

Land measurement for planning and development purposes

Global

1st edition, May 2021

Effective from 7 August 2021

Land measurement for planning and development purposes

RICS professional standard, global

1st edition, May 2021

Effective from 7 August 2021

Figures 1–5 graphics copyright © FAL, reprinted with permission.
Table 3 is reproduced with the kind permission of Ordnance Survey.



Published by the Royal Institution of Chartered Surveyors (RICS)

Parliament Square

London

SW1P 3AD

www.rics.org

No responsibility for loss or damage caused to any person acting or refraining from action as a result of the material included in this publication can be accepted by the authors or RICS.

This document was originally published in May 2021 as an RICS guidance note and reissued in April 2023 as an RICS professional standard.

ISBN 978 1 78321 423 5

© Royal Institution of Chartered Surveyors (RICS) May 2021. Copyright in all or part of this publication rests with RICS. Save where and to the extent expressly permitted within this document, no part of this work may be reproduced or used in any form or by any means including graphic, electronic, or mechanical, including photocopying, recording, taping or web distribution, without the written permission of RICS or in line with the rules of an existing licence.

Typeset using Typefi

Acknowledgements

Lead author

Jonathan Manns MRICS (Rockwell, UCL)

Working group

Chair: Paul Collins MRICS (Nottingham Trent University)

Chris Balch MRICS (University of Plymouth)

Richard Blyth (Royal Town Planning Institute)

Nick Francis (FAL Architects)

Alan Gunne-Jones (Planning & Development Associates)

James Muldowney (Barrister)

Anthony Shapland MRICS (Colliers International)

Ian Sutton MRICS (CBRE)

Andrew Taylor MRICS (Taylor Wimpey)

RICS standards lead

Tony Mulhall MRICS

Standards delivery project manager

Helvi Cranfield

Editor

Sam Birch

An earlier version of this professional standard was reviewed by Roy Pinnock, Solicitor (Dentons).

We are also grateful to Martha Grekos, Barrister, and Meeta Kaur, Solicitor (Town Legal), for their comments.

During the course of our consultation, we received many valuable submissions from the sector, which were greatly appreciated.

Contents

| | |
|--|-----------|
| Acknowledgements | ii |
| RICS standards framework | 1 |
| Document definitions | 2 |
| Glossary | 3 |
| 1 Introduction | 5 |
| 1.1 Overview | 5 |
| 1.2 Land measurement within national institutional frameworks | 6 |
| 1.3 Focus | 7 |
| 1.4 Unit of measurement | 8 |
| 1.5 Core definitions | 8 |
| 1.6 Effective date | 8 |
| 2 Key issues with the measurement of development land | 9 |
| 2.1 Definitions | 9 |
| 2.2 Land and property boundaries | 10 |
| 2.3 Measurement method and medium | 11 |
| 2.4 Inspection | 12 |
| 3 Application of key measurements | 14 |
| 3.1 Land ownership area (LOA) | 14 |
| 3.2 Site area (SA) | 16 |
| 3.3 Net development area (NDA) | 18 |
| 3.4 Density measurements: plot ratio (floor area ratio/floorspace ratio) and site coverage | 21 |
| 4 Factors affecting measurement calculations | 24 |
| 4.1 The blue line area: land ownership in the context of SA/NDA | 24 |
| 4.2 Density | 25 |
| 4.3 Open space | 26 |
| 4.4 Sustainable drainage systems (SuDS) | 27 |
| 5 Measurement of land 'as constructed' | 28 |
| 5.1 Plans as constructed | 28 |
| 6 Application for planning and development purposes | 29 |
| 6.1 Planning and development process | 29 |

| | |
|--|-----------|
| 6.2 Time | 32 |
| Appendix A: Survey accuracy banding | 33 |
| Appendix B: Ordnance Survey mapping | 35 |
| Appendix C: Supplementary glossary | 37 |

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> |

Glossary

This glossary defines terms that relate to the core purpose of this guidance. A supplementary glossary appears at the end of this professional standard, which defines terms in more general use.

| Term | Definition |
|-----------------------------------|---|
| Density | Density is measured on either a gross or net basis, and for residential schemes can be expressed in various ways, including dwellings per hectare/acre, habitable rooms per hectare/acre or bedspaces per hectare/acre. Plot ratio, floor area ratio, floorspace ratio and site coverage are also expressions of density that can be applied to all uses, but are most appropriately used for commercial premises. Density should always be expressed in terms of gross areas (based on site area), while net density can provide an additional measure to assist with the interpretation and assessment of the intensity of a development. |
| Gross density | Gross density is a measure that includes all aspects of a site of any size, including the housing, commercial space, roads, open and public realm, schools and their grounds, and other uses. It is calculated using site area. |
| Land ownership area (LOA) | Land ownership area is an area of land, measured on a horizontal plane, which is held in a single legal interest or title by one or more legal owners, and that may be the subject of a proposed or actual sale, letting or other disposal, valuation or compulsory purchase. It may comprise all or part of that single legal interest or title. |
| Net density | Net density is a measure that includes everything that is developed but excludes major roads, open and public realm, schools and their grounds, and commercial and community buildings. It is calculated using net development area. |
| Net development area (NDA) | Net development area is the extent of the site area upon which one or more buildings or other operations and their ancillary space can be built, measured on a horizontal plane. |
| Plot ratio (PR) | Plot ratio is the ratio of total development floor area to site area. Development floor area may be measured as gross external area (GEA) or gross internal area (GIA), but whichever is used – or modifications of them – should be clearly stated. Gross external area and gross internal area are defined in RICS property measurement . Floor area ratio (FAR) and floorspace ratio (FSR) are similar terms. |

| Term | Definition |
|--------------------|---|
| Site area (SA) | Site area is the total land area for which development authorisation is sought, measured on a horizontal plane. |
| Site coverage (SC) | Site coverage is the ratio of ground floor area (measured on the basis of GEA) to site area. |

1 Introduction

This section sets out the context in which this guidance has been prepared and published, in addition to making clear the scope of the guidance.

1.1 Overview

RICS acts globally to promote and enforce the highest international standards in the valuation, management and development of land, real estate, construction and infrastructure. This professional standard provides advice on the measurement of land areas for planning and development purposes. It provides clarity and consistency on such matters for built environment professionals and other stakeholders by enabling accurate descriptions and assessments of the size of a development site at all stages of the development process.

It identifies five principal measurements that apply in planning and development practice. These form the core definitions of this guidance, which should be used wherever possible:

- **Land ownership area (LOA)**
- **Site area (SA)**
- **Net development area (NDA)**
- **Plot ratio (PR)** and
- **Site coverage (SC).**

Land ownership area is a new term; the other four terms are in regular use. This professional standard also acknowledges that these terms will relate to other metrics that are used in certain contexts for assessing the intensity of use and which, where used, should be reported alongside the appropriate core definition. These are **floor area ratio (FAR)** and **floorspace ratio (FSR)**.

The publication of this professional standard remedies a historical lack of clarity and consistency in the way that land is measured and described for development purposes. It should be read in a cross-disciplinary context. The intention is that it will be applied across all built environment professions (including surveying, planning, architecture, engineering and related disciplines). This will allow development sites and proposals to be accurately compared and assessed, in addition to providing reassurance on such matters to wider stakeholders and the general public.

This professional standard is intended for use globally. It therefore recognises that planning and development regimes differ between nations and regions; some are prescriptive, while others are more discretionary in the implementation of policy objectives. Some jurisdictions will have large areas of **unregistered land**. The way in which this professional standard is applied will depend on the nature of each property and the purpose of each measurement,

in addition to the jurisdictional and regulatory context in which the measurement is being undertaken. While this professional standard should be applied consistently, there will be instances where professional judgement and/or negotiation are required. In these instances, any divergence should be made explicit in client reports.

This professional standard:

- **defines** four terms that are used in practice, but for which there has historically been no consistent definition
- **introduces** a new term, land ownership area, to ensure clarity about the extent of ownership within development sites and distinguish this from site area
- **clarifies** the relationship between land ownership area, site area, net development area, plot ratio and site coverage, and
- **expands** technical advice on conducting spatial measurement, marking out or recording land for professionals such as land surveyors and civil engineers.

The guidance applies equally to both smaller-scale and larger-scale land measurements. This is therefore relevant to both applications for permission to develop and the allocation/zoning of land in development plans.

It also applies to all forms of development property and at all stages in the development process. This reflects the need for RICS members to measure land and calculate areas for a variety of purposes at different stages of preparing a development proposal, particularly on larger projects. Responsible RICS members should:

- **obtain** clear instructions on the purpose of the measurement and
- **perform** their role and report in a transparent and consistent manner, with regard to both this professional standard and any appropriate legal, regulatory or other authoritative requirements in the relevant jurisdiction.

1.2 Land measurement within national institutional frameworks

International development and planning contexts vary, including variations in national land information systems, which may affect how legal interests and titles in land are verified. In most countries, the legal registration of land title is carried out through a cadastral system. This records details of:

- ownership
- tenure
- precise location and demarcation
- dimensions
- area and

- the value of individual land parcels.

Other forms of land information system include land registries, such as in the UK and Ireland, which primarily record details of land title. The information recorded and protection provided through these systems varies by jurisdiction. There are also locations where land may be in communal ownership, or may not be registered in a formal sense.

Regulation of new development also varies by country. It is usually administered through a planning system, the functions of which operate with varying degrees of negotiation and prescription. Different degrees of approval are also needed before development can start.

There are, however, elements that are common to most planning systems. The development process starts with an initial assessment of the development potential of an area of land. This progresses to an application for planning permission/a development permit or similar approval on a defined SA. When this is finally obtained, it fixes the NDA for a particular scheme (see section 5).

1.3 Focus

This professional standard focuses on the measurement of the surface area of land on a horizontal plane. All defined areas are therefore to be measured on a horizontal plane. Some approaches rely in part on measures (most commonly gross external area, gross internal area or net internal area as appropriate) already defined in [RICS property measurement](#), which focuses on the measurement of floorspace within buildings. This professional standard should be read in conjunction with [RICS property measurement](#). Together they provide a comprehensive approach to the measurement of land and buildings that complies with and supports the [International Land Measurement Standard \(ILMS\)](#).

The consistent application of this professional standard is intended to ensure both commonality across fields of surveying (measurement, valuation, planning and development, sale and purchase, etc.) and conformity with the objectives of the relevant planning or development regulatory system. As such, it provides a basis for land measurement for land acquisition, planning applications, development viability appraisal and the valuation of development land.

All measurements should be undertaken as accurately as possible in the context of the information available. Where assumptions are required in relation to the NDA, these should be made as accurately as possible and be clearly stated. It is recognised that in practice NDA measurement will become more refined as more information about the scheme becomes fixed and more precise information becomes available.

It is also recognised that in some situations, particularly for constrained sites, the different measurement definitions contained in this professional standard may correlate closely or exactly, while in other circumstances there will be clearer distinctions. Such circumstances will depend on the nature and context of the sites being measured. The provision of complete and consistent reporting will make any such differences clear.

1.4 Unit of measurement

This professional standard focuses on the approach to measurement and therefore does not specify a required unit of measurement. The unit of measurement to be adopted must comply with local jurisdictional legal requirements and local market practice. All formal documents should report in the system required by the jurisdiction in which they are produced.

It is recognised that, in some circumstances, jurisdictional requirements operate alongside market conventions. For example, it is common in some nations for professionals to use both imperial and metric units to report the size of property. The jurisdictional standard should be used in all circumstances. However, where conventions exist and the nature of reporting allows, both measurements should be reported for completeness.

1.5 Core definitions

This professional standard contains five technical core definitions:

- land ownership area (LOA)
- site area (SA)
- net development area (NDA)
- site coverage (SC) and
- plot ratio (PR).

RICS members should:

- use these terms unless there is a mandatory alternative jurisdictional requirement
- use land ownership area, as defined in this professional standard, to describe the land being dealt with and/or under consideration, which may consist of either a single **land parcel** or several different land parcels (and therefore may concern one or more land ownership areas)
- identify when a potential development site comprises land parcels in different legal ownerships and therefore within different land ownership areas. In such instances the RICS member should make this clear when reporting and set out the land ownership areas, and the nature of the legal interests within the individual parcels and the whole development site.

See section 3 for definitions.

1.6 Effective date

This professional standard is effective three months from the date of publication.

2 Key issues with the measurement of development land

This section sets out the key issues associated with the measurement of development land and provides guidance on how these should be addressed.

2.1 Definitions

This professional standard introduces global standards to clarify the current situation and rectify historical inaccuracies, conflation and scope for misrepresentation. An example is that land identified as being suitable for development is often described as 'the site', irrespective of whether the matter in question is the land ownership area or site area. Land being sold or promoted for development can often be referred to as 'the property', within which 'development land' may be identified in sale or promotion agreements as the land on which development is sought/approved by a specific permission. The seller's ownership (the property) may be less or more than the site. This professional standard refers to land ownership area and site area as distinct from one another, and in distinguishing between ownership interests and development sites, relies upon the following measurements.

- **Land ownership area (LOA):** an area of land, measured on a horizontal plane, which is held in a single legal interest or title by one or more legal owners, which may be the subject of a proposed or actual sale, letting or other disposal, valuation or compulsory purchase, and which may comprise all or part of that single legal interest or title.
- **Site area (SA):** the total land area on which development authorisation is sought, measured on a horizontal plane.
- **Net development area (NDA):** the extent of the site area upon which one or more buildings or other operations and their ancillary space can be built, measured on a horizontal plane.

It is recognised that certain sectors of the surveying/planning professions also adopt different spatial metrics for measuring the intensity of development on a particular site. Plot ratio (PR), floor area ratio (FAR), floorspace ratio (FSR) and site coverage (SC) are commonly used around the world to assist in the assessment of **density**. Commercial developers working within planning systems that zone and allocate land often use SC and PR to provide an indicator of scale, bulk and intensity of use. Of the terms that are most commonly used, these two should be the preferred metrics in all circumstances and always reported upon if alternatives are to be used as well:

- **Plot ratio (PR):** the ratio of total development floor area to SA. Development floor area may be measured as gross external area (GEA) or gross internal area (GIA) but whichever is used – or modifications of them – should be clearly stated. Floor area ratio (FAR) and floorspace ratio (FSR) are similar terms, used interchangeably in some jurisdictions to reference the same point. For consistency, PR should be used wherever possible. Where jurisdictional requirements are for the use of either FAR or FSR, PR should be reported as well.
- **Site coverage (SC):** the ratio of ground floor area (measured in accordance with GEA) to SA, expressed as a percentage.

Prescriptive planning regimes (such as in parts of Europe and the USA), particularly those that adopt a zoning approach to the identification of land for development, tend to have greater certainty about what is developable early in the process. In discretionary planning systems, certainty about what is developable tends to be determined much later in the process, following a period of negotiation and consultation. In instances where there is a degree of discretion, RICS members should advise their clients on the need for the ongoing review of measurements, particularly those that impact on the NDA, recognising the potential impact on land option agreements and land valuation.

2.2 Land and property boundaries

The exact location of the **boundary** line may be critical to the ability to carry out a development.

All countries operate national systems of land registration as an element of functioning land administration systems. Most operate a form of cadastre (fiscal, measured, taxation or multipurpose for example). These typically record boundary information that show the extent of the land holding in question, including registered burdens. The UK operates a 'general boundary' system; more in-depth information on this can be found in RICS' [Boundaries: procedures for boundary identification, demarcation and dispute resolution](#). Although such records provide a useful indication of the extent of a title, it should be noted that they are not always definitive and not all burdens may be shown in such registers. There is scope for error and dispute in relation to the interpretation of boundaries, particularly where assumptions are made without a legal basis or that are not clear. It is advisable to engage, at an early stage, an RICS member who is a boundary expert. RICS members should ensure that the following are clearly stated when (1) undertaking calculations at the initial feasibility stage (when detailed land boundary information may not be available) or (2) reporting on SA and all relevant LOAs at any stage:

- assumptions about the location of the boundary
- the basis for those assumptions
- the limitations of any registration system relied upon (e.g. the extent to which registered **title plans** are legally definitive versus indicative, subject to survey), and

- the limitations of reliance on documentary evidence alone, without site inspection or a topographical survey.

The recommendations in this professional standard assume that:

- all documented boundaries provided to the RICS member are accurate, as evidenced by their source, and
- the source and its limits have been identified for the RICS member by the professional providing the boundary information.

RICS members should consider whether additional legal assurance is required to confirm that this assumption is sound (or whether a topographical survey may be required).

A topographical survey plan will show the physical features of the land in detail and the boundaries of the site as they are on the ground. It is silent on legal title. If there is real doubt about the validity or conclusiveness of the available legal documentary evidence, which could materially impact on measurement or assumptions about the extent of LOAs relative to SA, RICS members should seek appropriate clarification. It is recognised that where disputes occur there will normally be courses of legal remedy or dispute resolution available.

2.3 Measurement method and medium

RICS members (or other professionals who use this professional standard) should make clear the purpose of the measurement and the means by which it has been undertaken (for appraisal, valuation, planning, etc.). This will depend on the nature of the instruction and the stage in the planning and development cycle. The appropriate basis of measurement, which will influence both the method of measurement and level of **accuracy** required (see Appendix A), will depend on the purpose for which the measurement is being used, for example:

- preliminary inquiries
- acquisition/sale, compulsory acquisition or option agreement
- development phasing
- planning application
- portfolio management or
- valuation.

These may have different accuracy requirements, and some of these purposes may be supported by legacy documentation held in a variety of formats and at different scales. Mixing and matching of inappropriate maps, plans, drawings, aerial photos, web-sourced geographic information and surveys can cause serious issues during and after the development process. It is advised that 'definitive' mapping information – as provided by national cadastre/mapping agencies – should be sourced as a primary base for further survey and increased spatial accuracy based on project need. Measurements can be produced with a high degree of accuracy as standard for almost all purposes (Appendix A).

Where clients provide LOA information in a particular format, for example paper title, the RICS member should form an independent judgment on the provenance of the information and its reliability for the purpose for which it is being used.

Older methods of spatial measurement by physical means and paper-based recording are increasingly being superseded by digital capture and reproduction formats. Nevertheless, there will be instances where these remain the most appropriate and it is acknowledged that in some jurisdictions much documentary evidence about land is still held in paper format. In some cases, paper map-based information may have been converted to digital format through digitisation. RICS members should be aware of the potential for inaccuracies arising from such conversions and caveat their advice accordingly.

Some of the possible sources of information on LOA are as follows:

- paper map
- digital map
- title plan
- cadastral plan
- electronic document
- geographic information system (GIS)-based map
- **measured survey**-based document and
- drone-based survey.

An RICS member relying on the measurement should report on the:

- basis on which the measurement was carried out
- appropriateness of such basis
- accuracy of such measurement for the purpose for which it is, or is likely, to be used and
- limitations of using it for a different purpose.

2.4 Inspection

RICS members should:

- wherever feasible, carry out a physical inspection of the LOAs when advising on land measurements for planning and development purposes
- not normally give advice on the matter without having inspected the LOAs, unless the instruction is clearly for desktop analysis (or there are other exceptional circumstances that prevent a site from being appraised in person)
- state when reporting:
 - whether the land area has been inspected in person (and the level of inspection conducted)

- if no land inspection has been carried out, why and what the limitations of the advice are as a result, and
- whether the official register of land ownership has been inspected (in the UK for example, this will be up-to-date HM Land Registry office copy entries), and if so, any inconsistencies observed.
- be aware of the risk of offering advice where they have not carried out a site inspection, or have not had a report on title available, and should both caveat their advice accordingly and ensure that its limitations are clear to those entitled to rely on it.

3 Application of key measurements

This section sets out how the definitions for the measurement of land for planning and development purposes are applied. It provides context to assist with calculation and considers each in terms of its purpose and description, in addition to any specific inclusions and exclusions. Where there is a dispute over the specifics of a particular calculation, negotiations should reflect the 'spirit' of the measurement in the context of its purpose. As has been made clear elsewhere in this professional standard, all measurements of land are those of surface area on a horizontal plane.

It is common practice for measurement boundaries to be illustrated on plans. It is typical to use a red line for such situations. There will be instances where documents prepared for different purposes both use a red line to delineate the site boundary (e.g. title documents and development application documents). What the red line relates to should be clear from the measurement being presented. However, in the event that different measurements are overlaid on the same plan, different colours should be used, and these should be clearly labelled (e.g. a blue line to represent the LOA on SA drawings for **planning purposes**).

It is recognised that different jurisdictions may have different requirements for the legal land title necessary to submit a valid application for development. Some may require sufficient title to be able to carry out the development, while others may have no such requirements with regard to land title. Also, there may be off-site implications that will need to be addressed, which would have similar implications. In circumstances where an applicant does not have immediate control, it will naturally affect the relationship between the sizes of the LOA, SA and potentially the NDA.

3.1 Land ownership area (LOA)

A single legal interest or title is typically delineated by a red line on title documents. Each relevant LOA should be measured to this legal boundary, in accordance with jurisdictional requirements and having regard to the legal documentation. Where only a part of an LOA is to be included, it is the responsibility of the RICS member to make this clear.

Where title deeds do not delineate the land with a map, the RICS member should clearly reference the documentary evidence relied upon to establish the boundary delineation. Legal advice may be required in some instances, such as where the boundary is unclear or disputed.

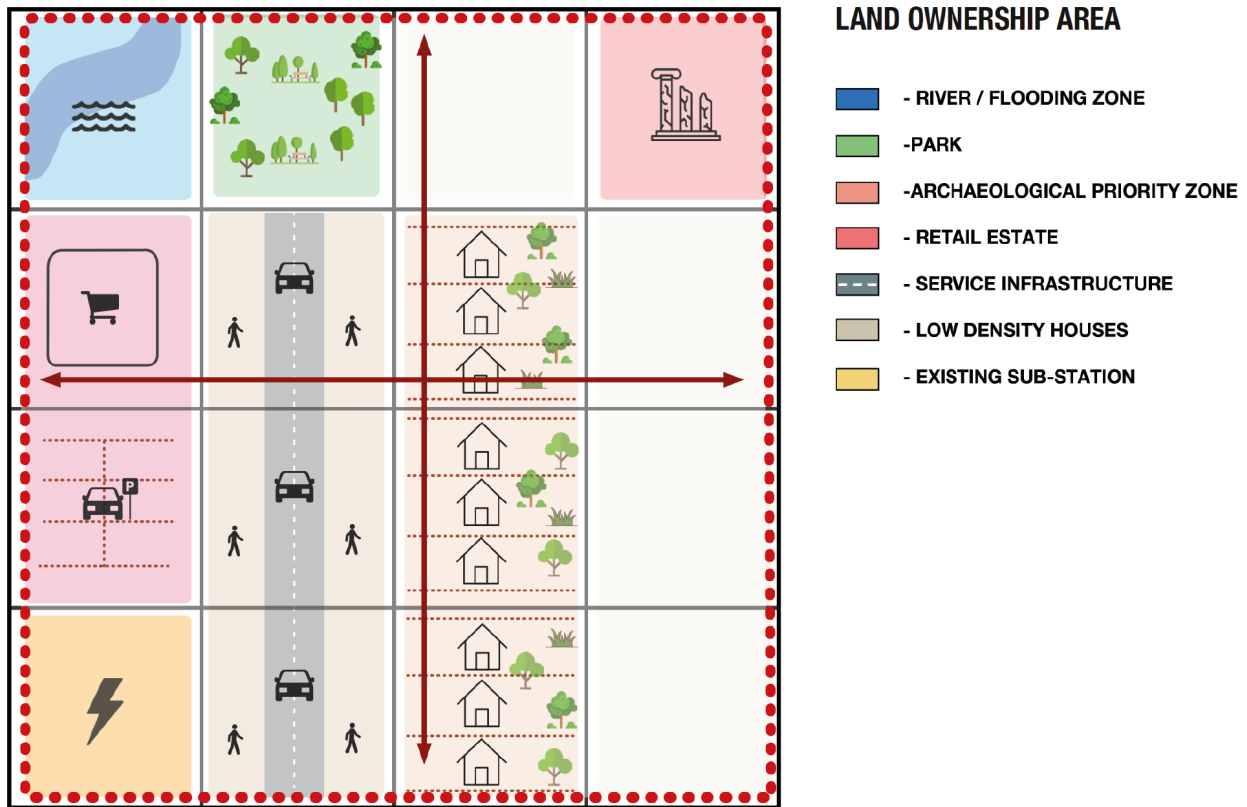


Figure 1: Land ownership area (in circumstances where it includes all land within the boundary of a single legal title or interest)

RICS members will need to be aware that within the delineated legal site boundary there may also be legal burdens on the title that will have a limiting effect on the functional area and volume of space available for development. These burdens may include:

- leases and underleases
- **wayleaves**
- **easements**
- rights of way
- rights to light
- mineral rights and subsoil freehold interests, and
- **covenants.**

There will also be other restrictions, such as safeguarding directions, which are revealed through searches on title. While such burdens affecting land are typically revealed through the various forms of legal search, others may also be observable or suspected from a site inspection. The burdens may be revealed as time progresses and RICS members should make this possibility clear.

3.1.1 Inclusions and exclusions

There are no explicit inclusions or exclusions for the LOA. This is because it is defined simply as land that is within a legal ownership boundary.

3.1.2 Purpose

Applications for LOA include, but are not limited to, measurement for:

- sales and marketing
- planning applications and approvals
- the promotion of land for allocation or zoning for **development**
- contractual arrangements, including option/promotion agreements or similar, and
- the financial appraisal and valuation of land.

3.2 Site area (SA)

The SA describes the area of land submitted in the planning application drawings that is subject to an application for permission for a particular development. This may be influenced by jurisdictional regulatory requirements or guidance.

The applicant must comply with statutory requirements for the SA in light of the form of development proposed. The proposed SA should ideally be discussed with a local government representative (or other representative of the planning authority) as part of the feasibility stages of design development.

The way the boundary for the SA is determined is generally at the discretion of the applicant for planning permission or a development permit (depending on the extent of the development they wish to receive permission/permitting approval for). However, the SA should always be measured to the submitted (or, when not yet submitted, the intended) planning application boundary and delineated by a red line.

The SA may be set to extend beyond the LOA(s). This may, for example, be to obtain permission for necessary off-site works (such as works on highway land adjacent to the site). The SA may also be less than the LOA(s), for example if they include land surplus to the requirements of the development or the developer wishes to bring land forward as separate development parcels.

RICS members should:

- report the basis on which an SA measurement was carried out
- advise on the appropriateness of such a basis and the accuracy of measurement for the purpose for which it is or is likely to be used, and
- report the density in relation to the SA, as this is the area within which development will be authorised. This reflects the fact that proposals can only be considered acceptable in their wider context (open space provision, access, etc.).

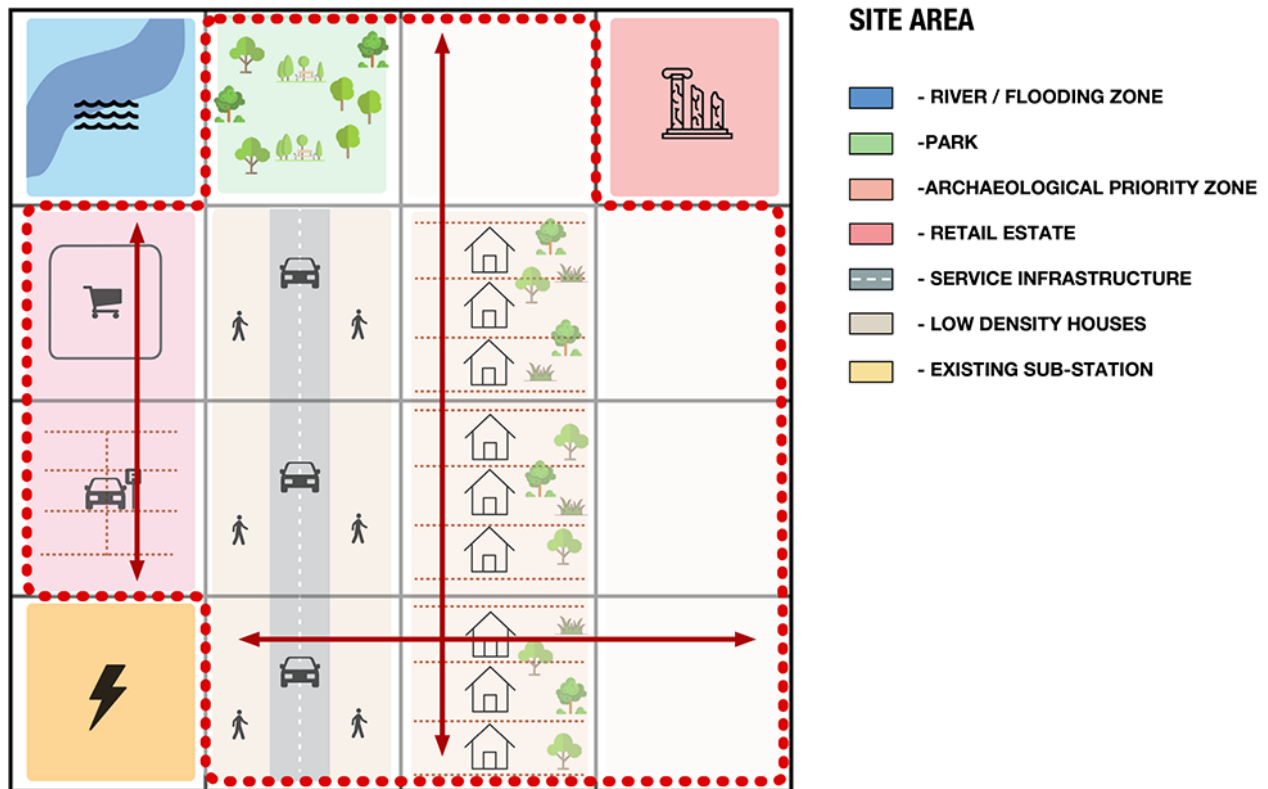


Figure 2: Site area, consisting of the land to form part of a development proposal/permission

3.2.1 Inclusions and exclusions

There are no explicit inclusions or exclusions for the SA. This is because it is defined simply as what is inside the area associated with a proposed/approved development. The principle behind the SA is to account for all elements of land that in some manner comprise part of the development, whether existing or proposed. It may therefore be considered as the gross development area.

3.2.2 Purpose

Applications for SA include, but are not limited to, measurement for:

- an application for development permission/permit
- consideration of land for which permission/permitting approval is or will be sought
- the financial appraisal and valuation of land for which permission may be sought/obtained
- the promotion of land for allocation or zoning for development
- contractual arrangements, including option/promotion agreements or similar
- the calculation of PR, SC and residential density, and
- the assessment of other metrics used to consider compliance with planning objectives and standards.

3.3 Net development area (NDA)

Unlike other land measurements, it is probable that the NDA will change as the scheme is revised and refined throughout the planning process and into the construction phase. There will only be a high degree of certainty about an NDA at the stage where an application is submitted, and the NDA will only be calculable in its final form once the development is complete. It is important therefore to recognise the elements of the scheme to which this should relate, and the key considerations that will impact on its measurement:

- It is the portion of the SA to which a financial value is directly attributable (as opposed to an area that could indirectly contribute to value). This will normally be those elements that are capable of being sold, let or occupied so that a capital value can be calculated for them.
- In planning terms, it is the area of land available for public and private buildings, and ancillary servicing space, after the public realm area (such as open space and major roads) has been identified for planning purposes.
- In development terms, it will influence the amount of floorspace that can be accommodated on any site and may also impact the density, height and massing of a proposed scheme.
- In legal terms, there will necessarily be a correlation between the NDA, SA and the permission/permit that confers the legal authority to construct the overall development.
- In phased developments, the NDA will include existing elements built under an extant planning permission, as well as new buildings being built under the same planning permission.

At the outset of the development, the NDA can usually only be estimated, particularly on large greenfield or regeneration sites. As project planning and design evolve, the NDA should become more certain.

The extent to which the NDA correlates to other measurements will vary. On dense urban sites where there may be complete development coverage, the NDA will in all likelihood coincide with the SA for planning purposes and the LOA in accordance with the legal boundary.

In determining the NDA, the stage at which this measurement is being undertaken and the assumptions underlying the delineation of the NDA should be stated alongside the measurement.

RICS members should be aware of the extent to which planning policies and other standards may impact upon the NDA of a given site. Such policies and standards could include, for example:

- density requirements
- sustainable drainage systems (SuDS)
- functional flood plains and
- title restrictions.

Further clarification is provided in section 4.

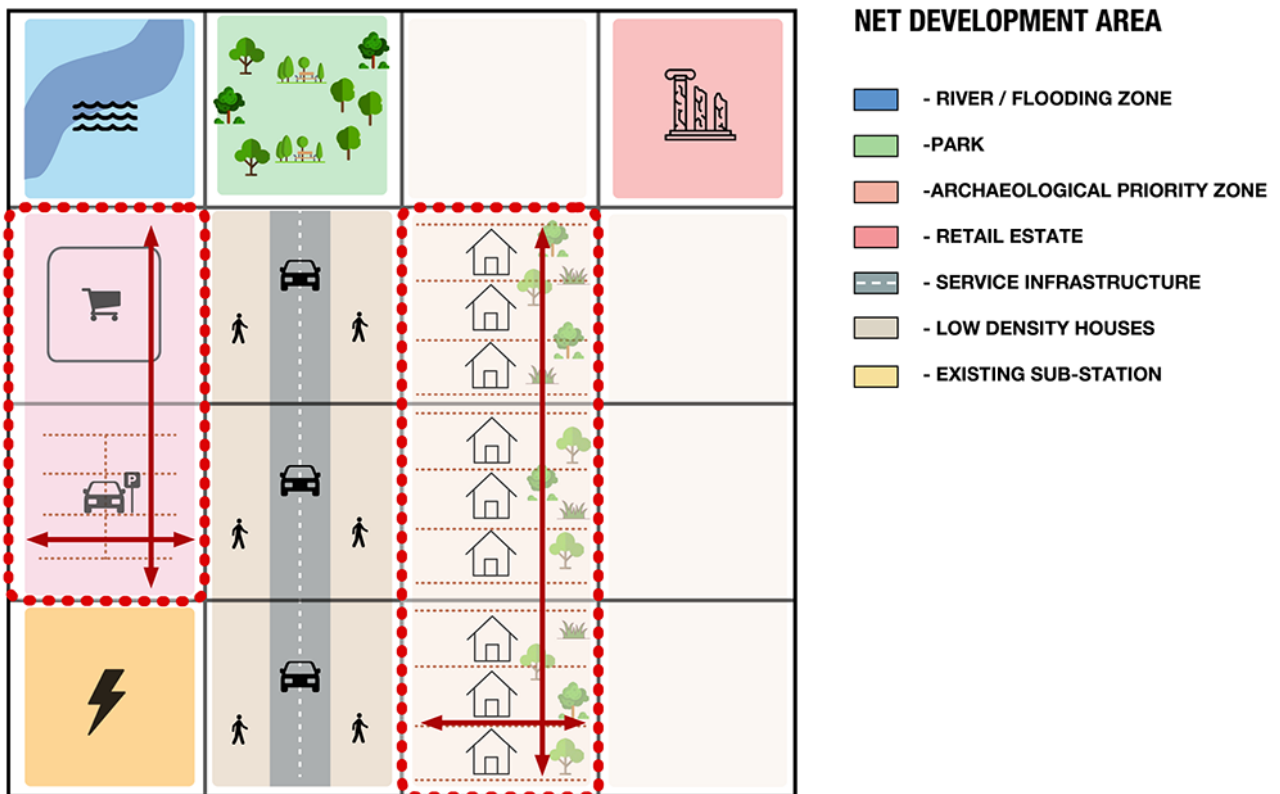


Figure 3: Net development area, defined as those portions of the site upon which new buildings or other operations, and their ancillary space, are delivered

3.3.1 Inclusions and exclusions

There are explicit inclusions or exclusions for the NDA. This is because it is defined by the area upon which one or more buildings or other operations and their ancillary space can be built.

The NDA includes:

- private residential gardens and ground floor private amenity space (patios, verandas, etc.)
- private residential parking at ground floor level
- private commercial yard, storage and parking at ground floor level

- private hardstanding, access roads, pavements, etc.
- undemised hardstanding, access roads, pavements, etc. that are strictly necessary for the servicing of the development as a whole, and
- ancillary buildings and structures.

The NDA excludes:

- public realm and open space (parks; verges; SuDS; undemised terraces, steps and patios, etc.) and
- undemised hardstanding, roads, pavements, etc. that are not strictly necessary for the servicing of the properties to be sold/let.

Whether to include or exclude the following will depend on where they are located on the site and is a matter of fact and degree:

- infrastructure (roads, railways, etc.)
- utilities (sewers, pylons, etc.) may be essential to include if applicable and
- legal entitlements (wayleaves, easements, etc.) may be essential to include if applicable.

The NDA as defined here should be regarded as the default position. **It is recognised, however, that there may be circumstances in which it is hard to agree upon the precise NDA.** In such instances, a degree of negotiation and flexibility may be required to agree a measurement that reflects the 'spirit' of this guidance in relation to its purpose and context. Similarly, where assumptions are required, these should be made clear and revised where appropriate, for example if the measurement is being clarified or restated at a point when additional information has become available that enables a more accurate, specific or up-to-date measurement to be provided.

It is also recognised that there may be circumstances, such as urban extensions, where the NDA of a wider area (comprising multiple sites) is of interest or relevance. Where the NDA is calculated across multiple parcels of a wider development site, land allocation or permission, it should be calculated consistently across the composite of all relevant SAs.

3.3.2 Purpose

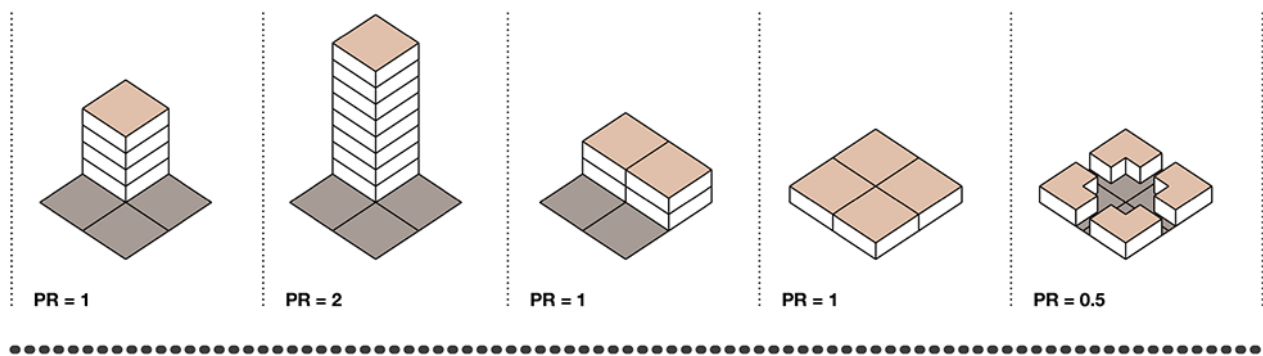
Applications for NDA include, but are not limited to, measurement for:

- the financial appraisal and valuation of land for which permission may be sought/obtained
- the allocation and/or zoning of land
- contractual arrangements, including option/promotion agreements or similar
- the calculation of residential density and
- the assessment of other metrics used to consider compliance with planning objectives and standards.

3.4 Density measurements: plot ratio (floor area ratio/ floorspace ratio) and site coverage

Figure 4 illustrates the difference between PR and SC as measures of intensity of site usage. PR is expressed as a ratio of the total floor area of buildings to the total site area. Both PR and SC calculations are expressions of the total floorspace of a development and therefore include all uses within a scheme, such as residential, commercial, educational and other institutional. SC expresses the proportion of the site covered by buildings measured at ground floor level, as a percentage of the total site area. Planning policies based on these measures, together with height parameters, influence the development potential of a site and the wider area.

PLOT RATIO



SITE COVERAGE

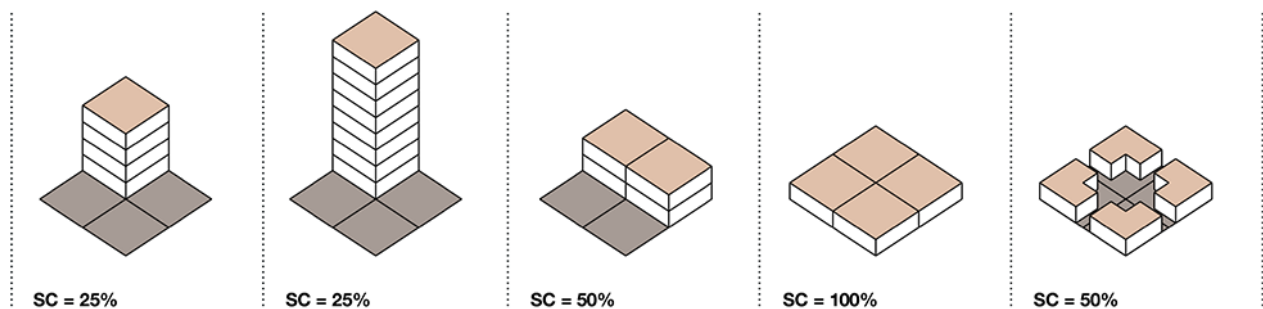


Figure 4: Plot ratio and site coverage

It is recognised that there may be circumstances, such as urban extensions, where the PR or SC of a wider area (comprising multiple sites) is of interest or relevance. Where the PR/SC is calculated across multiple sites, it should be calculated in the same manner across the composite of all relevant SAs.

3.4.1 Inclusions and exclusions

Plot ratio

PR includes within total floor area (measured as GIA or GEA):

- lift rooms, plant rooms, fuel stores and tank rooms that are housed in a covered structure of a permanent nature
- outbuildings that share at least one wall with the main building
- loading bays
- garages, greenhouses, garden stores and fuel stores
- conservatories
- ancillary buildings and structures
- internal structural, raked or stepped floors (to be treated as a level floor and measured horizontally)
- internal balconies and mezzanine floors
- covered walkways and
- enclosed terraces and patios.

PR excludes from total floor area (measured as GIA or GEA):

- overhanging elements, including eaves, cornices and other roofline projections
- hardstanding, including driveways, parking, roads, pavements, etc.
- unenclosed terraces, steps and patios
- open vehicle parking areas
- external structural, raked or stepped floors (to be treated as a level floor and measured horizontally) and
- gardens, landscaped areas, unenclosed terraces and patios.

Site coverage

SC includes within ground floor area (measured as GEA):

- lift rooms, plant rooms, fuel stores and tank rooms that are housed in a covered structure of a permanent nature
- outbuildings that share at least one wall with the main building
- loading bays
- garages, greenhouses, garden stores and fuel stores
- conservatories
- ancillary buildings and structures

- internal structural, raked or stepped floors (to be treated as a level floor and measured horizontally)
- internal balconies and mezzanine floors
- covered walkways and
- enclosed terraces and patios.

SC excludes from ground floor area (measured as GEA):

- overhanging elements, including eaves, cornices and other roofline projections
- hardstanding, including driveways, parking, roads, pavements, etc.
- unenclosed terraces, steps and patios
- open vehicle parking areas
- external structural, raked or stepped floors (to be treated as level floors and measured horizontally) and
- gardens, landscaped areas, unenclosed terraces and patios.

3.4.2 Purpose

Applications for PR and SC include, but are not limited to, measurement for:

- the financial appraisal and valuation of land for which permission may be sought/obtained
- the promotion of land for allocation or zoning for development
- contractual arrangements, including option/promotion agreements or similar
- the consideration of intensity of use and
- the assessment of other metrics used to consider compliance with planning objectives and standards.

4 Factors affecting measurement calculations

This section sets out factors that either affect, or else are related to the consideration of, land measurement calculations.

4.1 The blue line area: land ownership in the context of SA/NDA

4.1.1 Purpose

The **blue line area** identifies other land, nearby or adjacent to but outside the SA, which is in the ownership or control of the applicant for a proposed development.

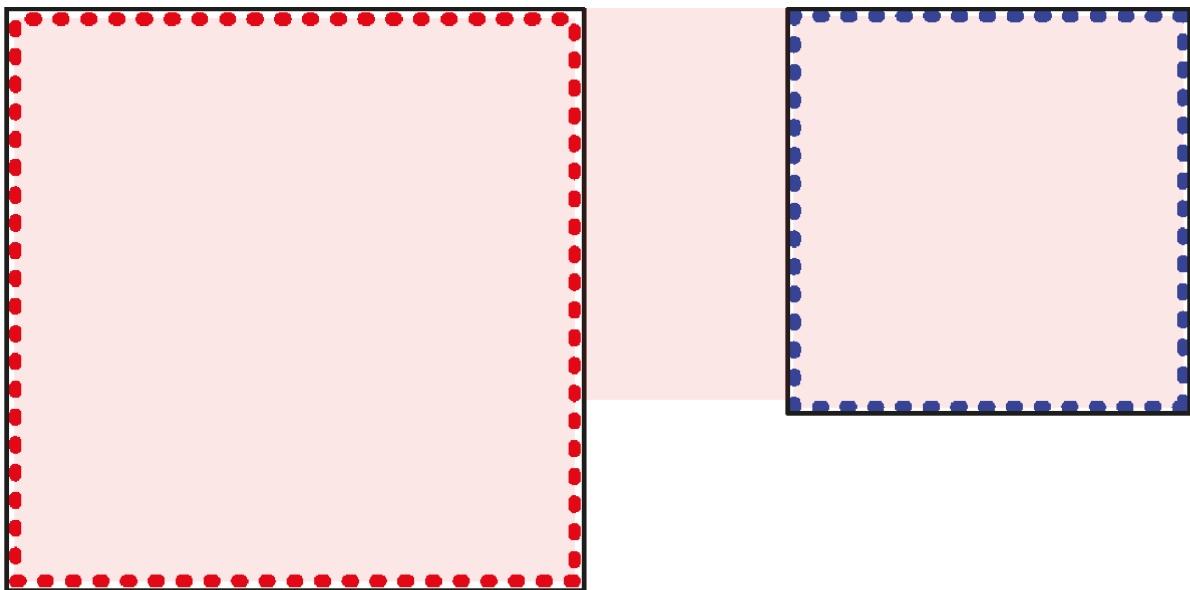


Figure 5: A blue line, indicating other land within the control of the owner/applicant

4.1.2 Description

The blue line provides useful context in circumstances where a local planning authority or equivalent body may require, or consider it beneficial, that the applicant identifies the other land that they control in proximity to the planning application site (the SA).

4.2 Density

In a rapidly urbanising world, density is becoming an increasingly important measure of the development potential of a site, and a key consideration when assessing proposals. While the appropriate density for a particular site will need to respond to and/or reflect relevant planning policies in relation to its specific circumstances, it is important that there is consistency in calculation.

4.2.1 Density: gross and net

Density is measured on either a gross or net basis. In terms of reporting density should always be expressed in terms of gross density (based on SA). Net density can provide an additional measure to assist with interpretation and assessment (based on NDA).

PR, FAR, FSR and SC are also expressions of density and can be applied to all uses (but are most commonly used for commercial developments). For residential schemes, the density of the development on a site can also be expressed in various ways, including dwellings per hectare/acre, **habitable rooms** per hectare/acre or bedspaces per hectare/acre. This is in addition to other approaches, not included in this professional standard, that may exist in particular jurisdictions.

Gross density is based on the full extent of the SA, which includes all aspects of a site of any size, including the housing, commercial space, roads, open and public realm, schools and their grounds, and other uses. It is a holistic measurement that considers a given site in its entirety. It enables a consideration of the total amount of development to arise from any allocation/zoning or proposal/permission; it is for this reason that gross density is calculated using the SA.

Net density is based on the extent of the SA upon which new buildings and ancillary space can be built, or operations can take place, measured on a horizontal plane. It is, in effect, the measure of density across the NDA as opposed to the SA. What is included within and excluded from the measurement of net density is defined by what is included/excluded from the definition of the NDA. It may be expressed alongside the gross density to assist with understanding and/or assessment.

For the avoidance of doubt in determining density, it is assumed that all references will normally relate to gross density (and therefore be interchangeable with it, unless otherwise stated). This includes specific development proposals and the zoning/allocation of land. Therefore, density should always be stated in gross terms. Where net density is stated and/or relied upon, this should be in the context of gross density. This is because it is a requirement of a new development that it meets a range of objectives on any given site. The amount of development that is achieved in the context of these requirements (for example, for parks and open space) is consequently the key indicator of the amount of development that can be achieved in any given circumstance. It is therefore the SA that allows the most definitive measurement of density to be applied, as this is the area relied upon for regulatory and policy compliance purposes. For this reason, the area of land to which the measurement of density most readily applies should be the SA.

It is noted, however, that the calculation of density based on the SA does not always provide for a clear assessment of either the land parcel's specific constraints or the resulting level of concentration in the proposed development. For this reason, net density may be helpful as a point of reference. In such circumstances, calculation of density based on the NDA can also be used as a supplemental measurement to assess how concentrated a proposed development may be in the context of any particular site. Where density based on the standard SA calculation is supplemented by a measure of density confined to the NDA for additional context, this should be made clear and both measurements should be consistently reported alongside each other for clarity.

When interpreting planning documents that were published or adopted prior to the publication of this professional standard, efforts should be made to ensure that any inconsistencies are flagged during the planning process. In circumstances where historical documents exist, it is advisable that densities are reported on the basis of both those documents and this professional standard. This is to ensure that decisions can be made in the context of local regulations as well as this guidance. Replacement or updated documents should solely reflect this professional standard.

4.2.2 Residential density measures

As set out in the preceding section, there are a number of different ways of expressing residential density that are not treated as core definitions in this professional standard and with variations between jurisdictions as to the favoured measure or measures. Examples include the following:

- **Dwellings per hectare/acre/square metre** refers to the number of dwelling units on a site but ignores their size.
- **Habitable rooms per hectare/acre/square metre** refers to the number of **habitable rooms** within a scheme and gives an indication of approximately how many people would live within that scheme.
- **Bedspaces per hectare/acre/square metre** refers to the size of a dwelling unit based on its bedspace capacity and gives an indication of approximately how many people would live within a scheme.

4.3 Open space

Open space requirements will vary between dense central urban areas (e.g. Hong Kong) and lower-density urban extensions (e.g. parts of the USA). In large new residential developments, publicly accessible open space is one of the largest components of land to be planned for, reducing the amount of land area available for building.

How this amount is to be determined and where it is to be located is dependent on considerations such as:

- local planning policies
- particular site conditions

- the development vision for the scheme
- whether the open space provision is being delivered in the context of a sustainable urban drainage system, and
- whether the open space is for passive or active recreational purposes.

As part of the planning for the future maintenance of public open space, planning authorities may enter into maintenance contracts with third parties, and a separate measurement of open space areas based on 'as constructed' measurements may be necessary for these purposes. Projects enabled by Building Information Modelling (BIM) would be expected to provide this as a matter of course.

RICS members responsible for measurement should obtain clear instruction on the purpose for which the measurement is required, and request any appropriate legal and regulatory documentation in support of the instruction.

4.4 Sustainable drainage systems (SuDS)

SuDS are increasingly encouraged or prescribed in large-scale developments. Whether this falls within the NDA or not is a matter of fact and degree in each case. Although not consistently mandated by local planning authorities and water companies, where the intention is to service the development using SuDS, space will need to be allocated for this function. Also consider related or overlapping functions that could be accommodated in shared space.

5 Measurement of land ‘as constructed’

This section clarifies the way in which the measurement of land should be undertaken once a development has been constructed.

5.1 Plans as constructed

Layout plans that are copies of the original planning permission drawings may or may not be an accurate representation of the development as constructed on the ground. Where alterations may have taken place in the siting of buildings as construction progresses, this may give rise to inconsistency where the original drawings have been relied upon for conveyancing purposes. Disputes can also arise where a boundary is found to be in a different position to that shown on the planning drawings, for example as a result of the subdivision and sale of the developed land.

While it is recognised that there is normally no need for the boundaries of a new plot to be determined as long as they are recorded on an accurate ‘as constructed’ survey, **it is highly recommended as best practice that ‘as constructed’ drawings be produced at the end of the construction process.** These should accurately record the position of buildings and boundaries on the site as they have been constructed. They should be recorded on an accurate boundary/land survey that complies with the accuracy requirements set out in Appendix A. Any variation should be brought to the attention of the conveyancer to ensure the most accurate documentation is provided to end purchasers.

In jurisdictions that operate a form of **cadastre** (fixed or otherwise), more stringent demarcation requirements of individual parcels may be applicable and final submission of cadastral plans to relevant authorities may need to be actioned by a locally/nationally licensed cadastral/land surveyor. It is important that RICS members understand the cadastral requirement of the jurisdiction in which they operate.

6 Application for planning and development purposes

This section provides further context on the general approach to implementing this advice, and discusses some of the issues commonly encountered when calculating land area for planning and development purposes.

It is recognised that while many RICS members will be familiar with the way in which a development proposal can emerge over time, those in allied professions or other stakeholders seeking to apply this professional standard may appreciate additional context.

6.1 Planning and development process

There are arguably only two fixed points in the process of planning and development: the start (at the site appraisal stage) and completion (once the development is constructed). The period and steps between these two points will vary according to jurisdictional requirements. However, in all instances the steps to be covered are likely to involve an ongoing process of design evolution and scheme refinement that continues right up until completion.

Broadly speaking, there are three stages of work in the planning and development process:

This applies in both discretionary and prescriptive systems.

As the measurements in this professional standard relate to the development process, which is iterative, it should be assumed that some may change over time as more information becomes available. A scheme prepared by an architect and transport consultant to test planning principles or inform initial discussions may need to be substantially revised at a later date as further, more detailed, work is undertaken, for example if a utilities survey identifies a sewer that cannot be diverted or archaeological remains are found that must be left in situ.

Surveyors, planners, architects, engineers and others engaged in the development process should all acknowledge that until a proposal is submitted and permitted, the SA and NDA are based only on the information that is available at that point. Until the scheme is constructed, they cannot be confirmed with absolute certainty. This has an impact upon the way that measurements are used throughout the development life cycle. RICS members are responsible for ensuring that the measurements being used are as accurate as possible and reflect what is known, or may reasonably be assumed, at any given time.

Where a planning decision by a local planning authority is subject to further proceedings (for example an appeal or judicial review), the most relevant measurements will normally be those that are the most up to date.

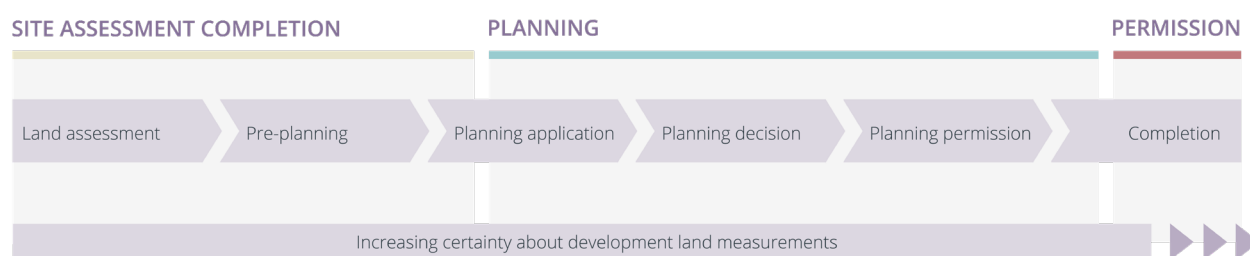


Figure 6: Key measurement stages in the planning and development process

6.1.1 Site identification and assessment

At the site identification and assessment stage, it is not uncommon for relatively little information about the relevant land to be available. An acquiring party may only have access to the information in a data room or sales pack. This could be limited to legal documents and topographical survey information. It would be helpful to establish the LOAs – and/or, if applicable, the part or parts of the LOAs – that comprise the relevant land under consideration. This information should be made available at an early stage.

Preparation of a development proposal in this context is reliant upon a significant number of assumptions. At this stage, measurements of SC, PR and SA are useful indications of what may be possible.

For commercial developments, SC is often key and therefore sufficient. PR is equally helpful in such instances, as a reflection of what might be constructed within a development (such as by showing mezzanine floors). For residential developments, a target density is often applied to understand what may be accommodated on site. The SA is particularly important as this will affect both the nature of the proposed development and the calculation of any associated metrics to assist with assessment.

6.1.2 Planning

During the planning process, the opportunities and constraints of any site are increasingly defined, particularly in discretionary systems where a degree of negotiation is required. Their extent and nature become more apparent as progress is made through the development process, reflecting the greater amount of information that becomes available as further site and scheme assessment work is undertaken.

During this process, it becomes easier to distinguish the LOA from the SA. This is because during the planning stage a detailed approach to a site's development is being fully established. For example, it is often at this point that the full extent of the functional flood plain can be assessed and acceptable responses can be established. It may be that the development of water-compatible uses is possible where other development is not, with the incorporation of these into an emerging scheme extending the SA. It might be that areas of landscape importance can be incorporated into the design of what occurs around – but not on – them. In all respects, this is where the boundary of the site that will form part of the

scheme is assessed, irrespective of whether it constitutes new building or merely facilitates it. It is also the point at which the specific application of planning policy and its implications are negotiated and considered.

In urban areas, there is often greater potential for existing infrastructure to impact upon the way in which a building may be constructed and the location in which it may be positioned. It may be, for example, that there is an underground railway line that prevents the depth of foundations required for a certain form of development, or there may be planning restrictions relating to key views, historic monuments or existing buildings. It is more likely that urban locations will be previously developed 'brownfield' properties and could be affected by the historical use of the land (e.g. utilities connections, contamination, etc.) in addition to surrounding developments. Therefore, while the measurement of the LOA, SA and NDA may be closer to one another than on larger 'strategic' sites, it is important to refine such measurements to ensure that a site's specific circumstances can be fully considered and assessed.

The expectation that calculations of density will rely on the SA is because planning policy typically requires the provision of a range of residential amenities to make a proposal acceptable in planning terms. There will often be policy requirements for residential proposals that directly impact the amount of development that can be supported, both in terms of target development densities and requirements for the infrastructure needed to support it, such as open space and child play space. It is only by basing assumptions about density on the SA that they can be properly assessed for planning compliance purposes. It is for the same reason that calculations of density based on the SA do not indicate the scale, bulk or form of buildings proposed.

As simple calculations do not provide any indication of the quality of design and construction that will be achieved, a greater degree of professional rigour and judgement is required. As a scheme becomes more advanced, it may therefore be useful to consider the NDA in order to contextualise any proposal. The NDA is important for the design and acceptability of any proposal because it also has a direct impact on the visual appearance of the site. For example, if the NDA is small but a high target density or floorspace must be achieved, the amount of development to be accommodated within the NDA is also necessarily large, with implications for building heights and massing.

6.1.3 Permission

Once permission has been granted, it is possible to accurately calculate all measurements of land applicable to a specific site at a specific point in time.

Where permission exists, the NDA is not only useful to the local planning authority, but also to the valuer and those marketing the development. While it is quite possible for one site to have several possible NDAs, the NDA of a permitted scheme indicates the way in which the site's various constraints have been resolved in the context of this particular scheme, although it may not automatically represent the optimal or 'highest and best' use.

6.2 Time

Any measurement is only accurate at a particular point in time, in light of the circumstances that apply at that point. A measurement can only reflect the very specific nature of circumstances as they currently exist. Should the basis for measurement change, the measurement should change accordingly. It is incumbent upon RICS members to ensure that the measurements being used reflect the most accurate information available to them at any point, and that where assumptions are required, these are reasonable and appropriate.

If measurements made in accordance with this professional standard are used as the basis for an [RICS Valuation – Global Standards](#)-compliant valuation, it will be necessary to clarify any assumptions being made regarding these site measurements.

Appendix A: Survey accuracy banding

| Band | Plan accuracy (X, Y) | Height accuracy (Z) | Example survey types/use | Legacy output scale | Min size of feature shown to scale (not symbolised) |
|------|----------------------|---------------------|---|---------------------|---|
| D | +/- 10mm | +/- 25mm | Measured building surveys, high accuracy land and topographic surveys, determined boundaries surveys. | 1:50 | 20mm |
| E | +/- 25mm | +/- 50mm | Measured building surveys, Boundary identification, measured land surveys, topographic surveys. | 1:100 | 50mm |
| F | +/- 50mm | +/- 50mm | Boundary identification, measured land surveys, UAV surveys. | 1:200 | 100mm |
| G | +/- 100mm | +/- 100mm | Topographic surveys, boundary surveys. | 1:500 | 250mm |
| H | +/- 250mm | +/- 250mm | Low accuracy topographic surveys, national urban area mapping. | 1:1000 | 500mm |
| I | +/- 500mm | +/- 500mm | Low accuracy topographic mapping, national non-urban mapping, general boundary mapping. | 1:2500 | 1000mm |

Table 1: Survey accuracy banding table

Table 1 is customised from the RICS' original [Measured surveys of land, buildings and utilities](#). This table refers to measured survey data and should be read in conjunction with sections 2 and 5.

RICS members should ensure they are fully conversant with RICS standards and information relating to measured surveys, and continue to follow best practice contemporary field survey techniques (see the current editions of RICS' [Measured surveys of land, buildings and utilities](#); [Guidelines for the use of GNSS in land surveying and mapping](#); [Boundaries: procedures for boundary identification, demarcation and dispute resolution](#) and [Earth observation and aerial imagery](#)).

Appendix B: Ordnance Survey mapping

Under the [Public Sector Geospatial Agreement](#) (PSGA), Ordnance Survey (OS) provides Great Britain's national mapping services. As part of its public task, OS creates, maintains and improves the National Geographic Database (NGD), which contains the data that describes the geography of Britain. Visit the [Our public task](#) webpage of the OS website for further information.

OS MasterMap® Topography Layer and OS MasterMap® Imagery Layer are both highly detailed topographic products, which provide valuable information in a boundary dispute case, though it needs to be understood from the outset that Ordnance Survey maps show only physical topographic features and make no comment on land and property ownership boundaries or rights. OS MasterMap® Topography Layer contains data that has historically been surveyed at three 'basic scales', with the associated accuracy referenced in Table 2.

| Original survey scale | 99% confidence level | 95% confidence level | RSME* |
|-----------------------|------------------------|-----------------------|-----------------------|
| 1:1250 | | | |
| Absolute accuracy | 0.9m | 0.8m | 0.5m |
| Relative accuracy | +/- 1.1m (up to 60m) | +/- 0.9m (up to 60m) | +/- 0.5m (up to 60m) |
| 1:2500 | | | |
| Absolute accuracy | 2.4m | 1.9m | 1.1m |
| Relative accuracy | +/- 2.5m (up to 100m) | +/- 1.9m (up to 100m) | +/- 1.0m (up to 100m) |
| 1:10 000 | | | |
| Absolute accuracy | 8.8m | 7.1m | 4.1m |
| Relative accuracy | +/- 10.1m (up to 500m) | +/- 7.7m (up to 500m) | +/- 4.0m (up to 500m) |

Table 2: Ordnance Survey mapping accuracies of large-scale topographic mapping data.
© Ordnance Survey Limited 2020

Confidence level is the probability that the value of a parameter falls within a specified range of values.

*RMSE (root mean square error) is the square root of the mean of the squares of the errors between the observations. It is a measure of the accuracy by comparing the actual measurements to the 'most likely' value. In practical terms this means that 68% (one σ) in a representative sample of points shall be correct to better than the stated accuracy value.

Ordnance Survey maps record physical features according to the then current OS specifications, not legal boundaries. If a feature is shown on an OS map it means that the feature existed, whereas the reverse is not always true.

Ordnance Survey and HM Land Registry have prepared a statement on their respective roles within boundary cases and the availability of relevant data:

'Ordnance Survey maps never show legal property boundaries, nor do they show ownership of physical features. Although some property boundaries may be coincident with surveyed map features, no assumptions should be made in these instances and consequently it is not possible to be sure of the position of a legal property boundary from an Ordnance Survey map.'

Since the [Ordnance Survey Act 1841](#), OS has been empowered to depict administrative boundaries in OS mapping. Today administrative boundaries are depicted in OS maps in accordance with the statutory position set out in the Orders (Statutory Instruments) issued under relevant laws. The administrative boundaries as shown on OS maps may assist in determining a private boundary.

Appendix C: Supplementary glossary

| | |
|---|--|
| Accuracy | Accuracy is the degree to which the result of a measurement, calculation or specification conforms to the correct value or a standard. It should be understood by comparison with <i>Precision</i> . |
| Alternative dispute resolution (ADR) | A range of options for resolving disputes without going to court, alternative dispute resolution includes mediation, adjudication, arbitration, conciliation and ombudsman schemes that apply to such issues as boundary disputes and adverse possession of land. RICS' Dispute Resolution Service (DRS) is one of the largest providers of alternative dispute resolution services in the land, property and construction industries. |
| Blue line area | A blue line area denotes one or more areas of land within the ownership or control of an applicant for permission to develop that lie nearby or adjacent to, but not within, the site area that is the subject of the application to develop, and which may comprise one or more land ownership areas (or part(s) of one or more). |

| | |
|-----------------|--|
| Boundary | <p>The edge of a title area using either of the following methods.</p> <p>Fixed boundary method: fixed boundaries are a key feature of cadastral systems. They are usually single points marked on the ground with stones, posts or metal, enabling the linear boundary between them to be determined. The type of demarcation is stated in the technical description of the cadastral survey. Coordinates, distances, bearings and areas are noted on the cadastral survey plan and mirrored on the cadastral index map.</p> <p>Determined boundary method: determined boundaries are a feature of land registration in the UK and some British Commonwealth countries, and are where boundaries identified under the 'general boundaries' principle are established on the ground and recorded. For example, in England and Wales the requirement is to record a boundary's position to a precision of +/- 10mm. The determined boundary should be mapped relative to surrounding 'hard' detail (any feature made of brick, stone or concrete that is expected to endure) to a high level of accuracy that is certified by a chartered land surveyor. The intention is that another chartered land surveyor would be able to relocate the boundary. A determined boundary should be agreed between the neighbouring landowners before it is recorded in the land register.</p> |
| Burdens | <p>These are legal obligations affecting land or buildings that typically restrict certain activities, impose use and/or building restrictions, or allocate responsibility for repair and maintenance.</p> |

| | |
|-----------------------------|---|
| Cadastre | <p>The term cadastre is used differentially. For example, it may be used to refer to the mensuration of individual land parcels by land surveyors, or to refer to the systematic aggregation of all the cadastral surveys into a land information/administration database system. It is also used to refer to the agencies of state responsible for cadastre and its regulation.</p> <p>Cadastre may be carried out for the purposes of securing tenure, known as the juridical cadastre. It may also be carried out for the purposes of land and property taxation, known as the fiscal cadastre. In some jurisdictions, multipurpose cadastre may be undertaken to serve both these purposes.</p> <p>Cadastre may be undertaken entirely by the state or may involve varying degrees of private sector participation. For example, some countries operate a system of publicly appointed and regulated private surveyors who undertake cadastral survey work. The quality control, regulation and aggregation of jurisdiction-level cadastral databases remain the function of the state.</p> <p>Cadastre helps to provide those involved in land transactions with relevant information, and also helps to improve the efficiency of those transactions and security of tenure in general.</p> |
| Covenant | <p>A contract arising by a deed. Covenants can be both permissive and restrictive. In terms of land, covenants tend to be mostly restrictive. A restrictive covenant is a promise by one person to another, for example by a buyer of land to a seller, not to do certain things with the land, such as build on it or use it as a shop or factory. It binds the land and not the buyer personally, and therefore 'runs with the land'. This means that the covenant continues even when the buyer sells the land on to another person. Restrictive covenants also continue to have effect even if they were made many years ago and appear to be obsolete.</p> |
| Development | <p>New building or other operations in, on or under land, and/or any material change in the use of that land.</p> |
| Development property | <p>'An interest where redevelopment is required to achieve the highest and best use, or where improvements are either being contemplated or are in progress at the valuation date' (IVS 410). See also RICS' Valuation of development property.</p> |
| Digital mapping map | <p>A digital map is based on a combination of graphic elements assigned to it in the form of electronic information. It is based on data captured and processed into digital cartographic images.</p> |

| | |
|--|--|
| Easement | <p>The right of one landowner to use other land for the benefit of their own land, which:</p> <ul style="list-style-type: none"> • applies to land affected by it (servient tenement) • is annexed to other land, which has the benefit (dominant tenement) • has different dominant and servient owners and • is capable of forming the subject matter of an easement. <p>Easements and covenants often run in parallel, but an easement is expressed as a right of the dominant tenement, whereas a covenant is generally expressed as an obligation of the servient tenement.</p> |
| Floor area ratio (FAR) | See <i>Plot ratio</i> . |
| Floorspace ratio (FSR) | See <i>Plot ratio</i> . |
| General boundaries | <p>Parts of the UK operate a general boundaries system, which has limitations that need to be understood. The title plan shows the general position of the boundaries; it does not show their exact line. Measurements scaled from such plans may not match measurements between the same points on the ground. When a land registry shows a general boundary on a title plan, it means that somewhere nearby there is an exact legal boundary. Other national systems rely on various forms of determined boundaries (see <i>Boundary</i>).</p> |
| Global Navigation Satellite System (GNSS) | <p>An increasingly important method that can be used for measured surveys is direct observation of features using Global Navigation Satellite System (GNSS) technology, for example the EU Galileo System or the US Global Positioning System (GPS). These services allow surveyors using GNSS receivers to achieve absolute accuracies of +/- 10–20mm in plan and +/- 20–30mm in height.</p> |
| Gross development value | <p>The market value of a proposed development assessed on the special assumption that the development is complete and sold as at the date of valuation, in the market conditions prevailing at that date (see also RICS' Valuation of development property).</p> |
| Habitable rooms | <p>Different jurisdictions may define habitable rooms differently. Typically, habitable rooms provide the living accommodation of the dwelling. They include living room, dining room, study, home office, conservatory and bedrooms. They exclude the bathroom, WC, utility room, storeroom, circulation space and kitchen (unless it provides space for dining).</p> |

| | |
|---|---|
| International Property Measurement Standards | <p>The <i>International Property Measurement Standards</i> (IPMS) for industrial, office, residential and retail buildings have been published to establish a consistent methodology for measuring buildings around the world.</p> <p>RICS professional measurement standards fully comply with IPMS.</p> |
| Land parcel | <p>A land parcel is a unique, well-defined unit of land. These units are defined by the formal or informal boundaries marking the extent of lands held for exclusive use by individuals and specific groups of individuals (e.g. families, corporations and communal groups). Each parcel may be given a unique code or parcel identifier. Examples of these codes include addresses, coordinates, and title or lot numbers shown on a survey plan or map. They can be composed of land within a single land title or a composite of several.</p> |
| Land registration | <p>Land registration is a system for recording and providing information and evidence concerning ownership, possession or other rights in land and land transactions. Responsibility for this may be held by a government agency, department, state or local authority.</p> |
| Measured survey | <p>A measured survey is carried out using precise surveying equipment that can measure and fix position, linear dimensions and shape. This may be achieved using equipment that measures angles and distances, such as an electronic theodolite/total station, or that fixes coordinates using satellites (GNSS). Drones are increasingly being employed for this purpose. The specification for undertaking the survey and the output accuracy should be fully understood.</p> |
| National mapping agency | <p>A national mapping agency is an organisation, usually publicly owned, that produces topographic maps and geographical information for a country. Some national mapping agencies also deal with cadastral matters. See also Ordnance Survey maps below.</p> |
| Ordnance Survey maps | <p>Most countries have a national mapping service based on different systems of representation and recording. The UK body responsible for this is Ordnance Survey. Ordnance Survey maps do not show legal property boundaries, nor do they show ownership of physical features. Although some property boundaries may coincide with surveyed map features, no assumptions should be made in these instances and consequently it is not possible to be sure of the position of a legal property boundary from an Ordnance Survey map.</p> |
| Paper title | <p>Title deeds are the legal documents by which land is or was bought and sold; these may include conveyances, transfers and indentures. The root of title is the deed that first created the plot of land, and the resulting boundaries are called the paper title boundaries.</p> |

| | |
|--------------------------|---|
| Planning purposes | In a statutory planning context, this refers to the designation, allocation or zoning of land for planning purposes in a plan or the identification of a site for development purposes, as part of a planning application process. |
| Precision | In survey measurement, precision relates to the degree to which repeated measurements show the same results. It should be understood by comparison with accuracy. |
| Title plan | A large-scale location plan that meets local requirements. It shows the approximate position of the boundaries of a legal interest in property, edged in red, in relation to the surrounding properties. In the UK and Ireland, it is usually drawn to a scale of 1:1250 for urban areas, 1:2500 for rural areas or 1:10000 for mountain and other remote rural areas. |
| Unregistered land | Land that has not been registered with a land registry or cadastre. The owner of unregistered land will often have a bundle of deeds that form a record of previous sales, mortgages and other dealings with the land. However, if the land is mortgaged, the lender normally holds the deeds as security for their loan. There is usually no public record of the information contained in the deeds, although in some jurisdictions there may be a registry of deeds. |
| Wayleave | A right of way granted by a property owner to another party (for example, an electricity or telephone services provider) to carry out and then maintain works (such as cable, pipe and pylon apparatus). There are also statutory wayleaves, which grant statutory undertakers the right to obtain such rights without landowner consent. |

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.

Americas, Europe, Middle East & Africa
aemea@rics.org

Asia Pacific
apac@rics.org

United Kingdom & Ireland
contactrics@rics.org



[rics.org](https://www.rics.org)