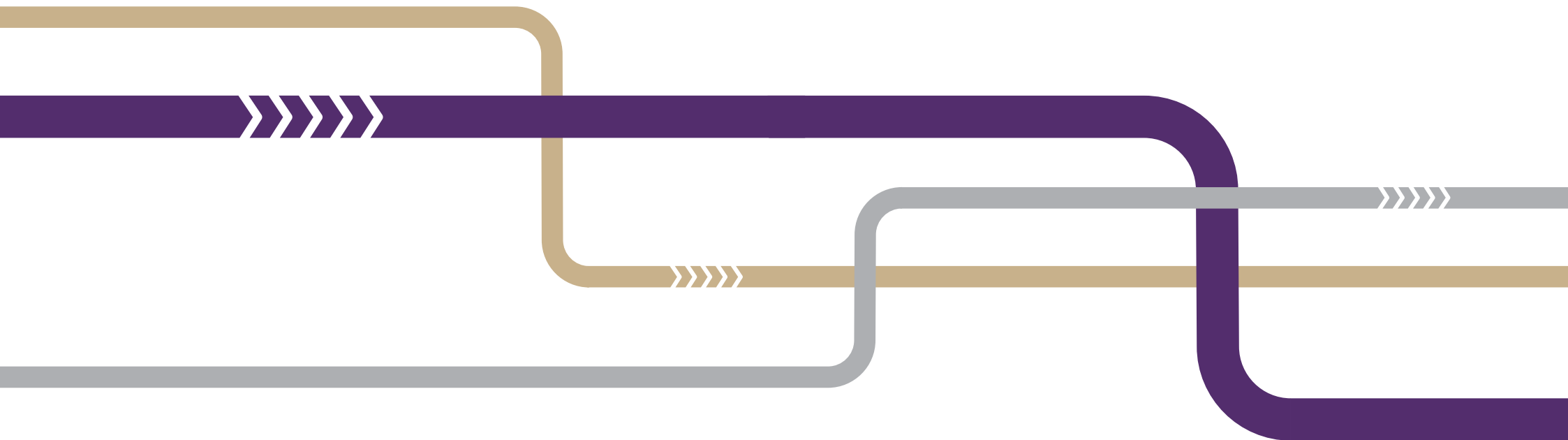




Assessment of Professional Competence

# Geomatics

February 2015



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## About the APC

The RICS Assessment of Professional Competence (APC) ensure that those applying for RICS membership are competent to practise and meet the high standards of professionalism required by RICS. There is a wide range of pathways available to qualify as an RICS member covering many different areas of practice.

The APC normally consists of

- a period of structured training
- a final assessment

The structured training is based on candidates achieving a set of requirements or competencies. These are a mix of technical, professional, business and management skills.

## How to use this guide

This guide supports the geomatics pathway. It is designed to help you understand more about qualifying as an RICS member in geomatics. Geomatics is a global pathway but it is appreciated that markets may vary from country to country. If you have any queries please contact your local office. The material is set out in three sections.

**Section one** – provides information on this area of practice with a general overview of the geomatics pathways.

**Section two** – lists the competency requirements of the geomatics APC.

**Section three** – describes the main technical competencies associated with geomatics section, providing expanded sector specific guidance on each of them. This forms the main part of the guide.

You **MUST** use this guide in conjunction with the core APC documentation which is available on the RICS website and comprises:

- APC Requirements and competencies guide
- The candidate guide
- The counsellor guide.

You can download all the supporting guidance from [www.rics.org/apcguides](http://www.rics.org/apcguides)

# Introduction

## About the competencies

The APC aims to assess that you are competent to carry out the work of a qualified chartered surveyor. To be competent is to have the skill or ability to perform a task or function. The RICS competencies are not just a list of tasks or functions, they are also based upon attitudes and behaviours. The competencies have been drawn up in a generic way so that they can be applied to different areas of practice and geographical locations. This guide is designed to help you interpret these competencies within the context of geomatics.

The competencies are defined at three levels of attainment and each APC pathway has its own specific combination of competencies that you must achieve at the appropriate level. You must reach the required level in a logical progression and in successive stages:

**Level 1** – knowledge and understanding

**Level 2** – application of knowledge and understanding

**Level 3** – reasoned advice and depth of technical knowledge

The competencies are in three distinct categories:

**Mandatory competencies** – the personal, interpersonal, professional practice and business competencies common to all pathways and compulsory for all candidates.

**Core competencies** – the primary competencies of your chosen APC pathway.

**Optional competencies** – a set of competencies selected by the candidate from a list defined for the particular pathway. In most cases there is an element of choice. These are mostly technical competencies, but certain mandatory competencies also appear on the optional competency list and candidates are permitted to select one of these at a higher level.

## Choosing your competencies

It is important that you give careful thought to your choice and combination of competencies. Your choice will inevitably reflect the work you do in your day-to-day environment [driven by the needs of your clients/employer]. Your choice and combination of competencies will be a reflection of your judgement. At the final assessment interview, the assessors will take these choices into account. They will expect you to present a sensible and realistic choice that reflects the skills needed to fulfil the role of a surveyor in your field of practice.

This guide should help candidates and employers with a degree of assistance in choosing the competencies that are most appropriate to their area of practice.

## How to find help

RICS has fully trained teams across the globe who will be able to help you with any general APC queries. For details of your local office – [www.rics.org/contactus](http://www.rics.org/contactus)

RICS HQ  
Parliament Square  
London SW1P 3AD  
United Kingdom

T +44 [0]24 7686 8555  
F+ 44 [0]20 7334 3811  
contactrics@rics.org  
www.rics.org

## About geomatics

Geomatics is the science and study of spatially related information focusing on the collection, interpretation/analysis and presentation of the natural, built, social and economic environments. As the underpinning information provider of the land and property life cycle, geomatics is of fundamental importance to society.

Driven by technology and maintaining its role in land law and other socio-economic areas, leading chartered surveying firms realise the importance of geomatics, not only to the profession but to the future success of their businesses. Particularly in the day-to-day integration of geomatics with traditional forms of real estate management, land administration and construction.

There is huge demand and are major opportunities for chartered land, hydrographic and engineering surveyors. This is due to a high media profile, coupled with the changing nature of mapping and spatial data management worldwide. This includes rapid advancements in Information Technology eg GIS, Global Navigation Satellite Systems, 'joined up government' initiatives, digital cadastres and many more. The growth in EU and national governments' spatial data agendas and legislation needs chartered surveyors to fill senior management and advisor roles, offering highly specialist expertise and knowledge.

## RICS qualification

This APC would also suit anyone with a good aptitude for science, technology, geography, internationalism, mathematics and much more. The professional group counts the following areas, all of which a chartered land/hydrographic/ engineering surveyor could potentially work within.

- Land and hydrographic surveying
- Mapping and positioning
- Global and local navigation systems
- Geographic information science
- Engineering survey
- Cadastre and land registration
- Private, regional and international boundaries determination
- Dispute resolution and expert witness
- Land law, administration and reform
- Cartography
- Photogrammetry and remote sensing
- Spatial and metadata management, interpretation and manipulation
- Land, coastal and marine information management
- Ocean bed and resource surveys
- Monitoring of structures
- Project management
- Research and consultancy.

RICS also offers a hydrographic surveying and land/engineering surveying pathway in its Associate qualification. For further details on Associate membership and this pathway please go to [rics.org/associate](https://rics.org/associate)

### Chartered alternative designations related to this pathway

Candidates who successfully complete this pathway may select the from the following chartered alternative designations:

- Chartered Land Surveyor
- Chartered Hydrographic Surveyor [candidates pursuing this must take the hydrographic core competency to level 3]
- Chartered Engineering Surveyor [candidates pursuing this must take the engineering surveying core competency to level 3]

# Pathway requirements

## Geomatics (including hydrographic) APC

### Mandatory competencies

You must achieve the minimum levels as set out below.

#### Level 3

- Conduct rules, ethics and professional practice

#### Level 2

- Client care
- Communication and negotiation
- Health and safety

#### Level 1

- Accounting principles and procedures
- Business planning
- Conflict avoidance, management and dispute resolution procedures
- Data management
- Sustainability
- Team working

### Core competencies

Three competencies to Level 3 from the list below

- Cadastre and land management
- Engineering surveying
- Geodesy
- GIS
- Hydrographic (marine) surveying
- Mapping
- Measurement of land and property
- Property records/information systems
- Remote sensing and photogrammetry
- Spatial data capture and presentation (advanced mapping)

- Surveying land and sea
- Use of the marine environment

### Optional competencies

Three competencies to Level 2 from the list below (including any core competencies not already used).

- Access and rights over land
- Analysis of client requirements
- Building information modelling (BIM) management
- Construction technology and environmental services
- Consultancy services
- Development/project briefs
- Environmental assessment
- Ground engineering and subsidence
- Legal/regulatory compliance
- Management of the natural environment and landscape
- Planning
- Project administration

Plus **one** competency to Level 2 from the full list of technical competencies, including any not already chosen from the lists on this page.

#### Notes

**If you are following the pathway to chartered hydrographic surveyor you must include hydrographic (marine) surveying competency to Level 3 amongst your core competencies.**

**If you are following the pathway to chartered engineering surveyor you must include the engineering surveying competency to Level 3 amongst your core competencies.**



## Competency guidance

The pages that follow are intended to provide guidance for candidates on the main competencies associated with geomatics.

The guidance has been drawn up by experienced practitioners and aims to give you a clear and practical understanding of how to apply the listed core and optional competencies in the context of geomatics.

The official competency definitions (at levels one, two and three) are provided, followed by a description of the key knowledge and activities that are likely to fall within the scope of each competency.

The information provided is designed to be helpful but informal guidance.

The knowledge and activities described under each competency are not exhaustive, and should not be relied upon as any form of revision list. Candidates must satisfy themselves and their employers that they have reached the required level of attainment before applying for final assessment. The competencies are arranged in alphabetical order.

## Mandatory competencies

These competencies are a mix of the professional practice, interpersonal, business and management skills that are considered common to, and necessary for, all professional members.

Title	Definition	Level required
Conduct rules, ethics and professional practice	<p><b>Level 1</b> Demonstrate knowledge and understanding of the role and significance of RICS and its functions. Also an appreciation of your personal professional role and society's expectations of professional practice and RICS Rules of Conduct and conduct regulations, including the general principles of law and the legal system, as applicable in your country of practice.</p> <p><b>Level 2</b> Provide evidence of practical application in your area of practice, being able to justify actions at all times and demonstrate personal commitment to the RICS Rules of Conduct, ethics and RICS 5 professional and ethical standards.</p> <p><b>Level 3</b> Provide evidence of application of the above.</p>	3
Client care	<p><b>Level 1</b> Demonstrate knowledge and understanding of the principles and practice of client care including:</p> <ul style="list-style-type: none"> <li>• the concept of identifying all clients/colleagues/third parties who are your clients and the behaviours that are appropriate to establish good client relationships</li> <li>• the systems and procedures that are appropriate for managing the process of client care, including complaints</li> <li>• the requirement to collect data, analyse and define the needs of clients</li> </ul> <p><b>Level 2</b> Provide evidence of practical application of the principles and practice of client care in your area of practice.</p>	2
Communication and negotiation	<p><b>Level 1</b> Demonstrate knowledge and understanding of effective oral, written, graphic and presentation skills including the methods and techniques that are appropriate to specific situations.</p> <p><b>Level 2</b> Provide evidence of practical application of oral, written, graphic and presentation skills that are appropriate in a variety of situations, specifically including where negotiation is involved.</p>	2

Title	Definition	Level required
Health and safety	<p><b>Level 1</b> Demonstrate knowledge and understanding of the principles and responsibilities imposed by law, codes of practice and other regulations appropriate to your area of practice.</p> <p><b>Level 2</b> Provide evidence of practical application of health and safety issues and the requirements for compliance, in your area of practice.</p>	2
Accounting principles and procedures	Demonstrate knowledge and understanding of accounting concepts and the format and preparation of management and company accounts, including profit and loss statements, cash flow statements and balance sheets.	1
Business planning	Demonstrate knowledge and understanding of how business planning activities contribute to the achievement of corporate objectives.	1
Conflict avoidance, management and dispute resolution procedures	Demonstrate knowledge and understanding of the techniques for conflict avoidance, conflict management and dispute resolution procedures including for example adjudication and arbitration, appropriate to your APC pathway.	1
Data management	Demonstrate knowledge and understanding of the sources of information and data, and of the systems applicable to your area of practice, including the methodologies and techniques most appropriate to collect, collate and store data.	1
Sustainability	Demonstrate knowledge and understanding of why and how sustainability seeks to balance economic, environmental and social objectives at global, national and local levels, in the context of land, property and the built environment.	1
Team working	Demonstrate knowledge and understanding of the principles, behaviour and dynamics of working in a team.	1

# Technical competencies

## Access and rights over land

### Description of competency in context of this sector

This competency is about access and easements for power, water and communications infrastructure including wayleaves. An understanding of land law, land registration methodologies and the content of land registration documentation is essential. This competency is also relevant to boundary and neighbour disputes.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the legislation and/or framework for acquiring sites or access for the provision of power, water, pipelines, other third party or communications infrastructure. This should include the methodology and techniques used in valuation for these purposes.	Provide evidence of identifying and understanding the appropriate routing for lines, cables and other third party infrastructure. This should include associated environmental assessment; undertaking inspections, and evaluating and negotiating payments for their use or acquisition.	Provide evidence of reasoned advice, undertake valuations on and write reports in relation to all matters relating to provision of power, water, pipelines, other third party or communications infrastructure.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>The processes involved in the acquisition of land for the purposes of establishing access agreements, wayleaves and easements for the provision of power, water, pipelines or communications infrastructure</li> <li>Understanding of rights over land within the context of national/local land law and registration</li> <li>Understanding of the processes of first registration [UK].</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Understanding of relevant RICS guidance [ie Expert Witness]</li> <li>Understanding of adverse possession and effects on rights</li> <li>Advising and surveying access rights to appropriate scale, accuracy including all agreed/specified related datasets [ie national mapping, aerial imagery etc]</li> <li>Advising clients of relevant 'rights' issues and possibly act in a expert capacity.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Providing strategic advice on complex elements of the subject including dispute resolution</li> <li>Preparing and providing strategic advice on unusual or challenging cases.</li> </ul>

## Analysis of client requirements

### Description of competency in context of this sector

This competency is about the establishment and agreement of a client brief, but primarily deals with the inception stage of a building project. This requires a sound understanding of the law applying to building projects, the preparation of outline design proposals in various formats, the preparation of budget costs, project programmes, and advising on various procurement options. It also requires an understanding of matters concerning energy efficiency, sustainability and alternative energies.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the need to collect data, analyse and define the needs of clients.	Provide evidence of the practical application of that knowledge and understanding. This should include the development of strategies and methodologies and, where appropriate, undertaking feasibility studies, design proposals and costings.	Provide evidence of developing appropriate strategies to meet the client's requirements under minimum supervision, based on analysis and interpretation. Demonstrate the ability to report on and present tailored strategies to the client.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• The methods of data gathering during the inception stage of a project including client briefings, site based information and accuracy/scale of surveys</li> <li>• The law applicable to building projects</li> <li>• The principles of energy efficiency</li> <li>• The principles of sustainability</li> <li>• The principles of the preparation of alternative outline design proposals including sketch drawings</li> <li>• The principles of the preparing basic budget costs</li> <li>• The principles of relevant RICS guidance</li> <li>• The need for specialist consultants and options for engaging them, such as specialist survey techniques [ie laser scanning].</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Analysing the data gathered through the client briefing process and formulating a detailed client brief</li> <li>• Consulting with statutory authorities, gathering land registry information and understanding implications of relevant legislation/directives</li> <li>• Considering the impact of energy efficiency, sustainability and the need for alternative energy sources</li> <li>• Preparing of options with regards to survey methods and output</li> <li>• Preparing outline schedules of work with approximate quantities</li> <li>• Preparing a project programme of works</li> <li>• Considering the need for specialist consultants and the options for engaging them.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Analysing the data gathered through the client briefing process and formulation of a detailed client brief</li> <li>• Advising on the need for statutory and other consents and approvals</li> <li>• Advising on the impact of energy efficiency, sustainability and the need for alternative energy sources</li> <li>• Presenting alternative outline design proposals including sketch drawings</li> <li>• Presenting outline schedules of work with approximate quantities</li> <li>• Advising on the need for specialist consultants and the options for engaging them</li> <li>• Presenting a detailed project plan.</li> </ul>

## Building information modelling (BIM) management

### Description of competency in context of this sector

This competency encompasses the establishment and management of the information modelling systems on projects. It covers collaborative process and technological principles involved in implementing Building Information Modelling (BIM) management.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the technical, process and collaborative aspects of the use of BIM on projects.	Develop and apply management systems to facilitate the use of BIM on projects including unified control and reporting procedures.	Provide evidence of the knowledge and experience gained in this competency has been applied to advising clients and/or senior management on BIM strategy.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Understanding of BIM strategies and implementation</li> <li>• Understanding of the various technical options and solutions for information modelling</li> <li>• Understanding of the collaborative processes necessary for BIM adoption</li> <li>• Knowledge of standard classification systems and their use in infrastructure</li> <li>• Knowledge of relevant internationally recognised management standards such as Construction Operations Building Information Exchange (COBie).</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Preparation of a BIM execution plan</li> <li>• Designing and implementing a BIM management process</li> <li>• Analysis of comparative BIM solutions</li> <li>• Maintaining an information model</li> <li>• Agreeing and implementing contractual aspects of BIM such as separate protocol</li> <li>• Facilitating and managing project team members for BIM implementation.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Analysing, assessing, evaluating and reporting on options for BIM strategies at a corporate or project level</li> <li>• Designing and advising on collaborative strategies for the successful implementation of BIM on projects</li> <li>• Advising on the contractual and commercial implications of using BIM on projects</li> <li>• Advising on options for software and protocols on BIM projects</li> <li>• Advising on technical information systems requirements for BIM at corporate or project level.</li> </ul>

## Cadastre and land management

### Description of competency in context of this sector

This competency deals with assessing documents relating to the demarcation, registration and transfer of land in order to define, on the ground, the extent of legal and/or registered title. It involves the preparation of expert lucid reports for the legal profession and provision of opinions to the legal profession and property owners.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of field and office procedures for boundary and/or cadastral surveys appropriate to your national and/or international location. Understand legal and physical boundaries and provide examples of these. Understand the principles of land management.	Apply your knowledge of the principles of land registration, land management, administration and legislation related to rights in real estate internationally and nationally. Understand the relationship between the surveyor, client and legal profession and preparation of evidence for the legal process.	Provide evidence of reasoned advice, and fully understand the role and responsibility of an expert witness, on the resolution of disputes by litigation and alternative procedures.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• An understanding of the property registers in use</li> <li>• An understanding of all plans relating to the registration process</li> <li>• Limitations of national mapping</li> <li>• Definition of 'extent of registered title'</li> <li>• An understanding of paper-title [the deeds]</li> <li>• The status of a deed plan when referred to in the text of a deed</li> <li>• Understanding common law presumptions regarding property boundaries</li> <li>• Understanding the law relating to 'moving boundaries' accretion, erosion, foreshore.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Adopting appropriate scales for measured surveys to be used in cadastre</li> <li>• Choosing which documentation to rely upon</li> <li>• Practising with complete independence from the client</li> <li>• Requesting documents from the legal profession</li> <li>• Obtaining documents from the Land Registries</li> <li>• Using and interpreting of aerial photography and digital imagery</li> <li>• Reporting relevant matters back to the legal profession</li> <li>• Understanding of the requirements for determining boundaries.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Advising on the duty of an expert to the court</li> <li>• Preparing expert reports for use in litigation</li> <li>• Advising on the requirements of an expert witness within the civil procedure rules</li> <li>• Advising on the requirements and role of an expert at a 'meeting of experts'</li> <li>• Advising on the role of an expert at a 'conference with counsel'</li> <li>• Preparing for trial</li> <li>• Advising on the role of an expert during and after the trial</li> <li>• An appreciation of alternative dispute resolution options, particularly the differences and advantages/disadvantages when comparing mediation with arbitration.</li> </ul>

## Construction technology and environmental services

### Description of competency in context of this sector

This competency covers the design, engineering surveying and construction of buildings and other structures. Candidates should have a clear understanding of the design and construction processes commonly used in the industry. They should have detailed knowledge of construction solutions relevant to their projects. This competency is particularly useful for those practicing chartered engineering surveying pathway.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles of design and construction relating to your chosen field of practice.	Apply your knowledge to the design and construction processes.	Advise on the selection and application of particular processes within your area of experience. This should include liaison with specialists and consultants to develop project specific design and construction solutions.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• The stages of design from inception to completion</li> <li>• Impact of current legislation and regulations (both national and international) in particular Health and Safety regulations</li> <li>• How the various elements of the building work inter-relate</li> <li>• The process of constructing the works</li> <li>• Ability to adapt engineering surveying methods and instrumentation to particular construction processes/methods</li> <li>• Be aware of calibration and instrumentation/survey method limitations.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Understanding alternative construction details in relation to functional elements of the design such as different types of piling or structural frame solutions</li> <li>• Implement appropriate engineering surveying methods to project</li> <li>• Produce as built drawings/surveys to appropriate and agreed formats, scales, accuracies and output</li> <li>• Advise on monitoring, engineering surveying and survey techniques/methods.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Advising on the choice of construction solutions for your project</li> <li>• Reporting on the impact of different design solutions and construction processes on cost and programme.</li> </ul>



## Consultancy services

### Description of competency in context of this sector

This competency is about the provision of management consultancy services to a range of different clients from inception to completion. Consultancy can occur in all areas of geomatics but particularly within the areas of GIS, land management and cadastre, remote sensing/imagery, geodesy and marine survey. The geomatics emphasis is on a 'holistic' approach to projects and problem solving. This approach calls for a clear, defined and sometimes in-depth understanding of client needs. Within the context of the actual competency wording, for real estate, read geographic.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the procurement and execution of advisory and strategic consultancy services in the context of the real estate and construction sectors.	Apply your knowledge of the provision of consultancy services in the context of the real estate and construction sectors.	Give reasoned advice, prepare and present consultancy reports, together with relevant analysis to clients, in the context of the real estate and construction sectors.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• The consultancy cycle</li> <li>• The types of problems, risks and issues that may arise during each phase of the consultancy cycle</li> <li>• The importance of agreeing a clear contract with clients</li> <li>• The need for the planning, timing and managing of consultancy interventions</li> <li>• Managing the use of resources</li> <li>• Managing client expectations</li> <li>• Forms of reporting</li> <li>• Importance of confidentiality when dealing with sensitive information</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Preparing consultancy service plans</li> <li>• Preparing client briefs</li> <li>• Update reports to clients</li> <li>• Negotiating client contracts</li> <li>• Dealing with ethical dilemmas</li> <li>• Keeping appropriate records.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Providing reports containing strategic advice and recommendations to a range of clients</li> <li>• Presenting to clients</li> <li>• Implementing consultancy intervention.</li> </ul>

## Development/project briefs

### Description of competency in context of this sector

The purpose of development briefs is to stimulate interest in development sites whilst project briefs influence the form that a desired development will take. Both provide a framework for developers in the conception of major types of development schemes. Geomatics professionals can play a major role in the spatial and procedural aspects of development/projects briefs.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the information required to prepare a development brief or project brief.	Apply your knowledge to identify, select, assemble and analyse information relevant to the preparation of development briefs or outline project briefs.	Apply information in the preparation and presentation of development briefs or detailed design briefs, or parts thereof.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• The objectives of development/project briefs</li> <li>• Essential site details including history, location, accessibility, services and utilities</li> <li>• Environmental features and issues</li> <li>• The consultation process</li> <li>• The planning policy background</li> <li>• Market conditions</li> <li>• Be aware of relevant RICS guidance</li> <li>• Review land ownership documentation and boundary definition</li> <li>• Assess spatial data capture and output needs</li> <li>• Assess data needs (ie aerial survey, national mapping, planning portal, historical mapping etc).</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Producing a development/project brief understanding geospatial elements</li> <li>• Analysing gathered information and data for a development/project brief</li> <li>• Produce agreed specification and decide on survey needs</li> <li>• Review and highlight any legal constraints (ie easements, neighbour issues)</li> <li>• Advise on boundary issues including determined boundaries and as built surveys.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Using a development/project brief to design a development scheme</li> <li>• Negotiating agreements with stakeholder interests</li> <li>• Planning the implementation of a development scheme</li> <li>• Formulating financial arrangements for a development scheme.</li> </ul>

## Engineering surveying

### Description of competency in context of this sector

Engineering surveying is the art of determining, and/or setting-out the position of features on, above, or below the earth's surface to facilitate the design and construction of engineering projects, and buildings.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles of construction setting out, deformation and as-built surveys. Be fully conversant with all forms of construction drawings, plans and surveys.	Apply your knowledge on site and be aware of safety, site management procedures and civil engineering/ structural principles.	Plan, specify and give reasoned advice on engineering surveys; define and assess accuracies and tolerances; manage the engineering surveying element in large projects; and understand the principles of good engineering practice.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Types of ground markers, installation techniques and suitability for use</li> <li>Requirements for survey data capture and presentation for design purposes in your field of operation</li> <li>Setting-out techniques</li> <li>Understand the importance of comparison of designed and as-built spatial locations</li> <li>Be conversant with construction drawings, plans and surveys</li> <li>Understand site Health and Safety issues</li> <li>Understand basic principles of civil engineering, terminology and construction techniques.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Recognising options, choosing and justifying instrument suitability for use in engineering projects</li> <li>Understanding accuracies and errors and how they apply</li> <li>Checking the work of others</li> <li>Leading the work of teams and individuals</li> <li>Identifying hazards and undertaking risk assessments</li> <li>Producing method statements for site survey activities</li> <li>Communicating and presenting results of surveys to others.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Designing and supervising provision, observation, computation and checking of plan and height control</li> <li>Advising other construction/design professionals on all aspects of site measurement; contributing to project management team decision making</li> <li>Producing project resource plans and budgets for programmes of work</li> <li>Defining survey processes and assessing accuracy and tolerances of survey systems</li> <li>Managing the engineering survey element within a large project</li> <li>Understanding and analysing the impact of your decisions on all aspects of the project</li> <li>Implementing project Health and Safety strategy for site surveying elements of a project.</li> </ul>

## Environmental assessment

### Description of competency in context of this sector

This competency is about an understanding and application of the principles of environmental assessment, particularly Environmental Impact Assessment and Strategic Environmental Impact Assessment for projects, within the planning and regulatory framework.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of appropriate environmental assessment concepts, processes and systems. This should include responsibilities imposed by law, codes of practice and other regulations relating to environmental assessment.	Apply in practice your understanding of environmental assessment and the requirements for compliance, including undertaking an environmental assessment.	Provide evidence of reasoned advice including the preparation and production of reports based on appropriate environmental assessments.
<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Principles of Environmental Impact Assessment (EIA) and Strategic Environmental Impact Assessment (SIA) regulations arising from EC Directives and national/ local legislation</li> <li>Understand the data gathering processes needed for EIAs</li> <li>Demonstrate knowledge of where EA may apply and whether this involves formal or informal environmental assessment</li> <li>Understand the basic processes, procedures and requirements of formal EIA and SIA.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Advising on the need for environmental assessment, including EIA and SIA for development projects</li> <li>Advising on requirements and scope of EIA and the regulators' roles</li> <li>Integrating EIA with topographic mapping and other data sources to form a complete client brief.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Advising on the need and application of EIA, SIA and EA</li> <li>Co-ordinating and providing specialist advice on these, including negotiations with clients and regulators</li> <li>Preparing and compiling environmental statements and non-technical summaries for submission to clients and regulators, and other stakeholders.</li> </ul>

## Geodesy

### Description of competency in context of this sector

Geodesy is primarily concerned with positioning and the gravity field and geometrical aspects of their temporal variations, although it can also include the study of the earth's magnetic field. Geodesy can be divided in geomensuration, which is concerned with measuring the earth on a global scale, and surveying, which is concerned with measuring parts of the surface. Geodesy is a primary skill set of all chartered land and hydrographic surveyors.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles of geodesy, Global Navigation Satellite Systems, global/regional/national geodetic reference systems, geoids, datums and projections.	Apply your knowledge in practice, specify and plan surveys and instrumentation needs. Be aware of error sources and 'fitness for purpose' of data. Use industry standard software and apply network adjustments and/or transformations.	Provide evidence of reasoned advice on advanced practice and planning. Use advanced software and carry out adjustments and analysis. Advise on client specifications and final product needs.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Understand the difference between geoid and ellipsoid</li> <li>• Being aware of the differences between types of projections, with their advantages and disadvantages</li> <li>• An appreciation of the applications and limitations of Global Navigation Satellite System (GNSS), with particular emphasis on GPS</li> <li>• Be aware of the definition of a datum, and the existence of datums relevant to the location of the candidate.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Understanding the various modes of GNSS (GPS) positioning (static, rapid static, kinematic, real-time kinematic)</li> <li>• Understanding the levels of accuracy achievable, equipment, data collection and processing strategies required for a variety of surveying/engineering tasks including: topographic survey, setting out, control establishment</li> <li>• Planning and executing relevant GNSS (GPS) surveys to appropriate levels of accuracy, including data processing</li> <li>• Using standard commercial GNSS (GPS) processing packages and appropriate transformation routines to transform GPS based coordinates to National datums.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Understanding differences between various orbit products, where to obtain and when to apply</li> <li>• Being able to select and apply appropriate models/estimation strategies within commercial GNSS (GPS) processing software eg tropospheric estimation</li> <li>• Being able to advise clients on detailed design, observation and processing requirements for high precision or large scale projects</li> <li>• Producing and commenting final processing reports and comment from a strong knowledge base on levels of achieved accuracies</li> <li>• Supervising and training junior colleagues in the field use of GPS equipment and data processing techniques.</li> </ul>

## GIS [Geographical Information Systems]

### Description of competency in context of this sector

A GIS uses computer technology to integrate, manipulate and display a wide range of information to create a picture of an area's geography, environment and socio-economic characteristics. Beginning with a computerised topographic map as its base, a GIS overlays and integrates graphic and textual information from separate databases. The end result is a tool that can support decision making and problem solving and provide almost instantaneous answers to complex questions.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
<p>Demonstrate knowledge and understanding of the principles of geographic information science and systems. Be aware of industry standard GIS, data structures, types and their applications, and of appropriate capture and output systems.</p>	<p>Apply your knowledge and assess data quality; define and use appropriate input and data transfer methods; analyse data and prepare databases; identify digital data sources and assess 'fitness for use'. Understand and be aware of national and international data standards.</p>	<p>Assess clients' needs and advise them accordingly. Define specifications including data and process modelling, customise systems, carry out advanced spatial analyses, and manage data and observe data standards.</p>
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Understand and be able to explain the generic concepts in GIS appropriate to different audiences</li> <li>Compare and contrast different commercial GIS software packages and explain their relative merits</li> <li>Proficiently operate at least one commercially available off-the-shelf GIS software package eg create, store, access, view, analyse and plot spatial data</li> <li>Understand and be able to describe the data types and data structures used for spatial data and explain their relative merits</li> <li>Understand and be able to explain different open source and proprietary data formats and explain their relative merits</li> <li>Understand and be able to describe the different methods of primary, and especially secondary, data capture and their underpinning technologies</li> <li>Understand and be able to describe the different output options and their underpinning technologies</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Specifying capture methods appropriate to the data source and the application, explaining and justifying the rationale used</li> <li>Managing data capture projects and providing quality control over the acquisition of spatial data for use in GIS</li> <li>Understanding the principles underlying the analysis of spatial data and implement these with typical GIS algorithms using standard functionality and/or a high level programming language</li> <li>Applying query languages in relation to database management systems eg data modelling, data loading, data maintenance, query, translate data formats, data export.</li> <li>Identifying, assessing and sourcing datasets appropriate to user requirements and assessing their quality and fitness for purpose in the context of quantitative and qualitative measures such as: spatial resolution, accuracy/precision, temporal resolution, purpose of original capture etc</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>Designing and conducting user requirements analysis at consultancy level</li> <li>Analysing and synthesising user requirements into a coherent and convincing strategy</li> <li>Presenting, explaining and justifying findings and advice in a language appropriate to the customer</li> <li>Defining data standards to meet specific user requirements</li> <li>Analysing customer processes and presenting options to model these as appropriate with respect to availability of resources, criticality and customer expectations</li> <li>Customising GIS software using a high level programming language in order to implement data specifications, data models, process models etc</li> <li>Analysing, defining and implementing appropriate analytical methods</li> </ul>

continued on next page

GIS [Geographical Information Systems] continued

## Examples of likely knowledge, skills and experience at each level

Level 1	Level 2 [cont.]	Level 3 [cont.]
	<ul style="list-style-type: none"> <li>• Understanding international de jure and de facto industry standards and how these apply in local jurisdictions and to local customs and practices</li> <li>• Understanding metadata for third party datasets and be able to prepare, creating and maintaining appropriate metadata for new datasets.</li> </ul>	<ul style="list-style-type: none"> <li>• Defining appropriate data management standards with respect to; currency requirements, conflict resolution, archiving, availability, backup and recovery, system resilience etc</li> <li>• Explaining all of the above in the context of the customer's wider information systems</li> <li>• Identifying and explaining the implications and limitations of advice with respect to any of the above</li> <li>• Preparing project proposals and draft tender documentation for system procurement, conducting benchmark tests, and overseeing implementation programmes.</li> </ul>

## Ground engineering and subsidence

### Description of competency in context of this sector

Understanding of rock and soil mechanics and how these are applied to ground and slope stability problems. Understanding of natural and mining induced subsidence in terms of causation, effect, mitigation and remedies. Understanding of the methodology of large scale metrology (LSM), deformation monitoring and advising on appropriate instrumentation and survey methods.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Undertake appropriate investigations including site inspection to research site history and geology.	Collate, analyse and interpret information gathered after initial research.	Provide evidence of reasoned advice, prepare and present reports.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• An understanding of soil and rock properties</li> <li>• An understanding of causation of natural and mining induced subsidence</li> <li>• Monitoring ground movement in a subsidence area using agreed/specified survey instrumentation and methods</li> <li>• Monitoring the effect of ground movement on a building/structure</li> <li>• Be aware of calibration issues, ISO documentation and relevant RICS guidance and client guides.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Designing and implementing (in accordance with client brief) a monitoring survey scheme</li> <li>• Investigating geological and mining records to produce a report on causation of ground movement</li> <li>• Examining the options for minimising the risk of ground movement</li> <li>• Examining the amount of ground movement expected and the strains induced using appropriate LSM methods</li> <li>• Being fully aware of calibration issues and instrument capabilities</li> <li>• Producing a full statistical analysis of tall survey work, advising on appropriate output.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Producing a report on slope instability recommending means of minimising risk</li> <li>• Assisting with the preparation of an expert witness report on ground engineering/subsidence</li> <li>• Analysing the results of ground movement monitoring and producing a report with conclusions</li> <li>• Evaluating the options for treating subterranean voids and mine outlets and recommending a course of action.</li> </ul>



## Hydrographic (marine) surveying

### Description of competency in context of this sector

Hydrographic surveying involves precise positioning and data acquisition in marine environments ranging from inland waters and rivers, to ports and the deep oceans. This competency involves the ability to provide precise three-dimensional position and measurement of various physical features within the marine environment such as bottom depth and structure, currents, tides and waves.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate a working knowledge and understanding of the principles and limitations of hydrographic survey. Conduct measurements in the marine environment.	Plan the conduct of marine surveys. Be fully aware of safety issues. Specify appropriate instrumentation and ensure correct calibration. Understand the principles of geodesy on a local and international basis, and its application in a marine environment. Fully understand the principles, application and limitations of navigation, geophysical and marine survey instrumentation and software.	Assess the client's needs and define specifications, tenders and/or contracts. Manage marine surveys. Analyse the data collected and use it to prepare reports and briefings. Be conversant with the International Law of the Sea and/or maritime boundaries.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Providing navigation and data collection for oil, gas and mineral resource exploration and extraction</li> <li>• Conducting data collection for environmental monitoring, aquaculture and oceanographic research</li> <li>• Providing surveying support for dredging, coastal works, near-shore and/or off-shore construction projects</li> <li>• Quality control and processing of hydrographic data</li> <li>• Presenting hydrographic data using a range of paper (chart) and electronic formats.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Being actively involved in project initiation and execution as senior surveyor/navigator, including assessment of survey requirements, equipment specifications and suitability</li> <li>• Conducting safety risk assessments and reviewing project safety plans for various activities</li> <li>• Being responsible for, and ensuring that, equipment is fully calibrated and understanding the importance of calibration methods and the relationship to data quality</li> <li>• Ensuring geodetic parameters specified for the project are correctly defined and implemented within acquisition software.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Assuming full responsibility for the initiation of the works in accordance with the approved project specific and standard survey procedures, customer requirements and technical specifications</li> <li>• Preparing tender documents and being responsible for financial control of projects</li> <li>• Liaising and advising clients regarding contract execution and having overall responsibility for the successful performance of the technical team</li> <li>• Evaluating and presenting survey results and advising clients with respect to survey findings</li> <li>• Assisting clients with their further requirements and helping develop future potential</li> <li>• Advising clients on national/ international policy and legislation and its influence on survey activities.</li> </ul>

## Legal/regulatory compliance

### Description of competency in context of this sector

Legal issues are at the heart of many areas of traditional land survey practice. All land surveyors should have a good working knowledge of any legislation which may impact on their work whether it be health and safety legislation in engineering surveying, land law and/or cadastral regulations or the law of the sea. Although land/engineering/hydrographic surveyors are not asked to be expert in legal matters, some are and many add expert witness training to their skillsets. For many international members and prospective members, this competency will be especially applicable in a cadastral context.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of any legal/regulatory compliance requirements in relation to your area of practice.	Apply your knowledge to comply with legal/regulatory requirements in specific situations within your area of practice.	Provide evidence of reasoned advice, prepare and present reports on legal/regulatory compliance requirements in relation to your area of practice.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Be aware of the legislative needs of land and marine survey work</li> <li>• Be aware and understand the basics of land law as applicable in your geographic location</li> <li>• Be aware of legislative strictures such as health and safety legislation and/or traffic management</li> <li>• Be aware of tort/contract law and its basic principles as applicable in your geographical area</li> <li>• Be aware of national land registration issues/legislation and cadastral laws.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Apply your knowledge of land law in an international/national and/or regional scenario</li> <li>• Apply your legal knowledge in a professional scenario such as a minor boundary dispute</li> <li>• Be aware of all relevant and applicable RICS guidance and practice notes in this area [such as Expert Witness]</li> <li>• Be aware of expert witness training</li> <li>• Apply your knowledge in a cadastral context.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Apply your legal knowledge in a court scenario</li> <li>• Prepare legal reports</li> <li>• Advise on legislative obligations [Health and Safety etc] to clients</li> <li>• Advise clients of survey and mapping issues in combination with legal advice in boundary disputes</li> <li>• Advise on other types of dispute such as party walls, right to light and subsidence</li> <li>• Advise courts of mapping issues, explain complex surveying problems [map accuracy for example] to legal professionals</li> <li>• Carry out cadastral surveys in compliance with national/regional legislation.</li> </ul>

## Management of the natural environment and landscape

### Description of competency in context of this sector

This competency is about the management of landscape and natural resources and habitat.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the importance and role of nature conservation and the landscape in real estate, business management and development.	Apply your knowledge of nature conservation and landscape in the management of real estate and development.	Provide evidence of reasoned advice, write reports and negotiate on all matters relating to nature conservation and landscape.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Landscape and designations and agri-environmental schemes</li> <li>• Relevant legislation governing designation schemes</li> <li>• Bodies charged with bringing in and delivering such legislation</li> <li>• Understand legislative drivers behind Sites of Special Scientific Interest (SSSI's) and other designated areas</li> <li>• Understand the impact of spatial data and land law on conservation and the natural environment.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Advising on grants available for protection of landscape and natural habitat and natural resources</li> <li>• Advising on mapping and survey specifications relating to nature conservation and landscape</li> <li>• Advising on spatial issues which may impact on nature conservation (ie rights of access).</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Providing strategic advice on land use, management practice, and management of specific habitats and species</li> <li>• Interpreting and filtering advice</li> <li>• Providing balanced report writing to provide over-arching view of management of a landscape.</li> </ul>

## Mapping

### Description of competency in context of this sector

Mapping, in this context, is an exceptionally broad potential area of practice. Encompassing everything from LIDAR, IFSAR, aerial photography and other primary data capture techniques to ground control using GPS and/or traditional techniques and the production of digital elevation models, DTMs or any form of geographical output including GIS data capture and output.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles of mapping and geographic information sciences appropriate to your area of practice. Be aware of accuracy, scale, currency and fitness for purpose of hardcopy and/or digital maps, drawings, imagery and plans.	Apply your knowledge of mapping and geographical sciences in relation to your area of practice.	Provide evidence of reasoned advice on the design and specification of mapping and/or geo-information projects in a national and/or international context.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Full awareness of data capture techniques and the knock on effects regarding accuracy and precision</li> <li>• Awareness of instrument checking techniques</li> <li>• Awareness and understanding of the basic principles of geodesy and its application to mapping according to your area of practice</li> <li>• Knowledge and use of basic survey software.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Using post processing survey/mapping software competently</li> <li>• Using digital terrain modelling/digital elevation models</li> <li>• Understanding the principles of data integration and compatibility, integrating different data sets to achieve client needs</li> <li>• Understanding scalability in the context of both mapping and user requirements</li> <li>• Using imagery software and GIS data capture tools</li> <li>• Using modern survey instrumentation and understanding checking/calibration techniques.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Using all forms of survey/mapping/imagery contracts competently and describing the nuances of each [ie accuracy/fitness for purpose issues]</li> <li>• Being fully conversant with all RICS Geomatics specifications and guidance in relation to mapping</li> <li>• Explaining complex mapping issues to clients and discerning their 'actual' needs.</li> </ul>

## Measurement of land and property

### Description of competency in context of this sector

This competency is relevant to all data capture and surveying/measurement areas of practice. Particularly, land survey, engineering survey and measured building survey.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles and limitations of measurement relevant to your area of practice.	Apply your knowledge to undertake measurement. Use basic and/or advanced instrumentation to collect data. Present appropriate information gained from measurement.	Evaluate, present, manage, analyse data and/or apply spatial data and information. Show an advanced understanding of accuracy, precision and error sources.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Be aware of all checking procedures and be able to ascertain the suitability of different instrumentation and measurement techniques</li> <li>• Understand the principles of error sources</li> <li>• Understand data capture techniques and limitations of use</li> <li>• Understand and use different basic survey instrumentation [EDMs, automatic levels, lasers etc]</li> <li>• Understand the principles of data representation and the use of appropriate data capture techniques to achieve agreed survey output.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Using advanced data capture instrumentation such as reflectorless EDM, GPS, handheld GIS data capture tools etc</li> <li>• Understanding the principles of measured building surveying and its outputs</li> <li>• Understanding the differences between different data capture techniques and their fitness for purpose</li> <li>• Producing final output and utilising post processing techniques</li> <li>• Understanding specifications and guidance.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Being fully conversant with all RICS geomatics specification and guidance and other official RICS guidance as appropriate to your area of practice</li> <li>• Appreciating all legislative issues such as health and safety</li> <li>• Advising on appropriate data capture techniques</li> <li>• Explaining complex survey data capture techniques and terminology to clients</li> <li>• Describing the principles of meta data and property data information and compatibility.</li> </ul>

## Planning

### Description of competency in context of this sector

The planning system plays a vital role in the opportunities available for any potential development scheme. Planning and development is one of the primary client areas for geomatics professionals. Geomatics has a vital role to play in any successful development.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles of planning.	Apply your knowledge to matters relevant to the planning process.	Give reasoned advice, including the preparation and presentation of reports on planning matters, brief other professional consultants and understand the application of specialist knowledge to the resolution of planning problems.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• The purpose of the planning system</li> <li>• The importance of the strategic planning framework</li> <li>• The decision making process on planning applications</li> <li>• The need for accurate, current and coherent spatial information</li> <li>• Advise on possible needs for client visualisation/digital representation of proposed development.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Completing the submission of planning applications</li> <li>• Applying pre-consultation and negotiation processes to the planning application process</li> <li>• Participating in the formulation of spatial planning strategies</li> <li>• Interpreting strategic planning policies</li> <li>• Advising on submission of registration documentation and boundary issues [eg implications of determined boundaries]</li> <li>• Advising on submission of as built, third party body to other agencies [eg ordnance survey]</li> <li>• Advising on spatial representation of developments.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Producing viability/feasibility reports</li> <li>• Providing reasoned client advice on planning applications including advice on appeals</li> <li>• Advising clients on reasonableness of planning conditions and involvement in related negotiations</li> <li>• Justifying environmental and other impact assessments</li> <li>• Overseeing the work of external consultants such as architects or engineers etc.</li> </ul>

## Project administration

### Description of competency in context of this sector

This competency concerns the contractual, legislative/statutory and other processes required to administer a project. It also covers the reporting and information management systems for projects such as medium/small scale mapping projects, high tech data capture and integration projects and large scale engineering survey projects. This competency is particularly applicable for geomatics professionals who are expected to data manage and integrate multiple data source and capture techniques.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of contractual, legislative and statutory terminology/requirements in the management of a project.	Implement management procedures necessary for the smooth running of a project.	Advise on the management procedures necessary for the smooth running of a project including document control techniques and systems, meetings and reporting procedures.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• An understanding of the principles of contractual, legislative and statutory requirements of projects</li> <li>• An understanding of the principles of document control requirements and information management systems</li> <li>• An understanding of the administrative processes and management reporting requirements associated with a project.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Identifying and implementing the contractual, legislative and statutory requirements needed for a development project including any collateral documents eg. insurances, warranties etc.</li> <li>• Managing document control and information management systems</li> <li>• Managing management reporting systems</li> <li>• Liaising with other professionals.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Advising on the contractual, legislative and statutory requirements for a development project</li> <li>• Advising on and designing document control and information management systems</li> <li>• Advising on and designing management reporting systems</li> <li>• Providing guidance on project organisation structures.</li> </ul>

## Property records/information systems

### Description of competency in context of this sector

This competency relates to the records that a country keeps and maintains to support its own system of the registration of rights in its land. It requires knowledge and understanding of the systems in use in one country, usually the country in which the candidate works.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the factors required for property records/information systems, including the sourcing and collation of data.	Demonstrate your ability to apply knowledge to analyse data and assemble it for use in a database.	Demonstrate your ability to extract data from property records/ information systems in order to use and present data for specific purposes.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Difference between deeds/registered titles</li> <li>• General/surveyed boundaries</li> <li>• Supporting maps/plans</li> <li>• Legal documentation</li> <li>• Index maps</li> <li>• Electronic records.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Interpreting plan/map data</li> <li>• Commissioning surveys/field investigation</li> <li>• Interpreting legal language in relation to property records</li> <li>• Accessing legal advice</li> <li>• Writing clear and factual reports on the results of surveys/field investigations</li> <li>• Ensuring security of data.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Retrieving data from existing records, manual or electronic</li> <li>• Advising on security of data</li> <li>• Preparing briefs for legal advice</li> <li>• Writing reports on contentious cases</li> <li>• Preparing clear and factual reports and letters to clients</li> <li>• Preparing information for the adjudicator</li> <li>• Explaining the adjudication process and the information required.</li> </ul>



## Remote sensing and photogrammetry

### Description of competency in context of this sector

Remote sensing and photogrammetry are activities and methods within the Geomatics profession related to provision of spatial information. This involves using photographs and digital imagery to provide information about the Earth's surface and changes which occur within the landscape. It also covers the science and technology of making precise measurements on the imagery to model, in three dimensions, the landscape and features or structures on the Earth's surface.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles of remote sensing and photogrammetry (both aerial and terrestrial).	Apply your knowledge and be aware of scales, camera and satellite principles and different data capture techniques. Understand and undertake procedures for routine data capture, and analyse and/or adjust/transform data. Use standard industry software.	Provide evidence of fit-for-purpose advice on client requirements. Identify and assess client specifications. Use advanced industry software and advise on data transfer and/or format.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Principles of photogrammetry               <ul style="list-style-type: none"> <li>– Camera geometry – scales, precision, ground sample distance</li> <li>– Properties of photography – principal point, radial properties</li> </ul> </li> <li>• Principles of remote sensing               <ul style="list-style-type: none"> <li>– Sensors – geometric characteristics</li> <li>– Image processing</li> </ul> </li> <li>• Types of imagery, the source of acquisition, and their practical application               <ul style="list-style-type: none"> <li>– Remote sensed data – infra-red, panchromatic, colour, thermal</li> <li>– Stereo photography and the requirements to achieve 3D measurement</li> <li>– Oblique photography</li> <li>– Ortho-photography (true, ortho-rectified, Geo-rectified).</li> </ul> </li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Interpreting of specifications</li> <li>• Setting up equipment – resolving interior and exterior orientations</li> <li>• Providing ground control – aerial triangulation</li> <li>• Digital Surface Modelling – techniques</li> <li>• 3D data capture.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Providing reasoned advice on tenders and contracts</li> <li>• Comparing and advising on benefits of alternative methodology</li> <li>• Project design and drafting of quality plans and method statements</li> <li>• Project and contract management</li> <li>• Producing reports, error detection and analysis.</li> </ul>

## Spatial data capture and presentation (advanced mapping)

### Description of competency in context of this sector

This competency is directly related to the mapping competency but puts more emphasis on the specifics behind data capture and visual representation [this also includes mathematical representation in the form of graphs, spreadsheets etc].

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate knowledge and understanding of the principles and basic working practices of data capture, digital and/or graphical cartography and mapping.	Apply your knowledge of data capture error sources, instrument calibration and limitations. Use mapping/cartographic survey software, understand production processes and digital data capture [scanning and/or digitisation], and carry out surveys through to end product.	Provide evidence of reasoned advice on cartographic, data management and data capture, mapping specifications and survey tenders.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Be fully aware of the limitations of use of spatial data capture instrumentation and techniques</li> <li>• Understand the issues around visual representation of spatial data and its relationship with data capture techniques</li> <li>• Understand scalability, fitness for purpose and accuracy constraints</li> <li>• Use basic data capture instrumentation and technology and use basic checking techniques</li> <li>• Understand data quality and checking criteria.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• A good understanding of error sources, probability and statistical analysis according to your area of practice</li> <li>• Using survey industry standard software and post processing techniques</li> <li>• Being fully conversant with the production of digital terrain models, digital elevation modelling and data integration techniques [overlying OS map layers with surveyed topographical data for example]</li> <li>• Understanding survey contracts and specifications [in conjunction with senior colleagues].</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Explaining complex mapping/surveying issues to clients</li> <li>• Responding to client needs appropriately</li> <li>• Being fully conversant with all RICS geomatics specifications and guidance according to your area of practice.</li> </ul>

## Surveying land and sea

### Description of competency in context of this sector

This competence covers aspects of both terrestrial and marine surveying. It involves the collection, processing, analysis and dissemination of geospatial data.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
<p>Demonstrate knowledge and understanding of the principles of geomatics and the various applications of its techniques within the natural, maritime and built environments.</p>	<p>Apply your knowledge by identifying, planning and accessing survey requirements, specifications and appropriate instrumentation. Use industry standard survey and/or offshore software, and demonstrate an understanding of the principles, uses and limitations of Global Navigation Satellite Systems and other navigation systems.</p>	<p>Define and assess client needs. Define specifications and prepare tenders and/or contracts. Demonstrate that you are fully conversant with the principles of geodesy on a national, international and/or maritime basis.</p>
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Conducting marine navigation and offshore data collection for exploration and exploitation purposes</li> <li>• Collecting and quality controlling spatial data for control networks and/or topographic detail surveys</li> <li>• Conducting engineering surveys to provide dimensional control, setting out and QA checks for the construction industry</li> <li>• Collecting and/or manipulating data for a specific use within a Geographic Information System</li> <li>• Conducting Photogrammetric measurements (2D or 3D) from photographs or imagery stored electronically.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Being responsible for and ensuring that survey equipment is fully calibrated, and understanding the importance of calibration methods and the relationship to data quality</li> <li>• Undertaking post-process GNSS observations and performing adjustments within a network</li> <li>• Performing datum transformations and understanding the relationship between local datum and global datums</li> <li>• Being involved in project initiation and execution as Senior Surveyor including assessment of survey requirements, equipment specifications and suitability</li> <li>• Working directly with program managers, software development engineers, and testers to write documentation that helps customers understand and use a GIS system.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Assuming full responsibility for the initiation of a survey in accordance with the approved project specific and standard survey procedures, customer requirements and technical specifications</li> <li>• Sourcing, managing and assessing survey contractors performing work on your behalf</li> <li>• Helping to create the overall direction, strategy, and coordination for the business development and marketing of a GIS product and service</li> <li>• Advising clients upon coastal processes and the potential impact of any activity and/or construction in the nearshore environment.</li> <li>• Advising clients on national/ international policy and legislation and its influence on survey activities.</li> </ul>

## Use of the marine environment

### Description of competency in context of this sector

This competency covers the wide range of sea area usage; application of national and international legislation; conducting data acquisition and analysis. It also involves presentation professional and scientific reports, assisting in sea area evaluation and the preparation of planning applications. Additionally it incorporates assistance provided to clients in respect of marine exploitation, with due regard to the environment.

### Examples of likely knowledge, skills and experience at each level

Level 1	Level 2	Level 3
Demonstrate an understanding of the principles of inshore and offshore resource development, exploitation and/or conservation. Be aware of the relevant legal guidance and environmental issues.	Apply these principles to planning for the exploitation and/or use of marine resources. Use appropriate marine data capture and analysis software and/or instrumentation.	Oversee the conduct of operations to use and/or exploit marine resources. Analyse the data collected and prepare reports and briefings on the data collected. Advise on national and international policy on ocean and inshore resource management.
<p>Examples of knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Be aware of the global distribution of physical, biological and chemical resources within the sea, upon and beneath the seabed that may be of value to humankind</li> <li>• Understand ethics and international/national legislation affecting sea areas</li> <li>• Understand the role of economic markets, property rights and market structures</li> <li>• Appreciate the range of sea area utilisation and the concept of conflict management</li> <li>• Appreciate the concepts of sustainable development.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Determining appropriate assessment techniques for sea area valuation</li> <li>• Planning and executing a marine survey in order to determine economic yield, seabed topography, ecology and/or geophysical structure</li> <li>• Undertaking water quality and movement observations and analysis</li> <li>• Appreciating the application and limitations of different data acquisition equipment</li> <li>• Displaying acquired data within a range of paper and electronic media formats.</li> </ul>	<p>Examples of activities and knowledge comprised within this level are:</p> <ul style="list-style-type: none"> <li>• Liaising with and advising clients on project planning</li> <li>• Conducting project management both pre, post and during development projects</li> <li>• Evaluating and presenting survey results with respect to planned sea area usage within scientific reports</li> <li>• Advising clients in lay terms on project findings</li> <li>• Assisting clients in the development of their future plans</li> <li>• Applying national and international policy to future developments.</li> </ul>



## Confidence through professional standards

RICS promotes and enforces the highest professional qualifications and standards in the development and management of land, real estate, construction and infrastructure. Our name promises the consistent delivery of standards – bringing confidence to the markets we serve.

We accredit 118,000 professionals and any individual or firm registered with RICS is subject to our quality assurance. Their expertise covers property, asset valuation and real estate management; the costing and leadership of construction projects; the development of infrastructure; and the management of natural resources, such as mining, farms and woodland. From environmental assessments and building controls to negotiating land rights in an emerging economy; if our members are involved the same professional standards and ethics apply.

We believe that standards underpin effective markets. With up to seventy per cent of the world's wealth bound up in land and real estate, our sector is vital to economic development, helping to support stable, sustainable investment and growth around the globe.

With offices covering the major political and financial centres of the world, our market presence means we are ideally placed to influence policy and embed professional standards. We work at a cross-governmental level, delivering international standards that will support a safe and vibrant marketplace in land, real estate, construction and infrastructure, for the benefit of all.

We are proud of our reputation and we guard it fiercely, so clients who work with an RICS professional can have confidence in the quality and ethics of the services they receive.

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