified in the report to ensure that there has been no double counting.

6.6 The valuation may reflect costs that are also separately identified in the entity's financial statements. The valuer should discuss with the directors and the auditors the accounting treatment of such costs, and the costs of any restoration liabilities, to ensure that these have been identified properly and to avoid double counting.

7 Valuation methods for valuing wasting assets

7.1 Wasting assets seldom transact in the open market. When they are sold, they are normally associated with a company acquisition of multiple operations or larger land deals. Thus a valuation approach based on the analysis of direct comparable evidence to arrive at market value is rarely possible.

7.2 If direct comparable evidence is not available, the valuer can use other valuation methods. The valuer is always responsible for determining the most appropriate method or methods in the circumstances of the individual case. One such method is the capitalisation of actual or notional royalties over the life of the resource/void space being valued, which in principle reflects the value of the natural resource or void space as an asset. This method can also be used to value the potential profit from the sale of the resource or the void space being consumed. When adopting this method, the valuer will need to decide the appropriate capitalisation rate, which may vary materially from case to case.

7.3 The capitalisation rate is itself usually derived or calculated from recent, comparable sales. Where such evidence is unsuitable or unavailable, the capitalisation rate should be based on an equated yield, replicating an appropriate return that an operator/landlord would expect from the initial investment. This return should reflect adjustments for non-recurring or abnormal items and any material changes in factors likely to affect the asset or business in the future. Examples include:

- the cost of borrowing
- the geological physical characteristics of the natural resource
- working rights
- the methods of operation and
- the risks associated in achieving the margins or
- royalties to be capitalised.

7.4 If the valuer is instructed to value the wasting asset as an operational going concern, an appraisal of the potential profit margins being achieved from the sale of the natural resource or void space should be completed. This information is usually incorporated into a discounted cash flow (DCF) model to arrive at the net present value of the projected future cash flows of the operation. RICS' *Discounted cash flow for commercial property investments* provides general guidance on DCF. The valuer will need to decide on an appropriate discount rate and whether the rate should be pre- or post-tax, which depends on the nature of the cash flows being discounted. The valuation of a wasting asset should take into account the lifespan of the income stream and should be reliable at whatever stage the asset is in.

Delivering confidence

We are RICS. Everything we do is designed to effect positive change in the built and natural environments. Through our respected global standards, leading professional progression and our trusted data and insight, we promote and enforce the highest professional standards in the development and management of land, real estate, construction and infrastructure. Our work with others provides a foundation for confident markets, pioneers better places to live and work and is a force for positive social impact.

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