RICS GUIDANCE NOTE

NRM 3

New rules of measurement

Order of cost estimating and cost planning for building maintenance works

RICS®

2nd edition UK
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NRM 3: ORDER OF COST ESTIMATING AND COST PLANNING FOR BUILDING MAINTENANCE WORKS

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Contents

Acknowledgment of copyright

The project stages from the *RIBA Plan of Work 2020* are reproduced here in section 1.2 with the permission of the Royal Institute of British Architects (RIBA).

NRM 3: Order of cost estimating and cost planning for building maintenance works recommends the use of *Life Expectancy of Building Components* (2nd revised edition, 2006), copyright of the Building Cost Information Service (BCIS). One of the tables and component life data and factors to be considered has been reproduced here as Table 5.3 with the permission of BCIS.

The scope of cost categories and definitions for maintenance works and life cycle costing, included in Appendix B, are copyright of the British Standards Institution (from BS 8544 Table 2: Cost categories and definitions for maintenance and life cycle costing) and are reproduced with the permission of BSI. Permission to reproduce extracts from British Standards is granted by BSI Standards Limited (BSI). No other use of this material is permitted. British Standards can be obtained in PDF or hard copy formats from the **BSI online shop**.

The calculation template and rules of measurement in Table 5.4 for producing an annualised maintain cost plan from asset registers and applicable planned preventative maintenance task schedules are reproduced here with the permission of the Building Engineering Services Association (BESA, formerly HVCA).

These rules recommend the use of 'Economic life factors and methodology regarding economic service life data for the building engineering services', provided in CIBSE *Guide M – Maintenance engineering and management*, copyright of the Chartered Institution of Building Services Engineers (CIBSE), and some of the methodology has been reproduced here in section 5.3 with the permission of CIBSE.

RIBA and OGC Gateway process

In order to maintain consistency with NRM 1, the *RIBA Plan of Work 2020* and the OGC Gateway have been used as the reference sources in this guidance note. It is recommended that practitioners refer to a current and recognised industry plan of work when undertaking cost estimating and cost planning services. If applicable, practitioners should also pay attention to the provisions of ISO 19650 (the successor to PAS 1192) regarding the cost management interface with building information modelling (BIM).

Introduction to NRM

New rules of measurement (NRM) is a suite of documents written to provide a standard set of measurement rules that are understandable by anyone involved in a construction project. They comprise rules for the measurement of the construction, repair, renewal, maintenance and demolition of built assets.

The suite provides essential guidance to all those involved in the cost management of construction projects.

The NRM suite comprises the following three volumes:

- *NRM 1: Order of cost estimating and cost planning for capital building works*
- *NRM 2: Detailed measurement for building works*
- *NRM 3: Order of cost estimating and cost planning for building maintenance works*.

The main reason for the new edition of NRM is the publication of:

- **International Cost Management Standard (ICMS): Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions**
- **International Property Measurement Standards** (IPMS)
- **Cost prediction**, RICS professional statement
- *RIBA Plan of Work 2020* and
- *RIBA Digital Plan of Work* (DPoW).

RICS professional standards and guidance

RICS guidance notes

Definition and scope

RICS guidance notes set out good practice for RICS members and for firms that are regulated by RICS. An RICS guidance note is a professional or personal standard for the purposes of *RICS Rules of Conduct.*

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Document status defined

The following table shows the categories of RICS professional content and their definitions.

Publications status

Type of document	Definition
RICS Rules of Conduct for Members and *RICS Rules of Conduct for Firms*	These Rules set out the standards of professional conduct and practice expected of members and firms registered for regulation by RICS.
International standard	High-level standard developed in collaboration with other relevant bodies.
RICS professional statement (PS)	Mandatory requirements for RICS members and RICS-regulated firms.
RICS guidance note (GN)	A document that provides users with recommendations or an approach for accepted good practice as followed by competent and conscientious practitioners.
RICS code of practice (CoP)	A document developed in collaboration with other professional bodies and stakeholders that will have the status of a professional statement or guidance note.
RICS jurisdiction guide (JG)	This provides relevant local market information associated with an RICS international standard or RICS professional statement. This will include local legislation, associations and professional bodies as well as any other useful information that will help a user understand the local requirements connected with the standard or statement. This is not guidance or best practice material, but rather information to support adoption and implementation of the standard or statement locally.

Introduction

NRM 3 provides a structured basis for measuring building maintenance works and presents a consistent approach for dealing with other key cost components associated with a building project when preparing order of cost estimates and elemental cost plans. It provides an elemental work breakdown structure (WBS), a cost breakdown structure (CBS), and a codification framework that has been designed for use with both projects using BIM and those using traditional design approaches. The codification framework allows for cost plans to be initiated using the traditional elemental approach, and then for components and subcomponents (and their associated costs) to be reallocated to work packages for tendering purposes. This simplifies the reconciliation of actual costs against cost targets and facilitates management of the cost limit (i.e. the client's project budget).

NRM 3 is linked to the *International Property Measurement Standards* (IPMS) – both IPMS 1 (external) and IPMS 2 (internal), which set the rules for measuring gross external floor areas (GEFA) and gross internal floor areas (GIFA), respectively.

NRM 3 can also be mapped to *ICMS: Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions*, a principles-based international standard that provides consistency in classifying and analysing and presenting global construction cost data at a project, regional, state, national or international level.

In addition, NRM 3 incorporates the principles of cost prediction reporting set out in the current edition of **Cost prediction**, RICS professional statement. RICS members and RICS-regulated firms must adhere to these principles when producing cost prediction reports. Table 1.1 (see section 1.2) shows how the information stages specified in that professional statement align with the formal cost estimating and cost planning stages and various plans of work. RICS members and RICS-regulated firms must adhere to the cost prediction reporting requirements defined in the professional statement.

NRM 3 also takes account of both the *RIBA Plan of Work 2020* and the RIBA DPoW. The NRM 1 and NRM 3 estimating and formal cost planning stages have been aligned to both these frameworks, as well as with the OGC Gateway Process, which is still used by some public sector organisations.

ICMS: Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions

ICMS: Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions (ICMS) is a principles-based international standard that sets out how to classify, define, measure, record, analyse, present and compare construction project life cycle costs in a structured and logical format.

It provides a high-level structure and format for classifying, defining, measuring, recording, analysing and presenting construction and other life cycle costs, which is to be applied worldwide. It promotes consistency and transparency across international boundaries.

ICMS is a construction and life cycle cost classification tool and therefore does not include detailed measurement rules for building components, systems and installations. Detailed measurement in connection with order of cost estimates and cost plans is to be in accordance with NRM 1, and whole life costs (e.g. renewal, maintenance and operational costs) in accordance with NRM 3.

The NRM 1 and NRM 3 elemental cost breakdown structure can be mapped to the ICMS high-level cost structure. ICMS mapping can be done at Level 4 (Cost sub-group level) to the NRM 1 elemental cost breakdown structure (elemental classification) as shown in Figure 0.1. A PDF version of Appendix A of the **ICMS User Guide** is available as an Excel version from the **RICS website**.

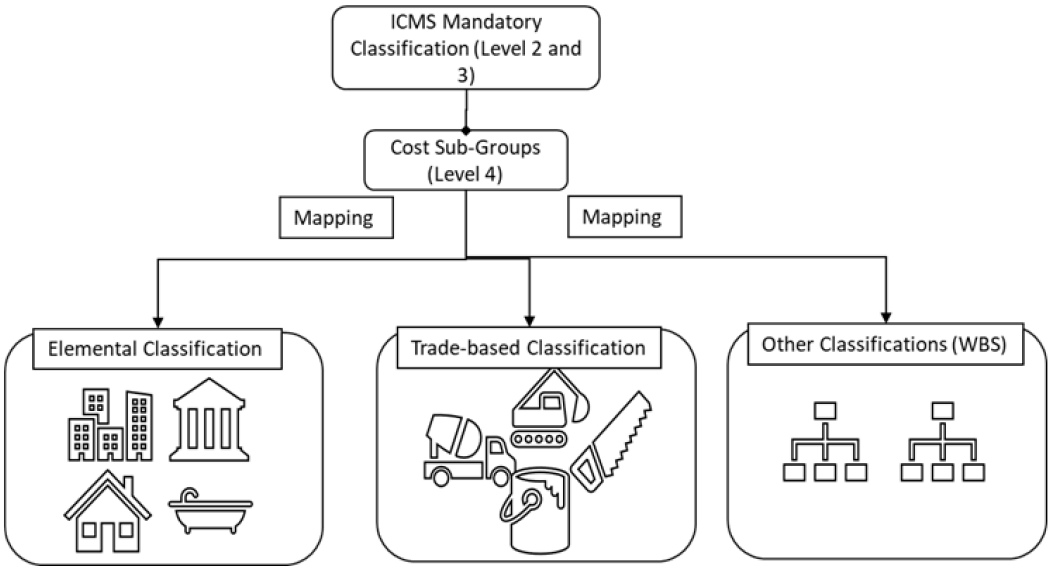

Figure 0.1: ICMS mapping

The hierarchy of the various documents in the suite is:

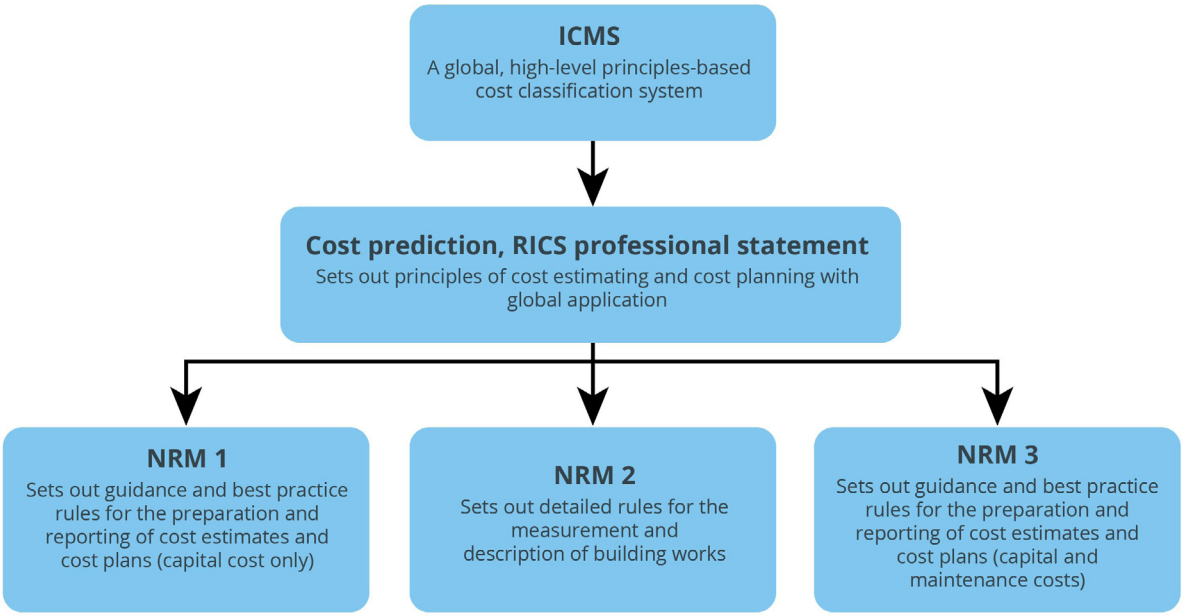

Figure 0.2: NRM hierarchy

Glossary

Symbols used for measurement	
ft²	square foot
ha	hectare
kg	kilogramme
kN	kilonewton
kW	kilowatt
m	linear metre
m²	square metre
m³	cubic metre
mm	millimetre
nr	number
t	tonne
∑	sum of

Abbreviations	
AEC	Annual equivalent cost
AIRR	Adjusted internal rate of return
AEV	Annual equivalent value
BCIS	Building Cost Information Service
BESA	Building Engineering Services Association
BIM	Building information modelling
BQ	Bill of quantities
BRE	Building Research Establishment
BSRIA	Building Services Research and Information Association
CBS	Cost breakdown structure
CIBSE	Chartered Institution of Building Services Engineers
Cost/ft² of GIFA	Cost per square foot of gross internal floor area
Cost/m² of GIFA	Cost per square metre of gross internal floor area
DCF	Discounted cash flow
DF	Discount factor
EUQ	Element unit quantity
EUR	Element unit rate
FCI	Functional condition indexation
FMI	Functional maintenance indexation
FMP	Forward maintenance plan (or programme)
FRI	Functional reinvestment indexation
GEFA	Gross external floor area
GIFA (GIA)	Gross internal floor area (gross internal area)
ICMS	International Cost Management Standard (formerly International Construction Measurement Standards)
IPMS	International Property Measurement Standards
LCC	Life cycle cost or life cycle costing

Abbreviations	
LCCP	Life cycle cost plan
LPG	Liquefied petroleum gas
LV	Low voltage
NB	Net benefit(s)
NIA/NIFA	Net internal area or net internal floor area
NPC	Net present cost
NPV	Net present value
NS	Net saving(s)
OCE	Order of cost estimate
OGC	Office of Government Commerce (although the Office no longer exists, the acronym OGC has not been changed and remains a recognised phrase in the UK construction industry)
PARL	Percentage asset remaining life
PBP	Payback period
PC sum	Prime cost sum
PPM	Planned preventative (or scheduled) maintenance
PV	Present value
PVF	Present value factor
RCM	Reliability centred maintenance
RIBA	Royal Institute of British Architects
RPI	Retail price index
RSL	Reference service life
SA	Site area
SIR	Savings to investment ratio
TPI	Tender price index
WBS	Work breakdown structure
WLC	Whole life cost or whole life costings

Definitions	
Abnormal costs	Costs other than those typically encountered for the project funding route, including costs accruing due to circumstances outside the project manager's control. Examples of abnormal costs include access constraints, legacy data issues, unforeseen events due to the nature of the assessment of works, statutory bodies and listed buildings.
Adjusted internal rate of return (AIRR)	A measure of the annual yield from a project over the period of analysis taking into account reinvestments of interim receipts and indicates projects with greater NS.
Annual equivalent cost (AEC) or annual equivalent value (AEV)	The uniform annual amount equivalent to the project's real costs, taking into account the time value of money throughout the period of analysis.
Asset	The whole building, element, system, sub-element and/or a specific asset, or component or part thereof. Note that asset classifications can be at portfolio/estate level (e.g. offices or schools) down to specific maintainable assets (e.g. boilers). NRM 3 applies to all levels of building or constructed assets that are 'applicable' to maintenance and life cycle major repairs and replacement work.
Asset registers	A record of applicable maintainable assets, including information such as constructed specification, operational performance data, financial and technical details about each asset.
Authorised budget (or approved estimate)	See cost limit.
Base cost (or benchmark cost)	The cost of an existing or selected situation against which other options or a specific solution can be compared or benchmarked.
Base cost estimate	An evolving estimate of known factors without any allowances for risk and uncertainty, or element of inflation. The base cost estimate is the sum of the works cost estimate, the project and design team fees estimate, and the other development and project costs estimate.
Base date of cost data or base date	The date at which the costs reported in the cost estimate or cost plan apply, exclusive of any adjustments for risk allowances and/or inflation.

Definitions	
Base rate	The interest rate selected as the basis of the discount rate. This could be the current bank rate or a client's opportunity cost of capital (the difference in return that a client may achieve by deciding to spend on a project now, rather than invest the funds for the future). The base rate is commonly adjusted by the inflation rate to give the discount rate.
Bill of quantities (BQ)	A list of items giving detailed identifying descriptions and quantities of the work comprising a contract.
Building information modelling (BIM)	A digital design and representation tool that creates a 3D model of the building, which seeks to remove design clashes before they occur on site.
Building systems	The constituent parts of a building or built asset including, but not limited to, structural systems, mechanical and electrical systems, facades, ceilings, floors and wall systems.
Breakdown	A failure resulting in the non-availability of an item or asset.
Building work(s)	The sum of the cost targets for group elements 1 to 8. It excludes the facilitating works estimate, as well as those relating to main contractor's preliminaries, main contractor's overheads, profit and design team fees estimate, other development and project costs estimate and risk allowances.
Building works estimate	The sum of the cost targets for group elements 1 to 8. It excludes the facilitating works estimate, as well as those relating to main contractor's preliminaries, main contractor's overheads, profit and design team fees estimate, other development and project costs estimate and risk allowances.
Capital costs	The initial construction costs and the costs of initial adaptation, where these are treated as capital expenditure.
Client (or employer)	The person(s) or entity that pays for the works and services provided.
Client requirements	A statement or document that defines the project outcomes and sets out what the client is seeking to achieve. It is used to develop the business case, which examines the viable options that meet the client requirements.
Coalface time	The actual time that is spent performing the defined maintenance activities. It does not include travel, arranging access or the erection or removal of any access equipment that may be required.

Definitions	
Condition survey	The collection of data about the condition of a built asset or facility, captured at a facility, block, zone, floor, space and systems, asset or component level (in scope).
Construction inflation	An allowance included in the order of cost estimate or cost plan for fluctuations in the basic prices of labour, plant and equipment, and materials during the period from the date of tender return to the mid-point of the construction period. See also tender inflation.
Construction information	Information used to construct the building systems on site. This information can be prepared by the design team or a specialist subcontractor and must comprise prescriptive information. See also building systems and prescriptive information.
Construction Operations Building Information Exchange (COBie)	A standardised tabular representation of a built asset or facility and its constituents, allowing the exchange of their detailed properties and impacts such as maintenance cost and carbon. COBie is a subset of International Federation Classes (IFC) schema.
Cost breakdown structure (CBS)	In the context of bill of quantities (BQs), the CBS represents the financial breakdown of a building project into cost targets for elements or work packages.
Cost checks (or cost checking)	Take place during all design stages and are concerned with comparing current estimated costs against cost targets previously set for elements or sub-elements of the building.
Cost code	A numeric code that uniquely identify projects, sub-projects, group elements, elements, sub-elements and components.
Cost codification framework	A numeric coding structure that may be used to uniquely identify projects, sub-projects, group elements, elements, sub-elements and components. The cost codification structure is derived from the cost breakdown structure (CBS).
Cost control	The process of planning and controlling the costs of building(s). Takes place throughout the duration of the construction project.
Cost exercises	Exercises used to develop the cost plan and to verify that the specification for the building systems and components meet the available cost targets and cost limit. See also cost limit.
Cost limit (or project budget)	The maximum expenditure the clients is prepared to make in relation to the completed building maintenance programme.

Definitions	
Cost per functional unit (or functional unit cost)	The unit rate that, when multiplied by the number of functional units, gives the total building works estimate (i.e. works cost estimate minus main contractor's preliminaries and main contractor's overheads and profit). The total recommended cost limit (i.e. the cost limit, including inflation) can also be expressed as a cost per functional unit when reporting costs.
Cost plan for maintenance and renewal works	The critical breakdown of the cost limits for maintenance and renewal works into cost targets for each element of a built asset. It provides: • a statement of how the available budgets are to be distributed among the elements • a frame of reference from which to ascertain the future maintenance and renewal requirements • a tool to inform the costs of future maintenance and renewal requirements and • a tool to inform design development and maintain cost control of future expenditure on maintenance and renewal works. It also provides a work breakdown structure (WBS) and a cost breakdown structure (CBS) that, by codifying, can be used to redistribute maintenance works into specific maintenance work packages for procurement (e.g. general mechanical and electrical building engineering services, lifts, catering equipment, refrigeration plant and systems, and landscape management). A maintenance and renewal works cost plan considers the estimated maintenance and renewal costs over the life of the built asset or facility. Cost planning is a method of cost prediction.
Cost target	The recommended total expenditure for an element. The cost target for each element is likely to be derived from several sub-elements and components.
Degradation	The process whereby an action on an item causes deterioration of one or more properties.
Descriptive information	The means by which the design team describe a building system or component in a manner that enables a specialist subcontractor to design the system or component.
Design life	The service life intended by the designer.

Definitions	
Design team	Architects, engineers and technology specialists responsible for the conceptual design aspects and developing these into drawings, specifications and instructions required for construction of the building or facility and associated processes. The design team is a part of the project team.
Director's adjustment	A reduction or addition to the tender price derived by the specific contractor's estimating team, offered by the director(s) of the maintenance contractor.
Discounted cash flow (DCF)	An analysis method of valuing projected asset life cycle costs using the concept of the time value of money (see definition).
Discount rate or discount factor	The percentage rate required to calculate the present value (see definition) of a future cash flow (i.e. used for bringing future costs to a comparable time base). For example, if investing at 3% interest, then the present value is discounted by 3% as it is worth less than future earnings due to interest. The discount rate is a factor or rate reflecting the time value of money that is used to convert cash flows occurring at different times to a common time base.
Disposal costs	The costs associated with the disposal of the asset at the end of its life cycle, including any asset transfer obligations.
Durability	The ability of an item to perform a required function under given conditions of use and maintenance, until a limited state is reached. Note: a limited state of an item may be characterised by the end of its useful life, or unsuitability for any economic or technological reasons.
Element	A major part of a group element (e.g. the elements that create group element 3: Internal finishes are 3.1: Wall finishes, 3.2: Floor finishes, and 3.3: Ceiling finishes). A separate cost target can be established for each element. Note also the use of the term 'cost group' or 'cost sub-group' in the context of ICMS.
Elemental cost plan (or cost plan)	The critical breakdown of the cost limit for the building(s) into cost targets for each element of the building(s). It provides a statement of how the design team proposes to distribute the available budget among the elements of the building, and a frame of reference from which to develop the design and maintain cost control. It also provides both a work breakdown structure (WBS) and a cost breakdown structure (CBS), which, by codifying, can be used to redistribute work in elements to construction work packages for procurement purposes. Cost planning is a method of cost prediction.

Definitions	
Elemental method	A budget-setting technique that considers the major elements of a building and provides an order of cost estimate based on an elemental breakdown of a building project. The elemental method can also be used to develop an initial cost model as a prerequisite to developing an elemental cost plan. The method involves the use of element unit quantities (EUQ) and element unit rates (EUR). The elemental method of estimating is a method of cost prediction.
Element unit quantity (EUQ)	A unit of measurement that relates solely to the quantity of the element or sub-element itself (e.g. the area of the external walls, the area of windows and external doors, and the number of internal doors).
Element unit rate (EUR)	The total cost of an element divided by the element unit quantity (EUQ). For example, the EUR for external walls is the total cost of the external walls divided by the EUQ for external walls. EURs include the cost of all materials, labour, plant, subcontractor's preliminaries, subcontractor's design fees and subcontractor's overheads and profit. EURs exclude main contractor's preliminaries, main contractor's overheads and profit and other allowances, such as project and design team fees, other development and project costs estimate, risk allowances and inflation. These items should be assessed separately.
Emergency maintenance	Unplanned or unscheduled maintenance works that require immediate action to restore services, remove problems that could adversely interrupt user activities or to protect life and/or property (see unplanned maintenance).
Enabling works	Works executed ahead of the main building contract. Enabling works are client and/or project team specified works, which might include a mixture of facilitating works and new building works (e.g. site preparatory works such as major demolition, removal of contaminated materials, reptile harm mitigation measures and soil stabilisation; together with new sewers, new access roads, new drainage, new retaining walls and minor new building works).
End of life cost	The net cost or fee for disposing of an asset at the end of its service life or period of interest, including: • costs resulting from decommissioning, deconstruction and demolition of a building • recycling and making it environmentally safe • recovery and disposal of components and materials and • transport and regulatory costs.

Definitions	
Estimate base date	The date on which the cost limit (excluding inflation, i.e. the sum of the works cost estimate, project and design team fees estimate, other development and project costs estimate and risk allowance estimate) is established as a basis for calculating inflation, changes or other related variances.
Externalities	The quantifiable costs or benefits that specifically occur when the actions of organisations and individuals impact on people other than themselves, such as non-construction costs, income and wider social and business costs.
Facilitating works	All components measured and incorporated in group element 0. It includes specialist works that normally need to be completed before any building works can commence (e.g. major demolition works, soil stabilisation works and/or temporary diversion of mains drainage).
Facilitating works and building works estimate	The sum of the cost targets for group elements 0 to 8. It excludes cost targets relating to main contractor's preliminaries and main contractor's overheads, profit and design team fees estimate, other development and project costs estimate and risk allowances.
Facilitating works estimate	The sum of the cost targets for group element 0. It excludes the building works estimate, as well as those relating to main contractor's preliminaries, main contractor's overheads, profit and design team fees estimate, other development and project costs estimate and risk allowances.
Facility	The built asset as a whole or part, including the site and building/ structure and appropriate block, floors, space, zone, room, systems, assets, components and subcomponents.
Factor method	Modification of reference service life (see definition) by factors to take account of specific in-use conditions.
Final project brief	The initial project brief amended so that it is aligned with RIBA Stage 2 (Concept Design) and any briefing decisions made during RIBA Stage 2. Both the concept design and the final project brief are information exchanges at the end of RIBA Stage 2.
Final specifications	The specifications issued at RIBA Stage 4 (Technical Design). These specifications can be descriptive or prescriptive.
Formal cost plan	The elemental cost plan that is reported to the client on completion of a specific RIBA Stage or OGC Gateway.

Definitions	
Formal cost plan stage	The point at which the quantity surveyor/cost manager formally submits an elemental cost plan to the client for consideration. The formal cost plan stages are interlinked with the appropriate RIBA Stages and OGC Gateways.
Forward maintenance plan or programme (FMP)	A document setting out the specific maintenance activities (actions or tasks), resources and sequence of activities relevant to maintaining a building.
Function	The purpose or activity of users and other stakeholders for which a built asset or facility is designed, used or required to be used.
Functional condition indexation (FCI)	The ratio of the functional cost estimate of predicted life cycle major repairs or replacements (identified by a condition and remaining life assessment) to the capitalised replacement value or rebuild costs, expressed over an agreed period of analysis (e.g. a banding of years such as 1, 2–3, 6–10 or 11+).
Functional maintenance indexation (FMI)	The ratio of the functional unit cost estimate of annualised maintenance (i.e. planned, reactive and proactive maintenance) to the capital replacement value (CRV) or rebuild costs, expressed over an agreed period of analysis (e.g. a banding of years such as 1, 2–3, 6–10 or 11+).
Functional reinvestment indexation (FRI)	The ratio of the functional cost of major repairs or replacements (identified by a condition and other form of asset assessment) to the capital replacement value (CRV) or rebuild costs, expressed over an agreed period of analysis (e.g. a banding of years such as 1, 2–3, 6–10 or 11+).
Functional type	The prime use of a built asset or facility.
Functional unit	A unit of measurement used to represent the prime use of a building or part of a building (e.g. per bed space, per house and per m^2 of retail area). It also includes all associated circulation space.
Functional unit method	A rough budget-setting technique that consists of selecting a suitable standard functional unit of use for the project and multiplying the projected number of units by an appropriate cost per functional unit.
Gross external floor area (GEFA) – IPMS 1 measurement	The total external floor area measured in accordance with IPMS 1 (external) as per the applicable International Property Measurement Standards.

Definitions	
Gross internal floor area (GIFA) or internal area – IPMS 2 measurement	The total internal floor area measured in accordance with IPMS 2 (internal) as per the applicable International Property Measurement Standards.
Group element	The main headings used to describe the facets of an elemental cost plan.
Inflation	Sustained increase in the general price level of resources (ISO 15686- 5), i.e. the opposite of deflation. It is included as an allowance in the order of cost estimate or cost plan for fluctuations in the basic prices of labour, plant and equipment and materials. Refer to tender inflation and construction inflation.
Initial project brief	The brief following discussions with the client to ascertain the project objectives, the client's business case and, in certain circumstances, in response to a site feasibility study.
Information requirements (or information exchanges)	The formal issuing of information for review and sign-off by the client at key stages of the building project.
Inspection (or technical inspection)	The examination of an asset, product or building engineering services installation (including plant and equipment) and the determination of its conformity with specific requirements, based on professional judgement.
Life cycle	The consecutive and interlinked stages of the object under construction.
Life cycle cost (LCC)	The cost of an asset or its parts throughout its life cycle while fulfilling the performance requirements.
Life cycle costing (LCC)	A methodology for the systematic economic evaluation of life cycle costs over a period of analysis, as defined in the agreed scope of assessment.
Main contractor's overheads and profit	The main contractor's costs associated with head office administration proportioned to each building contract plus the main contractor's return on capital investment.
Maintenance contractor (or prime contractor)	The contractor responsible for the total maintenance and completion process.

Definitions	
Maintenance contractor's management and administration	Items that cannot be allocated to a specific element, sub-element, or component. (See group element 9.)
Maintenance contractor's overheads and profit	The costs associated with head office administration proportioned to each building maintenance contract plus its return on capital investment.
Maintenance costs	The total of necessary labour, materials, plant and equipment and other related costs incurred to retain a building, or part, in a state in which it can perform its required functions.
Maintenance programme	A time-based plan allocating specific maintenance tasks of an item.
Manufacturing information	Information prepared for the manufacture of building systems and/or components during RIBA Stage 4 (Technical Design).
Minor replacement, repairs and maintenance cost	The cost of scheduled replacement, maintenance and minor repairs to components or parts together with associated making good and minor redecorations.
Net benefits (NB)	The PV of benefits in the 'in use' phase, less the PV of the additional investment costs to achieve them.
Net internal area (NIA) – IPM 3 measurement	The total internal floor area available to the occupier measured in accordance with IPMS 3 as per the applicable International Property Measurement Standard.
Net present cost (NPC)	The sum of the present values of all costs, less the sum of the present value of all benefits.
Net present value (NPV)	The aggregated sum of the future income and expenditure discounted back to a common base date, usually the present day, at a given compound interest rate.
Net savings (NS)	The present value of savings in the 'in use' phase, less the present value of the additional investment costs to achieve them.
Normal working hours	Normal working hours, typically 08:30 to 17:30 Monday to Friday (excluding statutory holidays). Note that actual working hours may vary and should be stated in the assumptions.
Occupancy cost	The cost, relating to the occupation of the building, incurred by the occupant, including rent, taxes, insurances on buildings and contents, depreciation and amortisation expenses.

Definitions	
Off-site maintenance	Maintenance performed at a different location than where the item is used.
OGC Gateway Process (or other equivalent Project Gateway Process)	A process that examines programmes and projects at key decision points in their life cycle. It looks ahead to provide assurance that the client can progress to the next stage. Project reviews are carried out under OGC Gateway reviews 1 to 5. The process is best practice in central civil government, the health sector, local government and the defence sector.
OGC Gateways (or other equivalent Project Gateways)	Key decision points within the OGC Gateway Process.
Optimisation	The lowest costs that provide the maximum benefit from an asset over the life cycle period defined, and with respect to specified criteria.
Option cost	An estimate of the cost of alternative design solutions to achieve the project objectives, so that they can be compared and appraised. Option costs will be incorporated into the overarching cost report.
Order of cost estimate	An estimate based on benchmark data for a similar type of project based on the client's strategic definition or initial brief. Its purpose is to establish affordability of a proposed development for a client. It takes place prior to the preparation of a full set of working drawings or bills of quantities and forms the initial build-up to the cost planning process. Order of cost estimates are a method of cost prediction.
Other maintenance-related costs	A cost that is not necessarily directly associated with the cost of maintaining the building or constructed assets, but forms part of the total cost of the maintenance to the client.
Other project costs	Costs that are not necessarily directly associated with the cost of constructing the building, but form part of the total cost of the building project to the client (e.g. land acquisition costs, fees for letting agents, marketing costs and contributions associated with planning permission).
Outline specification	Sufficient information to allow the client to understand what is proposed for each building system and/or component.

Definitions	
Out of hours working (or out of normal hours working)	Working outside of normal working hours; includes an uplift to rates for the extra hours worked Monday to Friday and additional time on weekends and bank holidays. Premium rate uplifts to be stated as a multiplier of normal working hourly rates (e.g. 1.5 times for extra weekday hours or 2 times for weekends and bank holidays).
Period of analysis	The period of time over which life cycle costs or maintenance, or whole life cycle building and maintenance costs, are analysed (in scope).
Planned preventative (or scheduled) maintenance (PPM)	The maintenance organised and carried out with forethought, control and the use of records to a predetermined plan. Planned preventative maintenance is always part of planned maintenance, whereas corrective maintenance may or may not be.
Post-tender estimate	A cost estimate carried out after the evaluation of tenders to corroborate the funds required by the client to complete the building maintenance contract.
Prescriptive information	Complete, instructive information used to manufacture and construct building systems and components, produced by the design team or the construction team.
Present value (PV)	The cost or benefit in the future discounted back to some base date, usually the present day, at a given compound interest rate. See net present value (NPV).
Present value factor (PVF)	The rate used in the calculation to arrive at the present value (PV).
Pre-tender estimate	A cost estimate prepared immediately before calling tenders for servicing, maintenance and life cycle replacement works.
Preventative maintenance	The planned and controlled programme of maintenance and inspection carried out at predetermined intervals (or corresponding to prescribed criteria) and intended to reduce the probability of failure or degradation of the functioning of an item. This includes inspections, adjustments, cleaning, lubrication and/or selective replacement of components (e.g. filters) and minor repairs, as well as performance testing and analysis intended to maximise the reliability, performance and life cycle of building systems, equipment, etc. Preventative maintenance consists of many checkpoint activities on items that, if disabled, may interfere with an essential installation operation, endanger life or property, or involve high costs or long lead times for replacement.
Price stability	The boundary between inflation and deflation.

Definitions	
Prime cost sum (PC sum)	A sum of money included in a unit rate to be expended on materials or goods from suppliers (e.g. supply-only ceramic wall tiles at £50/m^2, supply-only door furniture at £120/door or supply-only facing bricks at £480/1,000). It is a supply-only rate for materials or goods where the precise quality of those materials and goods is unknown. PC sums exclude all costs associated with fixing or installation, all ancillary and sundry materials, and goods required for the fixing or installation of the materials or goods, subcontractor's design fees, subcontractor's preliminaries, subcontractor's overheads and profit, main contractor's design fees, main contractor's preliminaries and main contractor's overheads and profit.
Proactive maintenance	Maintenance work that is undertaken to avoid failures or to identify defects that could lead to failure. It consists of tasks to eliminate the root cause of the failure and includes routine preventative and predictive maintenance activities and work tasks identified from them. This can include plant tours, targeted inspections and monitoring tasks.
Project	A single, or a series of, construction intervention(s) with a single purpose or common purposes to create a single asset or a series of assets commissioned by a client, or group of clients, with a defined start and end dates. A project may comprise several sub-projects.
Project and design team fee(s)	Consultants' fees for services related to pre-construction, construction and post-construction, other consultants' fees, fees and charges for intrusive site investigations, specialist support consultants' fees and main contractor's fees for the provision of pre-construction services. See group element 11 for an indicative list of project and design team fees.
Project and design team fees estimate	The total estimated cost of all project and design team fees at the estimate base date (i.e. excluding tender inflation and construction inflation).
Project brief derogations	A record used to identify and agree where aspects of the design do not need to comply with the project brief.
Project information	Information, including models, documents, specifications, schedules and spreadsheets, issued between parties during each RIBA Stage and in formal information exchanges at the end of each RIBA Stage.
Project outcomes	The client's desired outcomes for the project.
Project programme	The overall period for briefing, design, manufacturing, construction and post-completion activities on a building maintenance project.

Definitions	
Project strategies	Strategies to support the design process, which generally developed in parallel with RIBA Stages 2 (Concept Design) and 3 (Spatial Coordination) – in outline and in detail, respectively. Typically include: • conservation strategy • cost strategy • fire safety strategy • health and safety strategy • inclusive design strategy • planning strategy • plan for use strategy • procurement strategy and • sustainability strategy.
Project team	Client/employer, project manager, quantity surveyor/cost manager, design team and all other consultants responsible for the delivery of the building project on time, on cost and to the required performance criteria (design and quality). The project team includes the main contractor where one has been engaged by the client to provide pre-construction services.
Quality aspirations	The objectives that set out the quality aspects of a project. Could be defined by reference to a set of inherent characteristics of an object that fulfils requirements (EN ISO 9000-9001-9002).
Reference service life (RSL)	The service life that is expected under a reference set of in-use conditions, which may form the basis of estimating the service life. See factor method.
Reliability centred maintenance (RCM)	A process used to determine what must be done to ensure that any physical asset continues to function effectively in its present operating context.
Remaining life	The period during which a building or component may reasonably be expected to continue to fulfil its present function, provided it is given normal routine maintenance. Remaining life is the future expected life of an asset at a given point in time.

Definitions	
Repair	Work that is performed to return equipment to service after a failure, or to make its operation more efficient. The restoration of an asset or a component to such a condition that it may be effectively utilised for its designed purpose by the overhaul, reprocessing or replacement of constituent parts or materials that have deteriorated by action of the elements or use and have not been corrected by maintenance.
Residual risk (or retained risk)	The risks retained by the client. Could also be defined by reference to the effect of uncertainty on objectives (ISO 31000). An uncertain event or condition that, should it occur, will have an impact on project objectives or business goals.
Responsibility matrix	A matrix determining who is responsible for the different tasks to be undertaken at each RIBA Stage.
Retail Price Index (RPI)	A government-published index that measures the movement in the cost of a basket of consumer items that form a 'typical' family's spending.
RIBA Plan of Work	Refers to RIBA Plan of Work, a framework setting out the stages of a building project. It consists of eight Stages. The RIBA Plan of Work specifies the tasks to be undertaken by the project team at each Stage.
RIBA Stage	The stage the project is at. The RIBA Plan of Work consists of eight Stages identified by the numbers 0 to 7. Tendering and the awarding of works contracts are treated as a variable task, as they depend on the selected procurement route and can occur at any time between Stages.
Risk allowance	A quantitative allowance set aside as a precaution against risks and future requirements to allow for uncertainty of outcome.
Risk register (or risk log)	A schedule of identified risks.
Savings to investment ratio (SIR)	A measure of the cost-effectiveness of a proposed investment.
Scheduled maintenance	Preventative maintenance carried out in accordance with predetermined intervals, number of operations and hours run, including allowances for access.
Site area (SA)	The total area of the site within the site title boundaries (or the total area within the site title boundaries defined by the client as the site for the building), measured on a horizontal plane.

Definitions	
Site information	Specific project information in the form of surveys or reports relating to the site/context for a project, including site surveys.
Spatial requirements	A schedule of rooms and/or spaces that will achieve the client requirements.
Spatially coordinated	Design in which the client's spatial requirements and spaces required for any building systems and/or components – such as structural and building services engineering aspects, including grids, risers and plant rooms – have been determined and fixed to allow RIBA Stage 4 (Technical Design) to progress without further iteration.
Strategic engineering	Engineering information that is crucial to the development of the architectural concept, including plant room and/or riser information, or required to develop the cost plan for the consideration of project risks and risk allowances.
Subcontractor	A contractor who undertakes specific work within the building project. They are known as specialist-, works-, trade-, work package- and labour-only subcontractors.
Subcontractor's management and administration	The management and administration that relate specifically to maintenance and replacement works carried out by subcontractors. Costs associated with these should be included in the unit rates applied to sub-elements, components and individual assigned maintenance task schedules.
Subcontractor's preliminaries	Preliminaries that relate specifically to building works to be carried out by a subcontractor. Costs associated with subcontractor's preliminaries should be included in the unit rates applied to sub-elements and individual components.
Sub-element	A part of an element. As with elements, a separate cost target can be established for each sub-element (e.g. the sub-elements that comprise element 2.1 Frame are: 2.1.1 Steel frames; 2.1.2 Space frames/decks; 2.1.3 Concrete casings for steel frames; 2.1.4 Concrete frames; 2.1.5 Timber frames; and 2.1.6 Specialist frames).
Subproject	A subdivision of a project that can be described by a single set of attributes and values.
Sunk cost	The cost of goods and services already incurred and/or irrevocably committed.
Taxes and levies	Mandatory costs taxed or levied in connection with any phase of the project by national government, municipalities or government agencies, whether paid by the client, the contractor or the operator.

Definitions	
Temporary works	Non-permanent work or activity that is necessary for the completion of permanent construction work.
Tender inflation	An allowance included in the order of cost estimate or cost plan for fluctuations in the basic prices of labour, plant and equipment, and materials during the period from the estimate base date to the date of tender return. See also construction inflation.
Time-related charge	A charge for work, the cost of which should be considered dependent on duration.
Time value of money	The measurement of the difference between future monies and the present-day value of monies.
Total development cost	The cost limit (including inflation, i.e. the total of the works cost estimate, the project and design team fees estimate, other development and project costs estimates, tender inflation and construction inflation) for the building project.
Tender price index (TPI)	An index that measures the movement of tender prices over time.
Treasury discount rate	The rate specified as the discount rate by the UK government treasury to be used as the discount rate for public sector whole life costing calculations (see discount rate).
Unit rate(s)	The monetary rate applied to an element, sub-element or component per unit of measurement (e.g. cost per m, cost per m^2 and cost per m^3). The term also includes costs/m^2 of GIFA and cost per functional unit (or functional unit cost).
Unplanned (or unscheduled/ reactive) maintenance	Reactive and non-emergency work activities that occur in the current annual programme (i.e. maintenance carried out to no predetermined plan). Activities may range from unplanned/ unscheduled maintenance of a nuisance nature requiring low levels of skill for correction, to non-emergency tasks involving a moderate to major repair or correction requiring skilled labour.
Utilities cost	The cost of different fuels, water and drainage charges identified separately and reported on an annual basis. Included in the net utilities cost is any income generated from selling energy back to the national grid or generated for other uses.
Whole life cost (WLC)	All significant and relevant initial and future costs and benefits of a built asset or facility, throughout its life cycle, while fulfilling its performance requirements.

Definitions	
Whole life costing	A methodology for the systematic economic evaluation used to establish the total cost of ownership, or the whole life costing of option appraisals. It is a structured approach addressing all costs in connection with a built asset or facility (including construction, maintenance, renewals, operation, occupancy, environmental and end of life). It can be used to produce expenditure profiles of a built asset or facility over its anticipated life span or defined period of analysis.
Work breakdown structure (WBS)	In the context of a bill of quantity (BQ), the WBS is used to subdivide a building project into meaningful elements or work packages.
Work order	A written or automated instruction detailing the work to be carried out and the methods to be used.
Works cost estimate	The combined total estimated cost of the building works estimate, main contractor's preliminaries, and main contractor's overheads and profit, prepared using prices current at the time the estimate is prepared (or updated). The works cost estimate contains no allowance for project and design team fees, other development and project costs, risk allowances, tender inflation or construction inflation.
Works package contractor	A specialist contractor who undertakes identifiable aspects of maintenance or replacement work, e.g. maintenance of non-specialist mechanical and electrical engineering services; maintenance of specialist installations (such as building management systems and fuel installations); maintenance of building fabric, structure, finishes and fittings, furnishings and equipment; landscaping management and grounds maintenance works; or labour only. Depending on the contract strategy, works contractors can be employed directly by the client or by the maintenance contractor.
Works package contractor's management and administration	The management and administration costs relating specifically to work that is to be carried out by a works package contractor.

1 General

1.1 Introduction

This section places order of cost estimating and cost planning in context with the *RIBA Plan of Work* and the OGC Gateway Process.

1.2 Measurement in context with the RIBA Plan of Work and OGC Gateway Process

The *RIBA Plan of Work* is a UK construction industry recognised framework that organises the process of managing and designing building projects and administering building contracts into several key Stages. The *RIBA Plan of Work* organises the designing, constructing, maintaining, operating and use of buildings and built assets into eight Stages. However, the Plan is procurement neutral, as it recognises that the appointment of contractors can occur before or during any of the design Stages.

In addition to the *RIBA Plan of Work*, the RIBA has introduced a *Digital Plan of Work* (DPoW) for use with projects where building information modelling (BIM) processes are to be used. All DPoW Stages correspond with the *RIBA Plan of Work* Stages, as highlighted in Table 1.1.

An alternative to the *RIBA Plan of Work* is the OGC Gateway Process, which some UK government departments and other public sector organisations have adopted as best practice for managing and designing building projects. The process examines programmes and projects at key decision points in their life cycle. It looks ahead to provide assurance that the client can progress to the next stage. Project reviews are carried out under OGC Gateway Reviews 1 to 5. Typically, a project will undergo three reviews before commitment to invest, and two more looking at service implementation and confirmation of the operational benefits. Both the *RIBA Plan of Work* and OGC Gateway Process are recognised frameworks for managing and designing building projects in the UK.

Cost estimates and cost plans will need to be prepared by the quantity surveyor/cost manager at various Stages of the *RIBA Plan of Work* or at various Gateways in the OGC Gateway Process, whichever management process is applicable. To address this requirement, RICS has developed a series of formal cost estimating and elemental cost planning stages, shown in Table 1.1 in the context of the RIBA Stages, the RIBA DPoW and the OGC Gateways and information stages.

Although Table 1.1 only considers certain well-known design and management processes, any other processes (i.e. in-house or country specific) can be easily aligned with the RICS formal cost estimating and cost planning stages, and the RICS information stages.

RIBA project Stages			RICS formal cost estimating and cost planning stages	RICS information stages (RICS Cost prediction PS)	OGC Gateways	
Plan of Work 2020		Digital Plan of Work (DPoW)				
0	Strategic Definition	Strategy	**Rough order of cost estimate**	**Level 1 Estimate**	1	Business Justification
1	Preparation and Briefing	Brief	**Order of cost estimate(s)** (option costs) **Elemental cost estimate**	**Level 2 Estimate**	2	Delivery strategy
					3A	Design Brief and Concept Approval[1]
2	Concept Design	Definition	**Formal cost plan 1**	**Level 3 Estimate**		
3	Spatial Coordination		**Formal cost plan 2**[2]	**Level 4 Estimate**	3B	Detailed Design Approval[1]
4	Technical Design	Design	**Formal cost plan 3**[2]	**Level 5 Estimate**		
	Contractor Engagement	Contractor Engagement	**Pre-tender estimate**[3] **Pricing documents**[3] (for obtaining tender prices) **Post-tender estimate**[4]	**Level 5 Estimate(s)**	3C	Investment Decision (see note)
5	Manufacturing and Construction	Build and Commission				
6	Handover	Handover and Closeout	**Formal cost plan 4**[5] (renew/maintain) (measured in accordance with NRM 3)	**Level 6 Estimate**	4	Readiness for Service
7	Use	Operation			5	Operations Review and Benefits Realisation
		End of Life				

Table 1.1: Relationship between RICS formal cost estimating and cost planning stages and the RIBA Stages, DPoW Stages, OGC Gateways and RICS information stages

Notes on Table 1.1:

1 A prerequisite of OGC Gateway Review 3 (Investment Decision) is that the design brief, concept design and detailed design have been approved and signed off by the client. To compare the OGC Gateway Process with the RIBA Stages, these two decision points are referred to as OGC Gateway 3A (Design Brief and Concept Approval) and OGC Gateway 3B (Detailed Design Approval); with OGC Gateway 3C representing the final OGC Gateway Review 3 (Investment Decision).

2 The requirement to prepare formal cost plans 2 and 3 depends on the Stage at which tenders are sought. For example, if tenders are sought after the completion of Stage 3 (Spatial Coordination), it is unlikely that formal cost plan 3 will be required.

3 Pre-tender estimates and pricing documents are prepared at the commencement of contractor engagement, which can occur after Stage 2 (Concept Design), Stage 3 (Spatial Coordination), or Stage 4 (Technical Design), i.e. following completion of the Stage after which tenders are sought.

4 Post-tender estimates are prepared during contractor engagement and included in the report on tenders.

5 Cost plans addressing the life cycle renewal and maintenance costs of built assets can also be prepared in conjunction with cost plans dealing with capital costs (i.e. formal cost plans 1, 2 and 3). Both cost plans can then be used to inform the whole life costs of a built asset at each Stage, thereby enabling informed decisions to be made by clients during design development.

1.3 Purpose

NRM 3 provides essential guidance on the quantification and description of maintenance works for preparing initial order of cost estimates during the preparation stages of a building project, elemental cost plans during the design development stages (pre-construction) and detailed asset-specific cost plans (post-construction) throughout the in-use phases of a building project. The guidance also aids the procurement and cost control of maintenance works.

NRM 3 follows the same framework and premise as NRM 1. It gives direction on how to quantify and measure other items associated with maintenance works, but that are not reflected in the measurable maintenance work items, i.e. maintenance contractor's management and administration charges, overheads and profit, other maintenance-related costs, consultants' and specialists' fees, and risks in connection with maintenance works.

Unlike capital building works projects, maintenance works are required to be carried out from the day a building or asset is in use until the end of its life. Accordingly, while the costs of a capital building works project are usually incurred by the building owner/developer in the relatively short-term, costs in connection with maintenance works are incurred throughout the life of the building – over the short, medium and long term. Consequently, NRM 3 provides guidance on the measurement and calculation of the time value of money (methods of economic evaluation, net present value (NPV) and payback periods (PBPs)), and guidance on using the measured data to inform life cycle cost plans (LCCPs) and forward maintenance plans, as well as VAT and taxation.

Together, NRM 1 and NRM 3 present the basis of life cycle cost management of capital building works and maintenance works.

Figure 1.1 summarises how the NRM suite interrelates, as well as illustrating the link to the BCIS *Standard Form of Cost Analysis*.

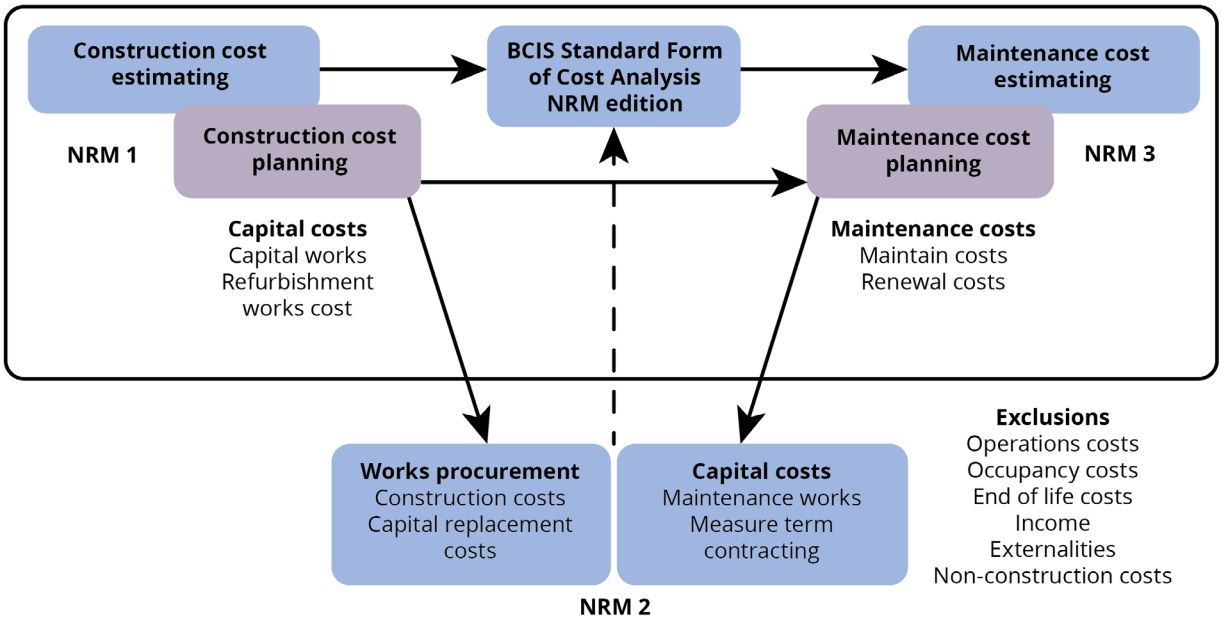

Figure 1.1: The NRM suite in relation to the BCIS Standard Form of Cost Analysis

NRM 3 provides a standard set of measurement rules that are understandable by all those involved in budgeting, cost managing and procuring building maintenance works for discrete buildings (or part elements, systems or components), building portfolios, establishments or estates, including the client. This therefore aids communication between the project and maintenance teams and the client.

NRM 3 also provides rules of measurement for the preparation of order of cost estimates and cost plans during construction procurement and post-practical completion (i.e. throughout the in-use period of the building). Direction on how to describe and deal with costs and allowances that form part of the cost of maintaining a building or constructed asset or its parts, but that are not reflected in the measurable maintenance work items, is also provided.

In addition, NRM 3 provides a cost management framework that can be used to develop labour resource plans (including materials, consumables, plant and equipment) for annualised maintenance (maintain) works. It can also be used for predicting the intermittent or periodic forecast of major life cycle repairs and replacement (renewal) works, as appropriate for the defined period of analysis.

NRM 3 does not explain estimating methods, cost planning techniques, procurement methods or maintenance strategies; advice on these is obtainable in other RICS publications and other external publications.

Where an order of cost report or a cost plan report has been prepared in accordance with NRM 3, this should be stated in the report.

1.4 Use

NRM 3 provides a standardised basis for measuring cyclical repairs, replacement (renewal) and annualised maintenance (maintain) of building components, which are to be carried out after completion of the construction phase and throughout the in-use phases of the constructed facility or built asset.

It also presents a consistent approach for dealing with other key cost components associated with the procurement of repair/replacement (renewal) and maintenance (maintain) works projects when preparing order of cost estimates and elemental- and component-level cost plans. The rules represent the basis of good practice.

NRM 3 deals with measurement for the preparation of:

- order of cost estimates for a repair/replacement (renewal) and annualised maintenance (maintain) works programme
- elemental cost plans for a predicted life cycle repair/replacement (renewal) and annualised maintenance (maintain) works programme
- calculations of annualised costs for repair/replacement (renewal) works from capital building cost plans and asset registers/survey data, and
- cost reporting and analyses for repair/replacement (renewal) and maintenance (maintain) works.

Users of this document are advised to adopt metric units as the standard system of measurement. Where the client requires reference to imperial units, these may be provided as supplementary information (e.g. in parentheses).

Although **BS 8888:2020 Technical product documentation and specification** recommends the inclusion of a comma rather than a point as a decimal marker, and a space instead of a comma as a thousands separator, the traditional UK convention has been adopted in these rules (i.e. a point as a decimal marker and a comma as a thousands separator). Users should take care to ensure that this does not conflict with client requirements.

1.5 Effective date

This document is effective from 1 December 2021.

2 Measurement rules for building maintenance works

2.1 Introduction

This section explains how maintenance costs relate to construction and life cycle costing; defines the scope and parameters for renewal (R) and maintenance (M) cost categories; explains the process of cost estimating and cost planning, and the levels of measurement; and explains the importance of developing a clear and comprehensive client's maintenance requirement, and how the measurement rules are to be applied.

2.2 CROME

The acronym 'CROME' describes the key constituents of the building LCCs of a constructed asset, and broadly categorises how they relate to the construction costs and to the other building maintenance costs (which are split into R costs and M costs) and to the other key aspects of LCC:

- **C**: Construction costs
- **R**: Renewal costs
- **O**: Operation and occupancy costs
- **M**: Maintenance costs and
- **E**: Environmental and/or end of life costs.

ICMS uses CROME cost categories for incorporating LCCs. NRM 1, NRM 3 and ICMS are aligned to the categorisation of Construct (C), Renewal (R) and Maintain (M) costs.

NRM 3 deals with the R works and M aspects of the built asset or facility, and/or asset systems or component parts. It also addresses other E costs of life cycle costing, such as improvements and upgrades for environmental reasons, end of interest and/or end of life considerations, and other related obligations, which may be included as part of a specific project costing scope.

For NRM 3, the C costs include subsequent refurbishment and adaptation works to the built asset or facility. The quantification of the initial construction or renovation of a building or assets, as well as the demolition of buildings and facilities (E), are dealt with in NRM 1.

Figure 2.1 clarifies the key cost categories included in a life cycle costing, and those wider non-construction-related costs, incomes and externalities that, together with life cycle costs, are referred to as whole life costs.

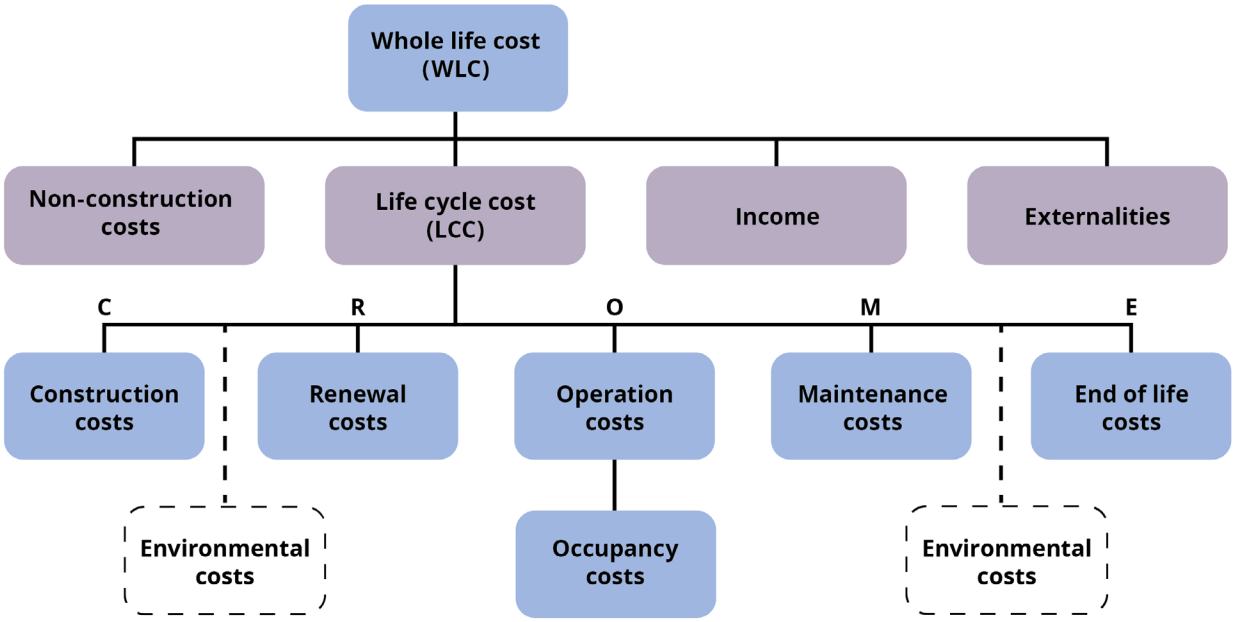

Figure 2.1: Key cost categories of life cycle costing and whole life costing

2.3 Scope and parameters of the R and M work categories

The scope of the key cost categories that constitute building maintenance works – split into R and M cost categories – and how this aligns and relates to the C cost categories from NRM 1, is summarised in Figure 2.2.

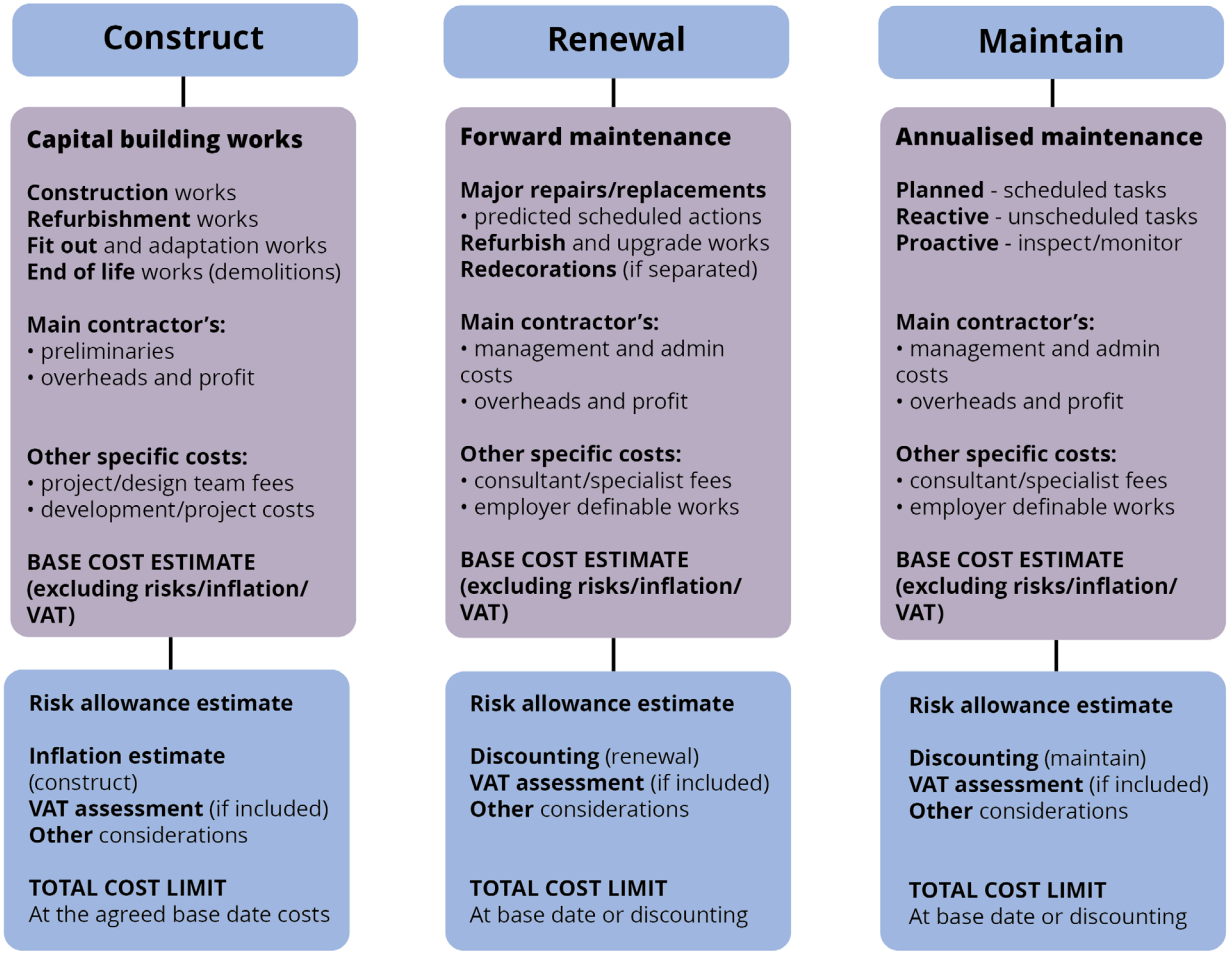

Figure 2.2: Scope of key cost categories of R and M, and their relationship with C

For asset-based cost planning (post-construction) during in-use phases, include the costs associated with quantification and verification of the asset maintenance registers, and identify the maintain tasks and renewal actions required.

Appendix B includes detailed definitions and guidance for each of the cost categories. Some of these aspects can be included in maintenance works, if required by the client to be in the scope of works.

2.4 Standardised building maintenance cost data structure (integrating C with the R and M works)

Part 6 (Elemental cost planning) includes a standardised cost data structure that links NRM 1, and a detailed 'inclusions' listing at the building or C components level, to maintenance asset types specifically defined for applicable R and M works. It creates a fully integrated and standardised construction and maintenance works cost breakdown data structure (i.e. construct with renewal and maintain – aligned to the NRM 1 level 3 'inclusions' component list).

Wherever the detailed rules of measurement or units of measurement differ between the capital building work rules (NRM 1) and the maintenance and life cycle replacement work

rules (NRM 3), this has been highlighted by exception in Part 6 (Elemental cost planning, group elements 0 to 14).

The logic and levels for elemental cost planning published in Appendix B of NRM 1 has been developed to integrate the C levels 1 to 3 of the R items and M inclusions and provided separately.

2.5 Process for order of cost estimating and cost planning of building maintenance works

The process for preparing both order of cost estimates and cost plans for building maintenance works is the same:

1. Define and agree the client's brief for the maintenance works (or update the previous iteration of the brief).
2. Plan the procedure.
3. Establish the rules of measurement to be applied for:
   a. order of cost estimating of maintenance works (see Part 3)
   b. cost planning of maintenance works (see Part 4) and
   c. annualised costing of maintenance works (see Part 5).
4. Compile the available information and record the data assumptions.
5. Document all information and assumptions used in compiling the cost estimate or cost plan.
6. Undertake the calculations, update unit rates and other costs, and check and validate the results.
7. Apply risk and sensitivity analysis (if required, in scope).
8. Carefully interpret and present the results.
9. Report the results.
10. Review the report with the client and obtain agreement on the final outputs.
11. Determine whether to do an analysis for comparative benchmarking purposes (if required).
12. Issue a final order of estimate or cost plan report, whichever is appropriate.

For the purposes of developing order of cost estimates and cost plans for building maintenance works, maintenance works are to be divided into separate cost categories, as follows.

- **R works costs** subdivided into the following subcategories:
  a. **major repairs/replacement costs**: including a predicted schedule of life cycle major repairs and replacement works, and a provision for unscheduled renewal works
  b. **refurbish and upgrade costs**: such as refurbishing heating systems; upgrading to modern day equivalents; and replacing for obsolescence, energy/carbon or performance reasons, and

c **redecoration costs** (if separated out, in scope).

- **M works costs** subdivided into the following subcategories:
  - a **planned preventative costs**: including annualised maintenance regimes, such as planned preventative maintenance works, minor repairs, consumables and equipment
  - b **reactive costs**: annualised unscheduled or responsive maintenance, including emergency/minor repairs and replacement items (within set renewal liability limits)
  - c **proactive costs**: such as planned inspections of buildings/components, audits, testing and monitoring regimes, and alternative maintenance regimes (e.g. predict and prevent using condition-based, asset criticality risk or thermal imaging).

See Appendices B, C, D, E and F for more detailed guidance on the scope and parameters for cost categories and definitions for R and M works, as well as how they relate to wider life cycle costing and whole life costing.

2.6 Levels of measurement during the building's life cycle

Producing order of cost estimates and cost planning construction and maintenance works are undertaken at various stages in the building's life cycle (see Figure 2.3). The level of information available and the type of cost estimate (i.e. whole building level or functional unit types, cost significant items, or elemental, sub-elemental down to detailed asset component-level cost planning) will be based on the design and maintenance data, asset registers, condition and life data.

	Built asset (level 0)	Grouped elements (level 1)	Elements (level 2)	Sub-elements (level 3)	Components (level 4)
Construct	m^2 or function unit	Construct work cost estimates (m^2)	Cost planning (concise)	Cost planning (amplified) - detailed measurement	Cost planning (specific) - detailed measurement
Renewal	m^2/pa or function unit	Renewal work cost estimates (m^2/pa)	Renewal work cost estimates (m^2/pa)	Cost planning (various) - detailed measurement	Cost planning (various) - detailed measurement
Maintain	m^2/pa or function unit	Maintain work cost estimates (m^2/pa)	Cost planning (various)	Cost planning (various) - detailed measurement	Cost planning (various) - detailed measurement
Other aspects	As agreed in scope (e.g. end of interest)	Relevant maintenance considerations	Relevant maintenance considerations	Relevant maintenance considerations	Relevant maintenance considerations

Figure 2.3: Levels of measurement undertaken during the building's life cycle

The logic and levels table published separately on the NRM page clarifies the logic and levels for elemental cost planning of the C, R and M works. Also see report templates in Appendices E and F.

2.7 Establishing the client's maintenance requirements

An important step in the estimating and cost planning of building maintenance works is establishing the client's requirements. Careful definition of the client's maintenance

requirements is essential and usually takes the form of a client's brief for maintenance works. The brief is an iterative document that will be reviewed and updated at each of the RIBA Stages or OGC Gateways, as applicable.

Development of the client's brief for maintenance works is an exploratory process. Success presupposes effective collaborative working between the client and relevant stakeholders (i.e. designers, maintenance contractors, suppliers' consultants, etc.).

Inexperienced clients should not be deterred by the detailed information requirements needed. This simply reflects the complexity of the maintenance process and the importance to the overall success of the defined maintenance programme of identifying all relevant maintenance requirements at the outset. Quantity surveyors/cost managers, in conjunction with the client's other professional advisers, should be able to help the client define their current and future maintenance requirements.

The client's maintenance strategy works should concentrate on a clear statement of aims and their context, which is specific enough for action by the quantity surveyor/cost manager and other interested parties.

The client's maintenance brief will need to be tailor-made to meet the client's specific project requirements, e.g. BIM. In some cases, the quantity surveyor/cost manager may need to propose the specific preparatory inputs for the maintenance cost estimating, elemental and/or asset-specific cost planning, particularly when the client is unfamiliar with the new rules of measurement for building maintenance works.

Cost estimating and cost planning of building maintenance works is an iterative process, which will be based on increasingly informed decisions as more detailed information becomes available.

To enable the preparation of an order of cost estimate or cost plan for a maintenance works project, the following will be agreed with the client and included in the client's brief for maintenance works:

1. scope of the maintenance:
    - **a** type of building(s), and/or other built asset(s) or facilities, and their functional usage
    - **b** occupancy details, i.e. tenure details, hours of operation and use of space
    - **c** a statement of building(s), and/or other built asset(s) or facilities, in scope
    - **d** location and
    - **e** purpose: the main reasons and aims of the maintenance programme (in general terms).
2. scope of the works, in respect of:
    - **a** R works and
    - **b** M works.
3. type of cost estimate or cost plan
4. precise scope of costs to be included and excluded, and how to express them

5 time period of appraisal (or period of analysis)

6 method of economic evaluation (NPV/PBP)

7 discount rate to be applied, including confirmation that costs are to be discounted

8 level of detail of the major life cycle renewal and maintenance works

9 extent to which taxes are to be considered and

10 required format of cost reporting, analysis and presentation of the results.

In addition, the quantity surveyor/cost manager is to ascertain:

- if there is a base case, or project benchmark, to be used as a comparator and
- the specific study inputs and rules of measurement to be applied.

Specific study inputs and rules of measurement comprise:

1 estimate base date for the order of estimate or cost plan

2 unit of time and costs

3 levels of the construction (C), renewal (R) and maintenance (M) works (BIM standards)

4 costing methodology, including location factors, time adjustment indices and other rate and price adjustment factors (e.g. tender price indexation)

5 the level at which the costs are to be reported and the required format

6 a list of available information and record data sources, and assumptions used for costing

7 factoring methods used to prioritise/optimise renewal (R and/or M works)

8 degree of risks and uncertainty to be applied

9 extent of sensitivity analysis to be applied (if required, in scope)

10 inflation and taxation (see sections 3.15 and 3.16)

11 the specific commercial considerations to be taken into account and

12 the project sponsor's formal sanction of the specific study inputs.

The estimate base date shall be stated (i.e. the point in time from which the maintenance costing period commences). All relevant costs used for the maintenance and life cycle repairs and replacement study shall be adjusted to the base date(s) for comparative prediction purposes, e.g. design date, construction base date, maintenance commencement base date and replacement period.

The unit of time should be stated. The units of time are the increments to which the calculations refer, e.g. years, six-month period, months, weeks, days, etc. All factors in the calculations, e.g. interest rates, will relate to the stated unit of time.

The period of analysis for the R and M works (and wider life cycle costing element study, if required) should be stated. The period is the time from the agreed base date to a given point in time in the future, and over which the calculations pertain.

The methods of economic evaluation (see Appendix C) that are most commonly used in the UK maintenance and construction industry are:

1 annual equivalent maintenance costs (AEC) used for annualised maintenance works

2 discounted cash flow (DCF) used for calculating the NPV to predict life cycle replacement programmes

3 DCF used for calculating the NPV for option appraisals, based on multiple scenarios

4 present value (PV) for non-DCF used for short-term scenarios and

5 PBP for assessing the period of time to recover the investment monies.

The level of the study may cover a single asset or multiple assets. Possible levels of study are:

1 multiple assets or portfolio/estate level

2 single asset or whole building level

3 cluster level (multiple elements, e.g. all windows and doors)

4 elemental level (e.g. a roof)

5 system level (e.g. an air conditioning system) and

6 component or subcomponent level (e.g. a boiler: oil fired type, and associated flues).

Costing should state whether the data used has been built up from first principles or if comparative and benchmark data have been used, stating the source (e.g. historic client data, published data or other specific information sources, such as BCIS, BESA SFG20, BRE or CIBSE).

Information and data should be recorded in the estimates and cost plans in a structured way, in accordance with NRM 3 Parts 3 to 6 for all the cash flow and option appraisals. This will enable a meaningful comparison and facilitate data sharing and analysis/benchmarking, as well as enabling BIM cost modelling and analysis.

Methods, techniques, and the other criteria used for undertaking sensitivity and/or risk and impact-based analysis should be stated on key cost-significant elements, such as discount rates, factoring component service life, critical maintenance schedules, labour rates and subcontracted works.

Sources of design and reference service life (RSL) data for component replacement should be stated, together with confirmation of the predicted range of replacement life used and the associated basis for factoring these to relate to the specific project circumstances, e.g. 24/7 use of the facilities. See section 5.3 for guidance on how to determine life expectancy.

Assumptions should be stated for:

1 obsolescence and the asset residual values

2 end of interest and/or end of contract obligations

3 interest rates and discount rates to be applied (if required) and

4 works in scope and out of scope (e.g. excludes information and communications technology).

Iterations of the process may be required and the level of detail and form of cost estimating, cost planning and reporting will change over the period of construction procurement and during the in-use phases.

Certain factors may significantly affect the outcomes. Therefore, it is important to understand the implications of applying certain factors (such as the period of analysis or the discount rate to be used) and to make sure these are properly considered at the outset.

Appendix D provides details of the information required for formal cost plans 1 to 4.

2.8 Projects comprising multiple buildings, facilities and/or functional types

Where a building project or establishment comprises more than one type of built asset or facility, it is recommended that a separate cost plan is prepared for each built asset or facility, culminating in a 'summary cost plan' for the entire project (see Figure 2.4).

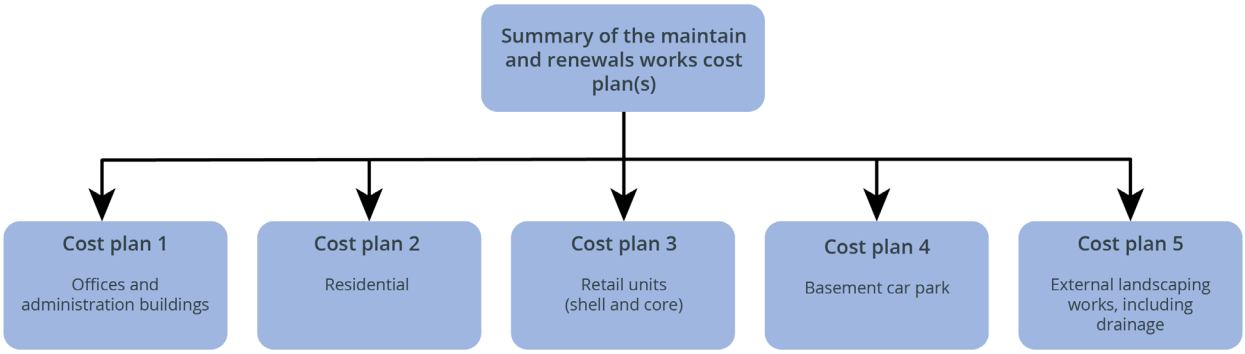

Figure 2.4: Part of a typical cost plan breakdown structure for an establishment comprising multiple components, or buildings and/or functional unit types

Appendix A lists the commonly used functional unit types (e.g. schools, railway stations, offices).

The functional unit method is used to calculate the total estimated cost for the maintenance works (i.e. the R and M works cost estimates). When used for maintenance cost planning, the functional unit method considers all maintainable assets 'applicable' to the specific functional unit or type of function being measured (e.g. office, house, shop, school, train station). It originates from design information, as-built data and/or an asset-specific maintenance register, based on an element, sub-element and component breakdown of the applicable maintenance items for each function unit being measured, which is then used to calculate the R and M work cost estimates.

This method can be used to customise the functional maintenance standards to suit any organisation or end user's functional use of the built environment and specific circumstances.

It is recommended that specialist advice is sought on setting the maintenance strategy to ensure the appropriate service standards are applied to suit the various aspects of building maintenance works. If required by the client, industry accepted standards should be used as the basis for cost estimating the maintenance works, such as the BESA SFG20 maintenance task specification standards for building and engineering services.

3 Measurement rules for order of cost estimating

3.1 Introduction

This section describes the purpose and content of order of cost estimates; puts these in context with the RIBA Plan of Work 2020 and OGC Gateway Process; and sets out guidance for the preparation of order of cost estimates for maintenance works, split into R and M works, using the following methods:

- floor area method
- functional unit method (e.g. bed space, per house or per m^2 of retail area) and
- elemental method.

The content and application of unit rates (i.e. cost/m^2 of GIFA, functional unit rates and elemental unit rates (EURs)) to measure quantities to generate the base cost of the building maintenance works are described. Also covered is the method of dealing with cost allowances for maintenance contractor's management and administration and overheads and profit, project-specific costs, fees and other client-definable maintenance costs, risk allowances, inflation and discounted values and VAT.

The method of dealing with the time value of money, i.e. discounting current day values and future benefits to present day values, is broadly explained. More detailed guidance on the methods of economic evaluation (e.g. NPV and PBPs), and various forms of discounting methods, is provided in Appendix C.

In addition, the basic information (from the client, other project members and relevant maintenance providers) needed by the quantity surveyor/cost manager to complete order of cost estimating is outlined. The necessary content of the quantity surveyor/cost manager's order of cost estimate report to the client is also described.

The guidance for elemental unit quantities used in the elemental method of estimating can also be used as a basis for measuring elemental unit quantities for the cost analysis of the building maintenance programmes of works.

3.2 Purpose of an order of cost estimate

Order of cost estimates for capital building works are produced as an intrinsic part of RIBA Stages 0 (Strategic Definition) and 1 (Preparation and Briefing) or OGC Gateways 1 (Business Justification) and 2 (Delivery Strategy). At the same time, order of cost estimates for future building maintenance works (i.e. R and M works) should be prepared to predict the likely cost of such works over the life of the built asset or facility. This permits life cycle costing of different development and/or design options to be compared at an early stage.

For new buildings or other built assets or facilities, order of cost estimates are prepared to inform decision making at an early stage of design development, e.g. to review the cost-effectiveness of different buildings or other built assets, or to review design options over a defined period. Consequently, order of cost estimates are used to inform the client's initial development or investment appraisals. However, order of cost estimates for R and M work can also be carried out at other project stages or after construction.

For new buildings or other built assets to be constructed, the requirements of RIBA Stages and OGC Gateways correspond equally to both capital building projects and building maintenance works. The requirements of RIBA Stages 0 and 1, described in the RIBA Plan of Work, are as follows.

3.2.1 RIBA Stage 0: Strategic Definition

Outcome: The best means of achieving the client's requirements is confirmed.

The primary goal of Stage 0 is strategic: to ratify that a construction project is the best means of achieving the client's requirements. Stage 0 focuses on making the right strategic decisions, capturing them in a business case and developing the strategic brief before the initial project brief is developed. This stage involves considering the pros and cons, project risks and project budget for a range of options and, where necessary, carrying out site surveys and corresponding planning appraisals, before undertaking a comparative analysis, recommending and ratifying the best option for delivering the client's requirements.

Stage 0 may require a review of several sites or alternative options, such as extension, refurbishment or new build. By asking the right questions, the consultants, in collaboration with the client, can properly define the scope for a project and the preparation and briefing process can begin.

OGC Gateway 1 is comparable to RIBA Stage 0.

Task: The quantity surveyor/cost manager is to prepare a rough order of cost estimate of one or more options, which captures a very high-level calculation of the construction and associated renewal and maintenance works costs to meet the client's requirements, including high-level spatial requirements, while taking into consideration any project risks. The estimated construction and associated maintenance works costs will be stated in terms of estimated cost per square meter of gross internal floor area (cost/m^2 of GIFA) or by reference to the estimated cost of a functional type, e.g. school place, bed space, etc. (cost per functional unit), taking account of feedback from previous similar construction projects.

The estimated construction costs will be used to inform the initial project budget, which forms part of the business case, with the addition of professional fees and land acquisition costs.

3.2.2 RIBA Stage 1: Preparation and Briefing

Outcome: The initial project brief is approved by the client and it is confirmed that it can be accommodated on the site.

The client's requirements for the project are considered in more detail, in connection with a specific site or sites.

The initial project brief will contain guidance on the project outcomes, sustainability outcomes and quality aspirations. These will influence how the client, design and construction teams are assembled to form the project team as part of the procurement strategy. It will also define each party's roles and responsibilities within the responsibility matrix, as well as the methods of information exchange. It may also dictate the core milestones in the project programme.

Stage 1 is about developing the information that the design team will need to commence the design process at RIBA Stage 2 (Concept Design).

The preparation of the initial project brief is the most important task undertaken during Stage 1. The time required to prepare it will depend on the complexity of the project.

The importance of properly establishing the project team cannot be underestimated, given the increasing use of technology that enables remote communication and project development using BIM. For Stage 2 to commence in earnest, it is essential that the project team is properly assembled.

OGC Gateway 2 is comparable to RIBA Stage 1.

Tasks: The quantity surveyor/cost manager is to perform the following tasks.

1. Prepare order of cost estimates to test the feasibility of achieving the emerging project brief, including quality aspirations and project strategies, when carrying out feasibility studies (also referred to as option studies), taking into consideration any project risks associated with the option.
2. Break down the cost of elements to highlight any areas that might cause significant cost-related project risks (e.g. foundation type) and consider the risk profile of potential market changes and effects of inflation. Refer to section 3.6.
3. Agree the cost limit.

The purpose of an order of cost estimate is to establish whether the proposed building project is affordable and, if so, to establish a realistic cost limit for the building project. The cost limit is the maximum expenditure that the client is prepared to make in relation to the completed project (i.e. authorised budget), which will be managed by the project team.

For existing buildings or other built assets, order of cost estimates are prepared to establish high-level budgets to inform the client's forward maintenance plans, or to help the client's building maintenance team to formulate a business case to obtain funding for the life cycle renewal and annualised maintenance programmes of works.

Although order of cost estimates for building maintenance costs are normally considered over a period of time (i.e. the defined life cycle of the building or other built asset, or over an agreed timescale defined in the client's brief), they can be prepared to inform a single annual maintenance programme.

Order of cost estimates are commonly presented in the form of an initial LCCP. The LCCPs for capital building works may be used by the client to inform a wider investment appraisal (or whole life cost plan). This may consider other costs (e.g. O – Operations and occupancy costs, and E – Environmental and/or end of life costs, plus any other relevant non-construction costs and/or incomes and externalities, as agreed in scope).

For developing order of cost estimates, the costs in connection with building maintenance works – the R and M works – are to be defined under two separate cost categories for renewal works and maintenance works.

A more detailed breakdown of the estimated costs will evolve through cost planning as the design of the building is developed. Guidance for the cost planning of R and M works can be found in Part 4.

For construction projects, order of cost estimates should be based on unit rates for R and M works (refer to section 3.8) applicable to the method of measurement adopted (elemental functional unit method). Unit rates are essential to enable quantity surveyors/cost managers to do the LCCs during the appraisal and design briefing stages of a project.

3.3 Information requirements for an order of cost estimate

To enable the preparation of an order of cost estimate, the following information will be required (this is not exhaustive, and is intended to provide guidance only).

For a new building and/or refurbishment, or a facility and/or function type:

1. the building(s) description and the site location(s)
2. a statement of building use and occupancy details (e.g. in use/sublet/vacant)
3. a statement of floor area (GIFA) of each building(s) or functional type(s)
4. functional unit (e.g. bed spaces, office, etc.) and schedule of accommodation
5. NIA – if functional unit should be expressed by NIA
6. external site area (SA) – if grounds maintenance and external works are required
7. access considerations and hours of operation, e.g. security available 24/7 for 365-days-a-year use
8. building life (see Appendix C) and/or period of interest in the built asset or facility
9. period of analysis for the cost (i.e. 5 years, 10 years, 30 years or more)
10. views of maintenance procurement strategies (in house and/or outsourced)
11. discount rate – the annual percentage rate at which the PV of cost is assumed to fall away through time (see Appendix C)
12. budget/cash flow constraints – short-term and from a longer-term perspective
13. requirements for refurbishments (i.e. known details of all outstanding maintenance necessary so the built asset or facility meets the defined asset performance/condition standard)
14. particular requirements of building services installations (e.g. carbon reduction commitments, availability and critical system-specific requirements)
15. salient initial project brief information (e.g. statement of quality, sustainability requirements and any specific 'fit-out' plans and responsibilities for reinstatement)

16 requirements relating to:

- a reatment of consultants' and specialists' fees
- b other client-definable maintenance-related costs (e.g. IT systems)
- c risk allowances and
- d treatment of VAT and other taxation/incentives.

17 other considerations (e.g. approach to deal with capital allowances and grants).

For existing buildings, or a constructed facility and/or functional type, all as for new buildings or refurbishments above, plus:

1 age of the building (measured from the practical completion date of the building)

2 last major refurbishment, and salient details to inform service life planning

3 details of renewal work (actions arising from condition surveys and remaining-life assessments) and

4 period of analysis, or built asset or facility life (or interest, defined in the initial project brief).

For the purposes of an order of cost estimate, the costs of R and M works should be considered over a period of time (the life cycle of the built asset or facility, or agreed period of analysis defined in the initial project brief). Therefore, an essential element of an order of cost estimate is defining the life cycle period to be adopted. An assessment should therefore be made of the life of the investment, 'the building life', as detailed in Appendix C.

The accuracy of an order of cost estimate will depend on the quality of the information supplied to the quantity surveyor/cost manager. The more information provided, the more reliable the outcome will be. Where little or no information is provided, the quantity surveyor/cost manager will need to qualify the order of cost estimate accordingly.

3.4 Constituents of an order of cost estimate

The key constituents of an order of cost estimate for building maintenance works are shown in Table 3.1.

Constituent (cost centre)	**£Y_1**	**£Y_2**	**£Y_3**	**...**	**£Y_n**	**Reference**
	£k	£k	£k	£k	£k	
Renewal costs estimate (1)	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See sections 3.5 to 3.9
Maintenance costs estimate (2)	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See sections 3.5 to 3.9
Subtotal (3) [(3) = (1) + (2)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	
Maintenance contractor's management and administration costs estimate (4)	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See section 3.10
Subtotal (5) [(5) = (3) + (4)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	
Maintenance contractor's overheads and profit estimate (6)	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See section 3.11
Maintenance cost estimate (7) [(7) = (5) + (6)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	
Consultants' and specialists' fees estimate (8)	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See section 3.12
Other client-definable maintenance-related costs estimate (9)	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See section 3.13
Base cost estimate (10) [(10) = (7 + (8) + (9)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	
Risk allowances estimate (11)						See section 3.14
Design installation risks (11a)	£Y_1	£Y_2	£Y_3	...	£Y_n	
Maintenance risks (11b)	£Y_1	£Y_2	£Y_3	...	£Y_n	
Client change risks (11c)	£Y_1	£Y_2	£Y_3	...	£Y_n	
Client other risks (11d)	£Y_1	£Y_2	£Y_3	...	£Y_n	
Risk allowance estimate (11) [(11) = (11a) + (11b) + (11c) + (11d)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	
Cost limit (at current price levels) (12) [(12) = (10) + (11)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	
Discount factor (DF) (13)	DF^1	DF^2	DF^3	. . .	DF^n	See section 3.19

Constituent (cost centre)	£Y_1	£Y_2	£Y_3	...	£Y_n	Reference
	£k	£k	£k	£k	£k	
PV (14) [(14) = (12) × (13)]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See section 3.19
NPV (total cost limit) (15) [(15) = ∑(PV) (14)] [= ∑PV Y_1 to PV Y_n]	£Y_1	£Y_2	£Y_3	. . .	£Y_n	See section 3.19

Table 3.1: Constituents of an order of cost estimate

Notes on Table 3.1:

1 VAT and other taxation incentives are excluded; see sections 3.16 to 3.17.

2 Other considerations (as defined in section 3.18) are to be taken into account, if required.

3 £Y_1 = Year 1 costs

4 £Y_2 = Year 2 costs

5 £Y_3 = Year 3 costs

6 £Y_n = Final year costs in which either maintenance or renewal works are to be undertaken

7 DF^1 = Year 1 discount factor

8 DF^2 = Year 2 discount factor

9 DF^3 = Year 3 discount factor

10 DF^n = Discount factor for final year in which either maintenance or renewal works are to be undertaken

The base cost estimate is the total of the renewal costs estimate, the maintenance cost estimate, maintenance contractor's management and administration costs estimate, maintenance contractor's and overheads and profit estimate, consultants' and specialists' fees and the other client-definable maintenance costs estimate. The base cost estimate should not contain allowances for risk, inflation or VAT.

Allowances for risk and inflation (where applicable) are to be calculated separately and added to the base cost estimate to determine the cost limit for the maintenance works.

When required by the client, the PV is calculated and the NPV of maintenance works and the equivalent annual value are ascertained. This allows different development and maintenance scenarios to be compared on the same basis. The method of dealing with the time value of money is dealt with in section 3.19.

Reference should be made to the cost classification of high-level costs as contained in ICMS.

3.5 Floor area and functional unit methods

Quantities for the building maintenance work, for both R and M works, should be determined by measuring the total GIFA of the building or built assets (using the floor area method) or by projecting the number of functional units (using the functional unit method). In certain circumstances, a combination of both the floor area method and functional unit method may need to be employed.

3.5.1 Floor area method

For Renewal (R) works: The total GIFA of the building or built assets is measured and multiplied by an appropriate cost/m^2 of GIFA. The equation for calculating the total estimated cost of future R works is therefore:

R = a × b

where:

- **a** = GIFA
- **b** = cost/m^2 of GIFA for renewal works
- **R** = renewal cost estimate (i.e. total renewal cost estimate, annualised over the analysis period, in scope)

For Maintain (M) works: The total GIFA of the building or built assets is measured and multiplied by an appropriate cost/m^2 of GIFA. The equation for calculating the total estimated cost of M works is therefore:

M = a × b

where:

- **a** = GIFA
- **b** = cost/m^2 of GIFA for M works
- **M** = maintenance cost estimate (i.e. total maintenance works costs, annualised over the analysis period, in scope)

The GIFA should be measured in accordance with 'Core definition: gross internal area (GIFA)' in the latest edition of the RICS **Code of Measuring Practice**.

Where measurement is for more than one building, the measurement for each building should be shown separately.

Where a single building comprises more than one user function (e.g. residential, retail and offices), the GIFA of each function should be calculated and quantified separately. The sum total of the GIFA for each separate function should be equal to the GIFA for the whole building. To establish the GIFA of each separate building function, the centre line of the party wall should be used to delineate the functions.

Where the external works are to be measured separately (e.g. to capture the estimated costs of grounds maintenance works), the external SA should be measured. The SA is the total area of the site within the site title boundaries (or the total area within the title boundaries defined by

the client as the site for the building), excluding the footprint of the building(s), measured on a horizontal plane.

The estimated costs of annualised R and M works are to be calculated for each year of the building or asset life cycle, e.g. year 0 (current year), year 1, year 2, year 3 … year 25+.

Unit rates (e.g. cost/m^2 of GIFA) used should be current at the time the order of cost estimate is prepared, irrespective of the year that the R or M works are to be undertaken.

Given that costs in connection with R and M works will be expended in the future, for the PV of the future cash flow, both the total (the NPV) and the yearly PVs are to be calculated. Guidance on ascertaining the annual PV and the NPV of a future cash flow is given in section 3.19.

3.5.2 Functional unit method

Functional units are a unit of measurement used to represent the prime use of a building or part of a building. It is essential that the functional unit is clearly identified when measurements are expressed in this way. A list of commonly used functional units and functional units of measurement for buildings, or constructed facilities, is provided in Appendix A.

A suitable functional unit of use for the building should be selected (e.g. office, air-conditioned). The total number of functional units is determined and multiplied by an appropriate functional unit (or cost per functional unit).

For Renewal (R) works: The equation for calculating the total estimated cost is therefore:

$$\mathbf{R = a \times b}$$

where:

- a = number of functional units
- b = cost per functional unit (or functional unit cost)
- R = renewals cost estimate (i.e. total estimated cost of renewal works, annualised over the analysis period, in scope)

For Maintain (M) works: The equation for calculating the total estimated cost is therefore:

$$\mathbf{M = a \times b}$$

where:

- a = number of functional units
- b = cost per functional unit (or functional unit cost)
- M = maintenance cost estimate (i.e. total estimated cost of maintenance works, annualised over the analysis period, in scope).

A functional unit includes all circulation space.

Where the external works are to be measured separately (e.g. to capture the estimated cost of ground maintenance works), the external SA should be measured. The SA is the total area of the site within the title boundaries (or the total area within the site title boundaries defined by the client as the site for the building), excluding the footprint of the building(s), measured on a horizontal plane.

The estimated costs of R and M works are to be ascertained for each year of the building or built asset's life cycle, e.g. year 0 (current year), year 1, year 2, year 3 … year 25+.

Unit rates (e.g. cost/m^2 of GIFA) used are to be current at the time the order of cost estimate is prepared, irrespective of the year that the R and M works are to be undertaken.

Given that costs in connection with R and M works will be expended in the future, for the PV of the future cash flow, both the total (the NPV) and the yearly PVs are to be calculated. Guidance on ascertaining the annual PV and the NPV of a future cash flow is given in section 3.19.

3.6 Elemental method

For new buildings and existing built assets, the elemental method is an alternative approach for calculating the total estimated cost of both capital building and maintenance works (the building and maintenance works estimate). The elemental method considers the major elements of the building maintenance works (in scope), and provides an order of cost estimate based on an elemental breakdown applicable to the building project and maintenance-related works agreed (in scope).

Typically, the group elements and elements used in the elemental method are the same as those used in the elemental cost planning process for capital building works. However, the choice and number of elements used to break down the maintenance cost estimate will be dependent on the applicable maintainable assets in scope and the information available.

The major elements commonly used when preparing order of cost estimates using the elemental method are listed in Table 3.2.

Group element	Element
0 Facilitating works	**0.0** Facilitating works
1 Substructure	**1.0** Substructure
2 Superstructure	**2.1** Frame **2.2** Upper floors **2.3** Roof **2.4** Stairs and ramps **2.5** External walls **2.6** Windows and external doors **2.7** Internal walls and partitions **2.8** Internal doors
3 Internal finishes	**3.1** Wall finishes **3.2** Floor finishes **3.3** Ceiling finishes
4 Fittings, furnishings and equipment	**4.1** Fittings, furnishings and equipment
5 Services	**5.1** Sanitary installations **5.2** Services equipment **5.3** Disposal installations **5.4** Water installations **5.5** Heat source **5.6** Space heating and air conditioning **5.7** Ventilation **5.8** Electrical installations **5.9** Fuel installations **5.10** Lift and conveyor installations/systems **5.11** Fire and lightning protection **5.12** Communication, security and control systems **5.13** Special installations/systems **5.14** Builder's work in connection with services

Group element	Element
6 Prefabricated buildings and building units	Not covered by NRM 3
7 Works to existing buildings	**7.1** Minor demolition works and alteration works **7.2** Repairs to existing services **7.3** Damp-proof courses/fungus and beetle eradication **7.4** Facade retention **7.5** Cleaning existing surfaces **7.6** Renovation works
8 External works	**8.1** Site preparation works (not applicable to NRM 3) **8.2** Roads, paths and paving **8.3** Planting (i.e. grounds maintenance) **8.4** Fencing, railings and walls **8.5** External fittings **8.6** External drainage **8.7** External services

Table 3.2: Elemental structure for elemental life cycle cost planning of construct, renewal and maintain works

See The logic and levels table published separately on the NRM page, which provides a detailed list of all group elements or systems, sub-elements and components used for elemental cost planning.

The method of measuring and unit of measurement for each of the elements are set out in section 3.7, Table 3.3, which is aligned with the NRM 1 elemental method of cost estimating.

If suitable information is available, then element unit quantities (EUQs) are measured for an element in accordance with the guidance, and priced with suitable EURs to ascertain the cost target for an element. Where insufficient information is available for a particular element, the EUQ for the element is based on the GIFA. The equation for calculating the cost target, say renewal (R) works, for an element is therefore:

$$\mathbf{c = a \times b}$$

where:

- **a** = EUQ
- **b** = EUR

- **c** = cost target (for element) for R works

The **total estimated cost of R works** (i.e. the renewal cost estimate) is ascertained by adding together the cost target for each element. The equation for calculating the R works estimate using the elemental method is therefore:

b = ∑ (a0 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 + aX etc.)

where:

- **a0, a1, a2, a3, etc.** = cost target for element
- **b** = renewal cost estimate

The **total estimated cost of M works** (i.e. the maintenance cost estimate) is ascertained by adding together the cost target for each element. The equation for calculating the M works estimate using the elemental method is therefore:

b = ∑ (a0 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 + aX etc.)

where:

- **a0, a1, a2, a3, etc.** = cost target for element
- **b** = maintenance cost estimate

Where a building and maintenance project comprises more than one building, the order of cost estimate for each building should be shown separately. See section 2.8.

The elemental method can also be used to generate an initial cost model (or an outline elemental cost plan) at the commencement of RIBA Stage 2 (Concept Design) and/or OGC Gateway 3A (Design Brief and Concept Approval), whichever is applicable. This elemental breakdown provides a frame of reference from which formal cost plan can be developed; see Part 4. The initial EUQs and EURs will eventually be superseded by more detailed measurement of elements, sub-elements, components and unit rates once suitable design- and maintenance-related information has been prepared and the elemental cost plan evolves.

The measurement rules for the elemental method of estimating in Table 3.3 can also be used as a basis for measuring EUQs for the cost analysis and benchmark analysis of maintenance works. The content of each group element is defined in Part 6.

3.7 Measurement rules for elemental method of estimating

Table 3.3 comprises measurement guidance for EUQs that can be used to develop an order of cost estimation using the elemental method of estimating. The table provides guidance and comprises the rules of measurement for building maintenance works and renewal works cost estimating (i.e. for group elements 0 to 10). The table is structured as follows.

a The first column lists the group element.

b The second column lists the element.

c The third column lists the unit of measurement for group elements and elements, as appropriate.

d The fourth column lists the rules of measuring EUQs for group elements and elements/sub-elements, as appropriate.

e The last column contains further advice on measuring EUQs.

The definitions of each group element and element used in the elemental method of cost estimating are the same as those defined for elemental cost plans in Part 6.

If suitable information is available, then EUQs should be measured for a group element, element or sub-element in accordance with the guidance, and priced with suitable EURs to ascertain the cost target for an element.

If suitable information is available, EUQs are measured for a group element or element in accordance with the rules, and priced with suitable EURs to ascertain the cost target for an element. Where insufficient information is available for an element, the EUQ for that element is to be the GIFA.

The measurement rules for the elemental method of estimating in Table 2.2 can also be used as a basis for measuring EUQs to perform cost analyses and benchmark analyses for tendered building projects.

EURs for R and M works are an essential method of cost estimating and life cycle costing of construction projects. Unit cost information should be derived from detailed elemental cost analysis and benchmarking based on outturn unit costs (i.e. from building R and M costs during the in-use phases (benchmark costs in-use unit rates)).

Group element	Element	Unit	Measurement rules	Notes
0 Facilitating works	**0.1** Toxic/ hazardous/ contaminated material treatment	m^2	The area measured is the site area (i.e. the total area of the site).	Costs to be separately shown for each type of toxic/hazardous material to be removed.
	0.2 Major demolition works		**1** The area measured is the GIFA of the building(s) demolished. **2** The area measured is measured in accordance with the rules of measurement for ascertaining GIFA.	Costs to be separately shown for each building demolished.
	0.3 Temporary support for adjacent structures		The area measured is the area of wall to be supported.	Costs to be separately shown for each structure to be supported.
	0.4 Specialist groundworks		The area measured is the site area (i.e. the total area of the site).	Costs to be separately shown for each element.
	0.5 Temporary diversion works			
	0.6 Extraordinary site investigation works			
1 Sub-structure	**1.1** Substructure	m^2	**1** The area measured is the area of the lowest floor measured to the internal face of the external perimeter walls. **2** The area of the lowest floor should be measured in accordance with the rules of measurement for ascertaining the GIFA. **3** Area of basements to be shown separately. **4** The area of basements shall be measured in accordance with the rules of measurement for ascertaining the GIFA.	

Group element	Element	Unit	Measurement rules	Notes
2 Super-structure	**2.1** Frame	m^2	**1** The area measured is the area of the floors related to the frame. **2** The area of the frame shall be measured in accordance with the rules of measurement for ascertaining the GIFA.	Buildings with open ground floors, etc. exclude the area of the open ground floor (i.e. for a completely framed building this would equate to the GIFA).
	2.2 Upper floors		**1** The area measured is the total area of upper floors. **2** The area of the upper floors should be measured in accordance with the rules of measurement for ascertaining the GIFA. **3** Sloping surfaces such as galleries, tiered terraces, etc. should be measured flat on plan. **4** Areas for balconies, galleries, tiered terraces, service floors, walkways, internal bridges, external links and roofs to internal buildings shall be shown separately.	Where balconies are included, the sum of the upper floors and lowest floor will exceed the GIFA.
	2.3 Roof	m^2	The area measured is the area of the roof on plan measured to the inside face of the external walls.	
	2.4 Stairs and ramps	nr	**1** Enumerate, giving total number of storey flights, i.e. the number of staircases or ramps multiplied by the number of floors served (excluding the lowest floor served in each case). **2** The total vertical rise of each staircase or ramp is to be stated, measured from top of structural floor level to top of structural floor level.	

Group element	Element	Unit	Measurement rules	Notes
2 Super-structure	**2.5** External walls	m^2	The area measured is the area of the external wall, measured on the internal perimeter (i.e. the internal face) of the external wall, less the area of windows.	**1** It is unlikely that the thickness of external wall construction will be known at RIBA Stages 0 and 1 or OGC Gateways 1 and 2. **2** Costs to be separately shown for each type of external wall system. **3** Sub-element includes costs in connection with forming openings for windows and external doors.
	2.6 Windows and external doors		The area measured is the area of windows and external doors measured over frames.	Costs in connection with forming openings for windows and external doors to be included in sub-element 2.5.
	2.7 Internal walls and partitions		The area measured is the area of internal walls and partitions – measured on the centre line.	Costs to be separately shown for each type of internal wall or partition.
	2.8 Internal doors	nr	Enumerate, giving total number of internal doors.	Irrespective of door type.
3 Internal finishes	**3.1** Wall finishes	m^2	The area measured is the total area of wall finishes (i.e. the area of wall to which finishes are applied).	
	3.2 Floor finishes		The area measured is the total area of floor finishes (i.e. the area of floor to which finishes are applied).	
	3.3 Ceiling finishes		The area measured is the total area of ceiling finishes (i.e. the area of ceiling to which finishes are applied).	
4 Fittings, furnishings and equipment	**4.1** Fittings, furnishings and equipment	m^2	**1** The area measured is the GIFA. **2** The area measured is measured in accordance with the rules of measurement for ascertaining the GIFA.	

Group element	Element	Unit	Measurement rules	Notes
5 Services	**5.1** Sanitary installations	nr	**1** Enumerate, giving total number of appliances. **2** The total number of appliances enumerated is the total number of items of: **a** domestic sanitary appliances **b** specialist sanitary appliances **c** bathroom pods **d** toilet pods **e** shower room pods.	
	5.2 Services equipment		**1** Enumerate, giving total number of items. **2** The total number of items enumerated is the total number of items of: **a** commercial catering equipment **b** sinks supplied as an integral part of catering equipment **c** food storage equipment **d** specialist equipment.	
	5.3 Disposal installations		**1** Enumerate, giving total number of aboveground waste installations to sanitary appliances and service equipment, and entry chutes to refuse disposal installations. **2** The total number of items enumerated is the total number of items listed below: **a** waste points for sanitary appliances **b** waste points for service equipment **c** waste points for laboratory and industrial liquid waste	**1** Do not separately enumerate ancillary fittings/items. Costs of ancillary fittings/items to be included in unit cost for item. **2** Costs and measurements to be separately shown for: **a** drainage for sanitary appliances **b** drainage for services equipment (e.g. sinks)

Group element	Element	Unit	Measurement rules	Notes
5 Services	**5.3** Disposal installations (continued)	nr	**d** entry points for rubbish chutes **e** entry points for chemical and industrial waste appliances.	**c** drainage for laboratory and industrial liquid waste **d** refuse disposal installations **e** chemical and industrial refuse disposal installations.
	5.4 Water installations		**1** Enumerate, giving total number of draw-off points. **2** The total number of draw-off points enumerated is the total number of items of: **a** mains supply draw-off points **b** cold water draw-off points **c** hot water draw-off points **d** steam and condensate draw-off points.	Costs to be separately shown for each: **a** mains supply draw-off point **b** cold water draw-off point **c** hot water draw-off point **d** steam and condensate draw-off point.
	5.5 Heat source	kW	State total number of kilowatts.	**1** Costs to be separately shown for each heat source. **2** State number and type of each heat source. **3** Rating in kilowatts to be stated for each heat source.
	5.6 Space heating and air conditioning systems	m^2	**1** The area measured is the area serviced by the system. **2** The area serviced is measured in accordance with the rules of measurement for ascertaining the GIFA. **3** Where more than one system is employed, the area measured for each system is the area serviced by the system.	Costs to be separately shown for each type of system.
	5.7 Ventilation systems			
	5.8 Electrical installations			
	5.9 Fuel installations			

Group element	Element	Unit	Measurement rules	Notes
5 Services	**5.10** Lift and conveyor installations	nr	Enumerate, giving total number of lift and conveyor installations.	Costs to be separately shown for each type of lift and/or conveyor installation: **a** lifts (passenger, goods, firefighting, etc.); also state number of levels served **b** enclosed hoists; also state number of levels served **c** escalators; also state number of levels served (nr), rise (m) and length of travel (m) **d** moving pavements; also state length of travel (m) **e** powered stairlifts **f** conveyors (passenger or goods); also state length of travel (m) **g** dock levellers and scissor lifts; also state total rise (m) and designed load (kN) **h** cranes, unenclosed cranes and unenclosed hoists; also state total rise (m) and designed load (kN) **i** car lifts; also state number of levels served

Group element	Element	Unit	Measurement rules	Notes
5 Services	**5.10** Lift and conveyor installations (continued)	nr	Enumerate, giving total number of lift and conveyor installations.	**j** car stacking systems; also state capacity **k** car/lorry turntables and the like **l** document handling systems **m** other lift and conveyor installations.
	5.11 Fire and lightning protection	m^2	**1** The area measured is the area serviced by the system. **2** The area serviced is measured in accordance with the rules of measurement for ascertaining the GIFA. **3** Where more than one system is employed, the area measured for each system is the area serviced by the system. Areas to be measured using the rules of measurement for ascertaining the GIFA.	Costs to be separately shown for each type of system.
	5.12 Communication, security and control systems			
	5.13 Specialist installations			
	5.14 Builder's work in connection with services		**1** The area measured is the GIFA. **2** The area measured is measured in accordance with the rules of measurement for ascertaining the GIFA.	
6 Pre-fabricated buildings and building units	**6.1** Prefabricated buildings and building units	m^2	**1** The area measured is the GIFA of the complete buildings or prefabricated room units. **2** The area measured is measured in accordance with the rules of measurement for ascertaining the GIFA.	Costs to be separately shown for each: **a** complete prefabricated building **b** type of prefabricated room unit (stating number of units).
7 Work to existing buildings	**7.1** Minor demolition and alteration works	m^2	**1** The area measured is the GIFA of the building(s) demolished or altered. **2** The area measured is measured in accordance with the rules of measurement for ascertaining GIFA.	Costs to be separately shown for each building demolished or altered.
	7.2 Repairs to existing services			

Group element	Element	Unit	Measurement rules	Notes
7 Work to existing buildings	**7.3** Damp-proof courses/fungus and beetle eradication	m^2	**1** The area measured is the GIFA of the room(s) treated. **2** The area of the rooms treated is measured in accordance with the rules of measurement for ascertaining the GIFA.	Costs to be separately shown for each building demolished or altered.
	7.4 Facade retention		The area measured is the area of facade to be retained.	
	7.5 Cleaning existing surfaces		The area measured is the surface area of the surface to be cleaned. No deduction for voids.	Costs to be separately shown for each type of surface.
	7.6 Renovation works		The area measured is the area to be renovated.	Costs to be separately shown for each type of surface to be renovated.
8 External works	**8.1** Site preparation works	m^2	The area measured is the site area, less the footprint of the building (or buildings) measured on the horizontal plane.	Costs to be separately shown for each element.
	8.2 Roads, paths, pavings and surfacings			
	8.3 Soft landscapes, planting and irrigation systems			
	8.4 Fencing, railings and walls			
	8.5 External fixtures			
	8.6 External drainage			
	8.7 External services			
	8.8 Minor building works and ancillary buildings		**1** The area measured is the GIFA of the building(s). **2** The area measured is measured in accordance with the rules of measurement for ascertaining the GIFA.	

Group element	Element	Unit	Measurement rules	Notes
9 Main contractor's preliminaries		%	The cost of main contractor's preliminaries as a percentage of the total cost of facilitating works and building works.	
10 Main contractor's overheads and profits		%	The cost of main contractor's overheads and profit as a percentage of the total cost of facilitating works, building works and main contractor's preliminaries.	

Table 3.3: Rules of measurement for elemental method of cost estimating

Notes on Table 3.3:

1 Facilitating works do not apply to maintenance works for permanent structures (e.g. major demolitions covered in NRM 1).

2 Substructure (foundations, basement walls and lowest floor slab) are not maintainable works. They will, however, require periodic inspection. Inspections are generally carried out for the building 'as a whole'. An allowance should be made for proactive maintenance. For drainage under the building and within the building footprint (e.g. gullies, ducts and manholes), maintenance work is measured in accordance with the tables in Part 6. Where an estimate is for an existing building, remedial work resulting from a structural survey should be included under this element; where no structural survey data exists, an allowance may be made in group element 13: Risks.

3 Frame structures are not maintainable works. Where an estimate is for an existing building, remedial work resulting from an inspection (i.e. a structural survey) should be included under this element. Where no inspection data exists, it is recommended that a suitable allowance is made under group element 13: Risks.

4 Upper floor structures: with the exception of drainage to balconies (outlets, gutters, downpipes, etc.), these are not included in maintenance works. Integral maintenance work to balcony drainage is measured in accordance with the tables in Part 6. Where the estimate is for an existing building, remedial work resulting from an inspection should be included under this element. Where no inspection data is available, it is recommended that a suitable allowance may be made in group element 13: Risks.

5 Roof structures: where the estimate is for an existing building, remedial work resulting from a structural survey should be included under this element. Where no inspection data is available, it is recommended that a suitable allowance may be made in group element 13: Risks. These rules apply to the maintenance of roof coverings, specialist roof systems, roof drainage, rooflights and roof features.

6 Stair and ramp structures are not maintainable works. Where the estimate is for an existing building, remedial work resulting from an inspection should be included under this element. Where no inspection data is available, it is recommended that a suitable allowance may

be made in group element 13: Risks. These rules apply to the maintenance of stair/ramp finishes and balustrades.

7 External wall structures are not included in maintainable works, except where re-pointing, re-sealing, etc. occurs within the study period. Where the estimate is for an existing building, remedial work resulting from a structural survey/inspection should be included under this element; where no inspection data exists, it is recommended that a suitable allowance is made under group element 13: Risks. These rules apply to the maintenance of solar/rain screening and facade access cleaning systems.

8 Internal walls and partition structure replacements are not maintainable work. Where an estimate is for an existing building, remedial work resulting from an inspection should be included under this element. Where no inspection data exists, it is recommended that a suitable allowance is made under group element 13: Risks. These rules apply to the maintenance of demountable partitions, moveable room dividers and cubicles.

9 Where prefabricated units are incorporated into a building, the maintenance should be measured and priced in the appropriate element, e.g. sanitary fittings supplied in bathroom pods should be included in element 5.1: Sanitary installations.

10 On refurbishment schemes, or where parts of an existing building are incorporated into a new building, the maintenance should be measured and priced in the appropriate element.

11 Site preparation works are a construction item and are excluded from maintenance works.

3.8 Unit rates and EURs used to estimate the cost of R and M works

The unit rates used are to be current at the time the order of cost estimate is produced. That is, they must exclude any allowances for future inflation or deflation.

Unit rates applied to measured quantities should be applicable to the method of measurement used (i.e. rates based on cost/m^2 of GIFA to be used for measured quantities determined using the floor area method, a cost per functional unit for measured quantities calculated using the functional unit method and appropriate EURs where measured quantities are derived using the elemental method).

Both unit rates (i.e. cost/m^2 of GIFA or cost per functional unit (or functional unit cost)) and EURs used to estimate the total cost R and M works are to include the cost of all materials (including consumables), labour and plant that are specifically required to renew and maintain the building component or element.

Unit rates and EURs are also to include allowances for any subcontractors' or suppliers' design fees, preliminaries and overheads and profit.

Unit rates and EURs are to exclude allowances for maintenance contractor's operating costs, maintenance contractor's overheads and profit and other allowances (such as consultants' and specialists' fees, other related costs, risk allowances and inflation). These items are to be assessed separately and added to the estimated cost of renewal works and maintenance works to give the maintenance cost estimate.

Costs per functional unit (or functional unit costs) include costs associated with all circulation space associated with the functional unit.

The cost/m^2 of GIFA, the cost per functional unit (or functional unit cost) and EURs can be derived from cost analyses or from benchmark analyses of previous maintenance programmes of a similar type. Where this is done, the unit rates should, if necessary, be adjusted to reflect changes in maintenance levels between the previous maintenance programmes and the proposed maintenance programmes. Time and regional variation of costs should also be considered.

When using unit rates from life cycle cost analyses and benchmark analyses, it is recommended that such rates are adjusted to reflect prices current at the time the order of cost estimate is prepared (i.e. adjusted to remove allowances included for inflation).

It is further recommended that cost analyses (and benchmark analyses) are based on the agreed contract sum (i.e. the original contract sum) not the final contract sum (i.e. the agreed final account sum). There are two main reasons for this.

- The life cycle cost analyses (or benchmark analyses) would not be available until after the final account sum had been agreed, which could be three or four years after an analysis is undertaken at the tender stage.
- It is much more difficult to analyse both the original contract sum and variation account than to analyse the original contract sum alone.

3.9 Updating unit rates and other costs to current estimate base date

The estimate base date should be established for an order of cost estimate. It is therefore essential that the unit rates used from cost analyses and benchmark analyses are updated to bring them into line with the estimate base date established for the order of cost estimate.

To do this, the unit rate is increased by the amount of inflation occurring during the period from the base date of cost data to the current estimate base date. The equation for calculating the updated unit rate is therefore:

$$Ra2 = Ra1 + (Ra1 \times p)$$

where:

- **Ra1** = unit rate at the base date of cost data
- **Ra2** = unit rate at the current estimate base date
- **p** = percentage addition for inflation

The percentage addition for inflation can be computed using published indices (i.e. tender price indices, maintenance price indices or retail prices indices). Alternatively, the percentage addition can be derived from in-house sources of indices. Using the appropriate published indices, the equation for calculating the percentage addition/reduction for inflation/deflation is therefore:

$$p = \frac{\text{Index 2} - \text{Index 1}) \times 100}{\text{Index 1}}$$

where:

- **Index 1** = index at the base date of cost data
- **Index 2** = index at the current estimate base date
- **p** = percentage addition/reduction for inflation

Care should be taken not to update previous rates that were based on percentage additions (e.g. maintenance contractor's management and administration costs, maintenance contractor's overheads and profits, and consultants' and specialists' fees). Such items will be systematically updated when the percentage addition is applied to the updated unit rates (and other rates).

3.10 Maintenance contractor's management and administration costs

Maintenance contractor's management and administration costs are to be added as a percentage to the total cost of maintenance works (i.e. to the maintenance works estimate). The percentage addition to be applied can be derived from a properly considered assessment of the cost analyses of previous maintenance programmes. The percentage can be ascertained by calculating the maintenance contractor's management and administration costs as a percentage of the total cost of all elements forming the maintenance works. Benchmark data from previously completed maintenance works contracts can also be used to assess the level of maintenance contractor's management and administration costs to be applied to new maintenance programmes.

The maintenance contractor's management and administration cost estimate should be calculated by applying the selected percentage addition to the cost of the R and M works. The equation for calculating the total cost of maintenance contractor's management and administration costs is therefore:

$$c = (Rc + Mc) \times p$$

where:

- **Rc** = R works estimate (i.e. the total estimated cost of R works)
- **Mc** = M works estimate (i.e. the total estimated cost of M works)
- **p** = percentage addition for maintenance contractor's management and administration costs
- **c** = maintenance contractor's management and administration costs estimate (i.e. the total estimated cost of maintenance contractor's management and administration costs).

The maintenance contractor's management and administration cost estimate is added to the combined total of the R and M work estimates. The equation for calculating the subtotal is:

$$d = Rc + Mc + c$$

where:

- **Rc** = R works estimate (i.e. the total estimated cost of R works)
- **Mc** = M works estimate (i.e. the total estimated cost of M works)
- **c** = maintenance contractor's management and administration costs estimate (i.e. the total estimated cost of maintenance contractor's management and administration costs)

- **d** = subtotal, i.e. the total cost of R and M works, excluding maintenance contractor's overheads and profit

If known during the early stages, costs relating to known site constraints (e.g. access, special security or operational conditions, sequencing of works, or other client- or site-specific non-standard requirements) are to be assessed and identified separately.

Allowances for subcontractors' and suppliers' management and administration costs, design fees, risk allowances, and overheads and profit are to be incorporated in the cost/m^2 of GIFA, cost per functional unit (or functional unit cost) or EURs used to estimate the cost of maintenance works (i.e. to calculate the maintenance works estimate).

A list of typical items found in maintenance contractors' management and administration costs is provided in Part 6 (group element 9: Maintenance contractor's management and administration costs).

For the most part, management and administration costs are those relating to administering a maintenance contract and providing plant, site staff, facilities, and site-based services and other items not included in the rates for measured works. For the avoidance of doubt, or double accounting, specifically state what is included or excluded in the maintenance contractor's management and administration costs.

3.11 Maintenance contractor's overheads and profit

Maintenance contractor's overheads and profit should be based on a percentage addition. The estimated cost of any maintenance contractor's overheads and profit should be calculated by applying the selected percentage addition for overheads and profit to the combined total cost of the R and M works estimates and the maintenance contractor's management and administration cost estimate. The equation for calculating the total estimated cost of maintenance contractor's overheads and profit is therefore:

e = (Rc + Mc + c) × p

where:

- **Rc** = R works estimate (i.e. the total estimated cost of R works)
- **Mc** = M works estimate (i.e. the total estimated cost of M works)
- **c** = maintenance contractor's management and administration costs estimate (i.e. the total estimated cost of maintenance contractor's management and administration)
- **p** = percentage for maintenance contractor's overheads and profit
- **e** = maintenance contractor's overheads and profit estimate (i.e. the total estimated cost of the maintenance contractor's overheads and profit)

The percentage addition to be applied for maintenance contractor's overheads and profit should be derived from a properly considered assessment of maintenance contractor's overheads and profit found from previous maintenance contracts, or as submitted with a competitive tender for the maintenance works.

The maintenance contractor's overheads and profit estimate should be added to the combined total of the R and M works estimates and the maintenance contractor's management and

administration cost estimate. The equation for calculating the maintenance cost estimate is therefore:

m = Rc + Mc + c + e

where:

- **Rc** = R works estimate (i.e. the total estimated cost of R works)
- **Mc** = M works estimate (i.e. the total estimated cost of M works)
- **c** = maintenance contractor's management and administration costs estimate (i.e. the total estimated cost of maintenance contractor's management and administration costs)
- **e** = maintenance contractor's overheads and profit estimate (i.e. the total estimated cost of the maintenance contractor's overheads and profit)
- **m** = maintenance cost estimate

A list of typical items to be found in maintenance contractor's overheads and profit is provided in Part 6 (group element 10: Maintenance contractor's overheads and profit; see section 6.2.3). These examples do not provide a definitive or exhaustive list of items but are simply a guide.

3.12 Consultants' and specialists' fees

Consultants' and specialists' fees are to be included in order of cost estimates unless specifically excluded at the request of the client. A list of typical consultants' and specialists' fees is provided in Part 6 (group element 11: Consultants' and specialists' fees; see section 6.2.4). These examples do not provide a definitive or exhaustive list of items but are simply a guide.

It is recommended that a single allowance is made for consultants' and specialists' fees, including stating the specific purpose as it applies to the maintenance works in scope.

For order of cost estimates, it is recommended that consultants' and specialists' fees be based on a percentage addition. These are to be calculated by applying a selected percentage addition to the total maintenance work cost estimate. The equation for calculating consultants' and specialists' fees and other maintenance works costs is therefore:

f = (m × p)

where:

- **m** = maintenance cost estimate
- **p** = percentage allowance for consultants' and specialists' fees
- **f** = consultants' and specialists' fees estimate (i.e. total estimated cost of consultants' and specialists' fees)

The consultants' and specialists' fees estimate is added to the overall maintenance works estimate.

3.13 Other client-definable maintenance-related costs

Other client-definable maintenance-related costs are costs that are not necessarily directly associated with the building maintenance works, or consultants' and specialists' fees/other

associated costs, but form part of the cost of procuring and managing the maintenance works by the client.

Examples are provided in Part 6 (group element 12: Client-definable maintenance-related costs). These examples do not provide a definitive or exhaustive list of items but are simply a guide.

These costs are to be included in order of cost estimates unless specifically excluded at the request of the client. Other client-definable maintenance-related costs are to be added as a lump sum allowance.

The nature of other client-definable maintenance-related costs and the extent of the lump sum allowance to be included in the order of cost estimate are to be ascertained in conjunction with the client.

The total estimated cost of other client-definable maintenance-related costs is added to the combined total of the maintenance works cost estimates and the consultants' and specialists' fees/other associated costs estimate.

The combined total of the annual maintenance/renewals works estimate, the consultants' and specialists' fees estimate and the other client-definable maintenance-related costs estimate is the base cost estimate.

3.14 Risk

All building maintenance programmes involve risks; some obvious, some less so. The proper management of risk saves time and money. Risks can occur at any point in a building maintenance programme and it is essential that they are identified, assessed, monitored and controlled.

Risk exposure (i.e. the potential effect of risk) changes as the building programme progresses; continually managing risks is therefore essential. As the maintenance programme evolves, more of the client's maintenance requirements are defined, and a risk response can be decided, for example:

1. **Risk avoidance**: where risks have such serious consequences on the maintenance programme outcome that they are totally unacceptable. Risk avoidance measures may include a review of the client's initial project brief and a reappraisal of the building maintenance programme, perhaps leading to a reduced or increased level of maintenance or early renewal works.
2. **Risk reduction**: where the level of risk is unacceptable. Typical actions to reduce risk can take the form of the following:
   - redesign combined with improved value engineering
   - more detailed design and related maintenance considerations, or site investigations to improve the information on which cost estimates and programmes are based
   - different materials or engineering services to avoid new technology or unproven systems and to assess the level of potential obsolescence
   - different approaches to maintenance and renewal works to avoid inherently risky maintenance techniques, and

- changing the contract strategy to allocate risk between the contracting parties in a different way.

3 **Risk transfer**: where accepting the risk would not give the client best value for money. The object of transferring risk is to pass the responsibility to another party better able to control the risk. Whenever risk is transferred there is usually a premium to be paid (i.e. the receiving party's valuation of the cost of the risk). To be worthwhile, risk transfer should give better overall value for money to the client (i.e. the total cost of the risk to the client is reduced by more than the cost of the risk premium). Risk transfer measures include taking out insurance cover where appropriate.

4 **Risk sharing**: occurs when risk is not entirely transferred. The client retains some element of risk.

5 **Risk retention**: risks retained by the client that are not necessarily controllable. This remaining risk is called the residual risk exposure.

Considering limited information is available about the building project's maintenance requirement at RIBA Stages 0 (Strategic Definition) and 1 (Preparation and Briefing), and OGC Gateways 1 (Business Justification) and 2 (Delivery Strategy), the risk allowance can be a significant percentage of the total estimated cost, whereas after completion (when all accounts are settled) the requirement for a risk allowance will be zero. Proper risk identification, assessment, monitoring and control are therefore a prerequisite of realistic cost estimates and of minimising the consequential costs arising from the client's residual risk exposure.

It is recommended that risk allowances are not a standard percentage, but a properly considered assessment of the risk, taking account of the completeness of the design and other uncertainties, such as the amount of site investigation done.

It is also recommended that separate allowances are made for each of the following.

- **Design development and associated installation risks**: an allowance for use during the design process to provide for the risks associated with design development on the associated installation, plus changes in estimating data.
- **Maintenance risks (unplanned/unscheduled)**: an allowance for use in the post-construction phase to provide for the risks associated with premature failure, resulting emergency or corrective maintenance/unplanned repairs and replacement works.
- **Client change risks**: an allowance for use during the design process and the construction process to provide for the risks of client-driven changes (e.g. changes in scope of works or project brief, changes in maintenance levels, changes in time).
- **Client other risks**: an allowance for other client risks (e.g. unconventional contracts and/or tender action, supplementary conditions of contract and special contract arrangements).

Lists of typical risks for each category of risk are included in Part 6 (group element 13: Risks). These examples do not provide a definitive or exhaustive list of items but are simply a guide.

Risk allowances are to be included in the order of cost estimates. Even at RIBA Stages 0 (Strategic Definition) and 1 (Preparation and Briefing), and OGC Gateways 1 (Business Justification) and 2 (Delivery Strategy), it is recommended that the size of the initial risk allowance is based on the results of a formal risk analysis. If the risk characteristics are not acceptable to the client, it is advisable that the risk allowance is not determined until management action has been taken

to review the client's risk exposure and to identify suitable risk responses that will reduce this exposure to an acceptable level. It is recommended that a revised risk analysis is undertaken to determine the most likely out-turn cost and the risk allowance.

Throughout RIBA Stages 0 (Strategic Definition) and 1 (Preparation and Briefing), and OGC Gateways 1 (Business Justification) and 2 (Delivery Strategy) of a building project, it is advisable that effort is concentrated on the main sources of risk. It may be beneficial, even at this stage of the project, to prepare a maintenance-specific risk register (incorporating the major risks identified) and a risk management strategy. It is recommended that risks are not excluded without due consideration. Take care not to allow the natural optimism that surrounds the early stages of a building project to influence the realism of judgments that are to be made.

Risks (which can influence the cost of maintenance, repairs and replacement works) change as the building project progresses through the subsequent RIBA Stages. It is recommended that risk registers and risk estimates are reassessed at regular intervals throughout the various formal stages of cost planning that follow once the cost limit has been authorised by the client.

For order of cost estimates, risk allowances for project development risks, unplanned/unscheduled maintenance risks and client's risks based on the application of percentage additions are to be calculated by multiplying the base cost estimate by the selected percentage additions. The equation for calculating the risk allowances for design development risk, construction risk and client's risk are therefore:

- for design development and associated installation risks: **R1 = a × p1**
- for maintenance risks (unplanned/unscheduled): **R2 = a × p2**
- for client change risks: **R3 = a × p3**
- for client other risks: **R4 = a × p4**

where:

- **a** = base cost estimate
- **p1** = percentage risk allowance for design development and associated installation risks
- **p2** = percentage risk allowance for maintenance (unplanned/unscheduled) risks
- **p3** = percentage risk allowance for client change risks
- **p4** = percentage risk allowance for client other risks
- **R1** = risk allowance estimate for design development and associated installation risks (i.e. total estimated cost of risk allowance for design development and associated installation risks)
- **R2** = risk allowance estimate for maintenance (unplanned/unscheduled) risks (i.e. total estimated cost of risk allowance for maintenance (unplanned/unscheduled) risks)
- **R3** = risk allowance estimate for client change risks (i.e. total estimated cost of risk allowance for client change risks)
- **R4** = risk allowance estimate for client other risks (i.e. total estimated cost of risk allowance for client other risks)

The equation for calculating the total risk allowance estimate is therefore:

RA = R1 + R2 + R3 + R4

The risk allowance estimate is added to the base cost estimate. This gives the proposed cost limit (excluding inflation). The equation for calculating this is therefore:

CL = a + b

where:

- **a** = base cost estimate
- **b** = risk allowances estimate
- **CL** = cost limit (excluding inflation)

3.15 Inflation

An order of cost estimate for maintenance works only should be prepared at current prices.

Where this estimate is for a tender, the prices should be adjusted in two stages.

1. For tender inflation to the date of the tender for the maintenance work.
2. For cost inflation during the fixed price period. This would normally be done by adjusting the estimated annual expenditures for inflation. Where the contract provides for index linking, the risk of any difference between the movement in the index and actual inflation should also be considered.

Where the estimate is prepared for use in an LCCP, it will need to be adjusted for future price changes (inflation) to the start date of the LCCP (year zero). Inflation during the period of the study will be covered by the discount rate in NPV and discounting factor calculations.

The amount of tender inflation is ascertained by applying a single percentage rate for tender inflation to the cost limit (excluding inflation). The addition of tender inflation gives the projected cost limit (excluding construction inflation) for the building project. The equation for calculating the amount of tender inflation is therefore:

t = CL × p

where:

- **CL** = cost limit (excluding inflation)
- **p** = percentage for tender inflation
- **t** = tender inflation estimate

The percentage for tender inflation can be computed using published indices (i.e. maintenance price indices, tender price indices, building cost indices or retail price indices. Alternatively, the percentage addition can be derived from in-house sources of indices.

The tender inflation estimate is added to the cost limit (excluding inflation). This gives the proposed cost limit (including construction inflation). The equation for calculating the cost limit (including construction inflation) is therefore:

CL2 = CL1 + t

where:

- **CL1** = cost limit (excluding inflation)
- **CL2** = cost limit (including construction inflation)
- **t** = tender inflation estimate

The amount of construction cost inflation during the period of study will be allowed for in the application of a discount rate (see section 3.19).

Where an estimate is being prepared for a measured term contract, construction cost inflation is ascertained by applying a single percentage rate for construction inflation to the annual cost limit (excluding construction inflation) for each year of the contract. This should be shown separately for:

- those years covered by any fixed price provision in the contract, i.e. for inflation that will be allowed for by the contractor in their tender, and
- those years that will be adjusted by indexation.

The percentage for construction cost inflation can be computed using published indices and forecasts (i.e. maintenance cost/price indices, tender price indices, building cost indices or retail price indices). Alternatively, the percentage addition can be derived from in-house sources of indices.

It is recommended that potential cost increases/decreases caused by tendering conditions and the effects of changes in the market are also considered. These include price increases/decreases associated with the materials or products or the impact of major projects sapping resources (home and abroad); specialist works, trade, work package and labour-only subcontractors; or other countries buying major quantities of raw materials. However, it is recommended that such potential cost increases/decreases caused by tendering conditions and the effects of changes in the market should be initially dealt with under risk allowances.

3.16 Taxation allowances and other incentives

Taxation allowances, taxation relief and grants can provide valuable financial aid to a client on certain types of building, as well as on maintenance and renewal programmes. However, due to the complexity and constantly changing nature of legislation, it is recommended that specialist advice is sought to maximise the availability and quantum of taxation allowances, taxation relief and grants. For that reason, unless specifically requested by the client, it is recommended that these allowances should be excluded from order of cost estimates and therefore not covered by the scope of NRM 3.

The taxation allowances and incentives covered provide only broad guidance on how to deal with the effect of taxation allowances and incentives available for expenditure on capital building works and maintenance, repair and replacement works applicable in the UK during the life of an asset.

3.17 VAT assessment

VAT in relation to capital building works and maintenance, repair and replacement works is a complex area. Therefore, for order of cost estimates it is recommended that VAT is excluded from cost plans.

It is recommended that specialist advice is sought on VAT matters to ensure that the correct rates are applied to the various aspects of the building maintenance works. However, if required by the client, provision for VAT assessment can be incorporated into the cost estimate or maintenance cost plans.

3.18 Other considerations

Other considerations that are not covered by the scope of NRM 3 for maintenance works are:

- finance accounting (i.e. asset depreciation/write downs)
- service credits or non-performance rebates, and
- defects and warranty implications (these are contractual issues, not measurement).

Service credits or performance rebates may be applied during the execution of the maintenance but are not applicable for order of cost estimate purposes.

3.19 Present value, inflation and discounting methods

The present value (PV) concept captures the time value of money by making an adjustment through compounding and discounting cash flows to reflect the increase in costs due to inflation and the increased value of money when invested. The PV of a cash flow reflects, in today's terms, the value of future cash flows adjusted for the cost of capital. The time value of money reflects the fact that money in hand today is more valuable than an identical amount of money received in the future. Since money today can earn interest, all costs must be adjusted to reflect the inflation rate and then discounted to reflect the effect of interest rates on their PV.

Discounting is the procedure for presenting all costs and future benefits in one timeframe (i.e. on a common basis). The PV of an investment is calculated from the time series of projected cash flows using discount rates.

The discount rate is therefore based on assumptions about interest rates, adjusted for assumptions about inflation.

An example calculation of a discount rate is as follows.

- Interest rate assumption = 4.0% per annum
- Inflation assumption = 2.5% per annum

$$\text{Discount rate} = \frac{1 + \text{interest rate as a decimal}}{1 + \text{inflation assumption as a decimal}} - 1$$

$$= \frac{1 + 0.04}{1 + 0.025} - 1 = 0.0146$$

$$= \frac{1.040}{1.025} - 1 = 0.0146$$

$$= 1.46\%$$

To estimate a net present value (NPV), future costs must be discounted. Discounting translates projected cash flows into PV terms using specified discount factors (or PV factors). The equation for calculating discount factors for each year of the building life is therefore:

$$DF = \frac{1 \ldots}{(1 + r)\, n}$$

where:

- **DF** = discount factor
- **r** = discount rate as a factor of 1
- **n** = number of years from the date of practical completion or handover of the building project, i.e. from the point at which the 'in use' phase commenced (1, 2, 3 … 25, etc.)

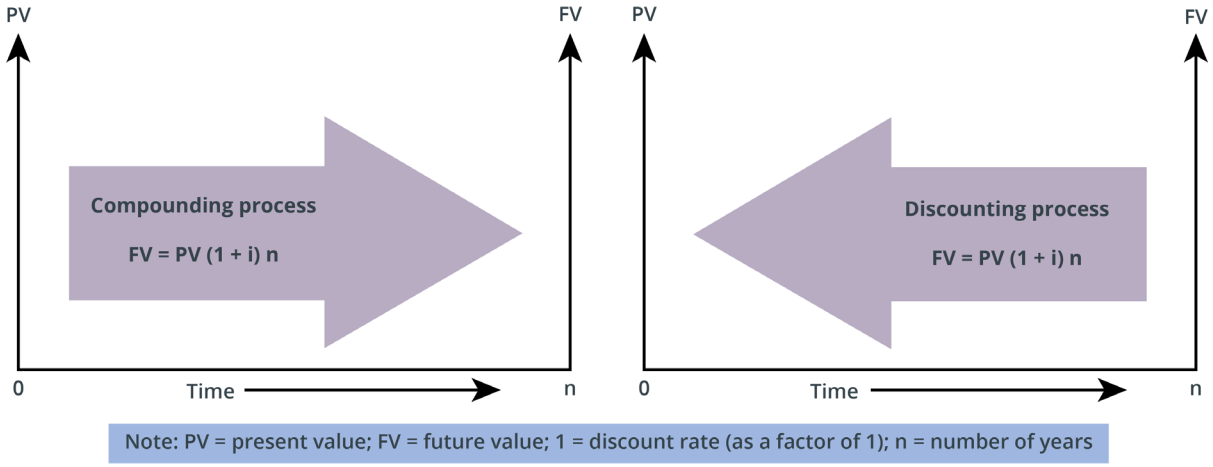

Figure 3.1: Compounding and discounting processes

See Appendix C for more detailed guidance on the methods of economic evaluation and discounting equations (time value of money).

3.20 Reporting of order of cost estimates

Costs are to be expressed as cost/m² of GIFA per annum and/or functional unit cost (e.g. by bed space/per annum) or as a PV, an NPV, an AE cost or a total cost over the period of analysis. The cost/m² of GIFA per annum is calculated by dividing the total cost by the number years of the analysis. See Appendix C for the economic methods of calculating PV, NPV, etc.

Where appropriate and/or required by a client, costs may be expressed as a 'cost per functional unit' (or functional unit cost) as an alternative, or in addition, to the cost/m² of GIFA. The functional unit may be a client-defined unit. It is therefore essential that the functional unit is clearly identified when costs are expressed in this way.

Order of cost estimates, as with all estimates, are a forecast out-turn cost, with stated allowances for consultants' and specialists' fees, other maintenance-related project costs, risk allowances, inflation and VAT, as appropriate.

Items included or excluded from the estimated cost should be clearly communicated to the client when reporting the order of cost estimate.

Typical items for inclusion in order of cost estimate reports for maintenance works are:

1. project title
2. project description
3. status of the cost plan(s), i.e. first or iteration version of the order of cost estimate
4. a statement of cost (including cost limit)
5. details of the information and specification on which the cost plan was prepared
6. a statement of the floor areas
7. basis of cost estimates (i.e. assumptions) and the period of analysis
8. estimate base dates (i.e. to which inflation has been applied)
9. cash flow forecasts, where appropriate for the life cycle R and M works
10. method of economic evaluation (i.e. discounted, stating the rates applied)
11. reasons for changes to the cost targets (explain the adjustments or transfers that have taken place against the previous cost estimates)
12. estimated costs of, and a request for decisions on, any alternative proposals (i.e. summary of option costs)
13. inclusions and exclusions (i.e. a clear statement of what is included in and excluded from the order of cost estimate).

At the outset, the scope of the initial project brief will define the project-specific reporting requirements and the format of cost reporting, analysis, and presentation of the results.

Caution should be exercised when using benchmark data for order of cost estimates that have been derived from sources that did not use the new rules of measurement for building maintenance works. The level of cost certainty should be reflected in the risk allowances included.

The source of cost data used for order of cost estimating of construction projects should be stated (e.g. ideally from benchmark unit rates derived from maintenance costs in use). Over time, more robust unit rates for renewal and maintenance works will become available – derived from detailed analysis of actual costs of running built assets, which can then be used for order of cost estimating at various levels for the feasibility stages of a construction project. (See section 4.24 for more details of the level of analysis of maintenance cost data).

4 Cost planning of R and M works

4.1 Introduction

Part 4 describes the purpose, methods, content and types of elemental cost plans used for maintenance works (pre- and post-construction), as well as explaining the rules of measurement for the preparation of formal cost plans 1 to 4. The formal cost planning stages are put into context with the RIBA Digital Plan of Work (DPoW) and the OGC Gateway Process.

The measurement rules for cost planning provide the basis for measuring quantities for the application of life cycle cost planning. Integrating the capital building works cost plans with the R and M works cost plans will enable the project team to evaluate the costs (on an elemental and whole building level) and inform value management and design and maintenance specification choices (i.e. option appraisals and trade-off studies) to help determine the optimum life cycle solution.

The content and application of unit rates to measured quantities (to generate the base cost of the life cycle (R and M works) is described. Also discussed is the method of dealing with cost allowances for maintenance contractors' management and administration charges, maintenance contractors' overheads and profit, consultants' and specialists' fees, other maintenance-related costs, risk allowances, inflation, discounting for the time value of money, VAT, taxation allowances and other incentives.

The method of dealing with the time value of money, i.e. discounting current day costs and future benefits to present day values, is explained.

In addition, the basic information needed from the client and other project/maintenance team members by the quantity surveyor/cost manager to complete a cost plan at each stage is outlined. The requisite content of the quantity surveyor's/cost manager's cost reports to the client is also described.

Guidance is also provided on rules for cost reporting and maintenance management, including the functional unit cost analysis and benchmarking of the annualised M costs and the forecast R programmes of works, which also include making provisions for unscheduled expenditure.

4.2 Purpose of cost planning

The main purpose of cost planning or elemental cost planning is to:

- ensure clients are provided with value for money
- make clients and designers aware of the cost consequences of their requirements
- provide advice to designers that enables them to arrive at practical and balanced designs within budget
- keep expenditure within the cost limit approved by the client, and
- provide robust cost information with which the client can make informed decisions.

Cost planning is a budget distribution technique implemented during the design stages of a building project. It involves a critical breakdown of the cost limit (i.e. the client's authorised budget) for the building(s) into cost targets for each element of the building(s). Cost targets are the recommended expenditure for each element (e.g. substructure, frame, upper floors and roof).
The resulting elemental cost plan is a statement of how the project team proposes to distribute the available budget among the elements of the building. It provides a frame of reference from which to develop the design and maintain cost control. It also provides a WBS and a CBS which, by codifying, can be used to redistribute works in elements to construction work packages for procurement purposes.
Elemental cost planning is an iterative process, performed in steps of increasing detail as more design information becomes available.

Cost plans are produced as an intrinsic part of RIBA Stages 2, 3 and 4, or OGC Gateways 3A and 3B. The requirements of RIBA Stages 2, 3 and 4, as described in the RIBA Plan of Work, are summarised as follows.

4.2.1 RIBA Stage 2: Concept Design

Outcome: Architectural concept is approved by the client and aligned with the project brief.

Stage 2 sets the architectural concept for a project. Proposals that align with the site information and the project brief, including the spatial requirements, are prepared. Regular design reviews are used to seek comments from the client and other project stakeholders, and the design is iterated in response. Any project brief derogations are agreed, or the project brief is adjusted to align with the architectural concept.

The proposals should demonstrate that the spatial requirements are being achieved, along with any adjacency requirements. Any non-briefed areas, such as cores, must be developed sufficiently to co-ordinate with the architectural concept.

The project team also develops, in parallel with the concept design, several project strategies. Their importance at this stage will depend on how they will influence the concept design. For example, the sustainability strategy is likely to be a fundamental component of the concept design, whereas a security strategy may have minimal or no impact and can therefore be developed during a later stage.

It is essential to revisit the initial project brief during this stage, and it should be updated and issued as the final project brief as part of the information exchange at the end of Stage 2.

In parallel with design activity, several other related tasks need to be progressed in response to the emerging design: the development of a construction strategy, a maintenance and operational strategy and a health and safety strategy, as well as updating the project execution plan.

OGC Gateway 3A is comparable to RIBA Stage 2.

Tasks: The quantity surveyor/cost manager is to:

1 Prepare an initial formal cost plan, or life cycle cost plan (LCCP) if instructed (formal cost plan 1), which takes into account initial design parameters established by the architectural concept and strategic engineering requirements, and which includes an elemental analysis

of the significant elements of cost and initial bulk quantities of key items set out in the outline specification. The LCCP is to take into account the renewal, repair and maintenance of building systems throughout the built asset's lifetime.

2 Review the cost implications of iterations of the architectural concept and strategic engineering requirements, considering the project outcomes, the procurement strategy, project programme implications and project risks.

3 Identify risk allowances and uncertain areas where either provisional sums, prime cost sums or prime cost prices are required.

4 Demonstrate that the architectural concept and outline specification are aligned to the project budget (i.e. the cost limit).

5 Agree the cost limit with the client before proceeding to the next stage.

4.2.2 RIBA Stage 3: Spatial Coordination

Outcome: Architectural and engineering information is spatially co-ordinated.

Stage 3 is fundamentally about testing and validating the architectural concept, to make sure that the architectural and engineering information prepared at Stage 2 is spatially co-ordinated before detailed information required to manufacture and construct the building, or built asset, is produced at Stage 4.

Detailed design studies and engineering analysis are undertaken to ratify the assumptions made during Stage 2 and to layer more detail onto the design. Stage 3 is not about adjusting the architectural concept, which should remain substantially unaltered, although detailed design or engineering tasks may require adjustments to make sure that the building, or built asset, is spatially co-ordinated. Changes to the architectural concept, for whatever reason, should be agreed with the client via the change control procedure.

Design studies should be aligned to cost exercises and the development of the outline specification; iterations of the design may be required to ensure the cost plan aligns with the project budget.

In parallel with detailed design studies, the construction strategy, maintenance and operational strategy, health and safety strategy and project execution plan will be reviewed and updated if required.

OGC Gateway 3B is comparable to RIBA Stages 3 and 4.

Tasks: The quantity surveyor/cost manager is to:

1 Carry out cost exercises, including cost-in-use cost exercises, to allow more detailed aspects of the design, project strategies and outline specification to be tested. Use design studies and involve suppliers or specialist subcontractors as necessary to determine affordability. Take into consideration the cost implications of achieving the project outcomes, including compliance with statutory requirements.

2 Update formal cost plan 1 iteratively with increasing levels of cost certainty as greater detail of the design proposal is developed to align with the project budget (establishing formal cost

plan 2). Greater certainty allows any cost increases to be balanced by transfer between cost targets and/or reductions in project risk allowances.

3 Identify risk allowances and uncertain areas where either provisional sums, prime cost sums or prime cost prices are required.

4 Demonstrate that spatially co-ordinated design is aligned to the project budget (i.e. the cost limit).

5 Agree the cost limit with the client before proceeding to the next stage.

4.2.3 RIBA Stage 4: Technical Design

Outcome: All design information required to manufacture and construct the building, or built asset, is completed.

Stage 4 involves the preparation of all information required to manufacture and construct a building or built asset. The core documents at the start of Stage 4 are the responsibility matrix, the information requirements and the Stage 4 design programme, which will be heavily influenced by the procurement strategy.

The responsibility matrix, produced at Stage 1 (Preparation and Briefing), defines whether the design team will deliver prescriptive information or descriptive information (including final specifications) for each building system. Prescriptive information can be used for construction purposes, with descriptive information issued where a specialist subcontractor will design a building system for manufacturing and/or construction.

While the procurement strategy influences who takes ultimate responsibility for manufacturing information and construction information, it may also influence when the building systems will be designed – dictating how the Stage 4 design programme will be structured. The procurement strategy will also influence the structure of the project team. For example, one or more of the design team may be novated to the construction team.

Cost control measures applied during this stage will vary from project to project. These might include the preparation of an updated cost plan (formal cost plan 3), bills of quantities or pricing schedules, as defined by the procurement strategy.

OGC Gateway 3B is comparable to RIBA Stages 3 and 4.

Tasks: The quantity surveyor/cost manager is to:

1 Update formal cost plan 2 iteratively, to a level of detail defined by the procurement strategy (establishing formal cost plan 3); formal cost plan 3 becomes a pre-tender cost estimate (where the procurement strategy does not require either a full bill of quantities or pricing schedules).

2 Identify risk allowances and uncertain areas where either provisional sums, prime cost sums or prime cost prices are required.

3 Agree the cost limit with the client before tendering.

4 Review tender returns or contractors' proposals, including any alternatives proposed to reduce costs, against formal cost plan 3.

4.2.4 Procurement of constructors/contractor engagement

Procurement is set out as a variable task in the RIBA Plan of Work 2020 (referred to as contractor engagement or contractor appointment) as tendering activities do not have a specific place in the chronology of a project.

4.2.5 RIBA Stage 5: Manufacturing and Construction

Outcome: Manufacturing, construction and commissioning are complete.

Stage 5 comprises the manufacturing and construction of the building systems, in accordance with the construction programme agreed in the building contract.

Stage 5 concludes with the issue of the practical completion, or completion, certificate, which allows the built asset to be handed over.

It is likely that Stages 4 and 5 will overlap. The extent of overlap will be dictated by the procurement strategy and the project programme.

OGC Gateway 3C is comparable to RIBA Stage 5.

Tasks: The quantity surveyor/cost manager is to:

1. Update the cost plan on the basis of the contractor's accepted pricing document, based on the revised expected out-turn costs (cost plan control document).
2. Monitor and report the cost of any variations to the building contract against the relevant element, sub-element and component cost targets using the cost plan control document, the contractor's accepted pricing document, based on the revised expected out-turn costs, agreed and anticipated changes, and the release strategy for any risk allowances.
3. Prepare and issue interim valuations for payment of works completed in accordance with the building contract.
4. Manage the cost of items outside the building contract, which form part of the overall project (e.g. furniture, fittings, equipment and other project costs).

4.2.6 RIBA Stage 6: Handover

Outcome: Built asset is handed over, aftercare is initiated and building contract is concluded.

Stage 6 starts with the built asset being handed over. However, several tasks may need to commence during Stage 5 to ensure that the handover of the built asset is as efficient and effective as possible, such as training of users on how to use the building systems.

OGC Gateway 4 is comparable to RIBA Stage 6.

Tasks: The quantity surveyor/cost manager is to:

- Capital works:
  1. Calculate the adjusted contract sum as a progression from the cost plan control document/ contractor's pricing document and the original contract sum to settle the final account.
  2. Produce benchmarking data for estimating and planning costs on future projects.

- Maintenance works:
  1 Collect final cost data, building systems specification information and maintenance data from the completion of the construction phase.

4.2.7 RIBA Stage 7: Use

Outcome: Built asset is used, operated and maintained efficiently.

In Stage 7, the facilities management, maintenance or asset management strategies over the course of the built assets' lifetime are implemented.

OGC Gateway 5 is comparable to RIBA Stage 7.

Tasks: The quantity surveyor/cost manager is to:

1 Embed the final cost data from the completion of the construction phase into an asset management operating model for use in building maintenance, repair or renewal, as required.

2 Prepare a formal LCCP (formal cost plan 4) or update the previous LCCP. Include operational costs for inclusion in WLC assessment, if required.

3 Monitor actual renewal, repair and maintenance costs against the LCCP. Monitor actual operational costs for WLC assessment, if required.

RIBA Stage 7 can be the first stage of a project, depending on how it is used, completing the circular process of planning, designing, constructing and use over time. This RIBA stage is the study and analysis of a building in use, and includes all aspects of the building and its uses.

RIBA Stage 7 is also when the long-term costs (i.e. renewal costs, operation and occupancy costs, and maintenance costs) and function of a building are assessed. This affects the building's viability in terms of being:

- suitable for the stakeholder
- sustainable and
- offering value in operation.

RIBA Stage 7 is the longest stage, as it covers the entire life of the building.

OGC Gateway 4 (Operations Review and Benefits Realisation) can be compared with RIBA Stage 7 (Use).

The fundamental purposes of maintenance cost planning during construction work stages are to:

- ensure that clients are provided with value for money – in terms of both capital costs, annual M costs and life cycle R costs – and any other costs agreed in the scope (over the defined life cycle of the building project)
- make clients and designers aware of the cost consequences of alternative proposals
- provide advice to designers that enables them to arrive at practical, balanced and optimised designs within budget, based on sustainable maintenance plans, and meet the client's requirements in respect of future maintenance costs

- provide advice to maintenance teams so maintenance plans fall within budget and meet the client's requirements in terms of future maintenance and renewal costs
- keep predicted life cycle expenditure within the cost limit approved by the client, and
- provide robust cost information so the client can make informed decisions.

The main purposes of formal cost plan 4 (post-construction completion works) are to:

- determine the target cost limit for the R and M programmes of works
- inform setting the annualised maintenance budgets versus available funding constraints, and prioritisation of maintenance expenditure against competing risks and liabilities
- provide the basis for procuring the maintenance work as a whole or in work packages
- provide robust cost information so the client can make informed decisions (e.g. whether to refurbish or disinvest in an asset or part of an asset)
- inform what asset investments are funded or not funded, and then track and monitor the expenditure of sanctioned works, including revising the LCCP and
- ensure the client is provided with the best value for money from their maintenance expenditure.

Elemental cost planning is a budget distribution technique that is first implemented during the design stages of a building project. It involves a critical breakdown of the cost limit (i.e. the client's authorised budget) for maintenance and repair/replacement works into cost targets for each element of the building(s). Cost targets are the recommended expenditure for each element (e.g. maintenance of roofs, internal finishes and services).

The elemental cost plan that results is a statement of how the project team proposes to distribute the available maintenance budget among the elements of the building, and across the wider LCCs of R and M elements and other LCC elements. It provides a reference point from which to develop the design and maintenance cost controls. It also provides a WBS and a CBS that, by codifying, can be used to redistribute works in elements to construction and building maintenance works packages for procurement.

Elemental maintenance cost planning is an iterative process, performed in steps of increasing detail as more design and production information becomes available.

Formal cost plan 4 is prepared at a point where the built asset or facility is practically completed, or during the in-use phases of the built asset or facility.

There is no difference between a maintenance cost plan for a new or existing built asset or facility, except that each plan is based on different data. Data for a newly built asset or facility is initially derived from the capital building works cost plan and completed using the as-built information (including asset schedules) provided by the construction contractor. Data for an existing built asset or facility is ascertained from record drawings, asset registers and the findings and recommendations obtained from inspections. It is an iterative process that is performed annually to reset the annual maximum expenditure that the client is prepared to make in terms of the total cost of maintenance.

4.3 Constituents of a cost plan

The key constituents of a maintenance cost plan are shown in Table 4.1:

Constituent (cost centre)	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	**Reference**
	£k	**£k**	**£k**	**£k**	
Renewal (R) annualised costs:					
(1a) Facilitating works	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(1b) Substructure	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(1c) Superstructure	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(1d) Internal finishes	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(1e) Fittings, furniture and equipment	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(1f) Services	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(1g) Work to existing buildings	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	If not covered in (1e) to (1f)
(1h) External works	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Renewal costs estimate (1) [(1) = ∑ (1a) + (1b) + (...) + (1h)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See sections 4.8 to 4.11
Maintenance (M) annualised costs:	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2a) Facilitating works	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2b) Substructure	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2c) Superstructure	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2d) Internal finishes	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2e) Fittings, furniture and equipment	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2f) Services	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2g) Works to existing buildings (not covered in 2a to 2f)	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(2h) External works	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.12
Maintenance costs estimate (2) [(2) = ∑ (2a) + (2b) + (...) + (2h)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See sections 4.8 to 4.11 and 4.13
Subtotal (3) [(3) = (1) + (2)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	

Constituent (cost centre)	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	**Reference**
	£k	**£k**	**£k**	**£k**	
Maintenance contractor's management and administration costs:					
(4a) Renewal works	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.14
(4b) Maintenance works	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.14
Maintenance contractor's management and administration costs estimate (4) [(4) = (4a) + (4b)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Subtotal (5) [(5) = (3) + (4)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Maintenance contractor's overheads and profit (6)	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.15
Maintenance cost estimate (7) [(7) = (5) + (6)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Fess and other related costs:					
(8) Consultants' and specialists' fees estimate	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.16
(9) Client-definable maintenance-related costs estimate	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.17
Base cost estimate (10) [(10) = (7 + (8) + (9)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Risks:					See section 4.18
(11a) Design and installation risks	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(11b) Maintenance risks	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(11c) Client change order risks	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
(11d) Client other risk	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Risk allowance estimate (11) [(11) = (11a) + (11b) + (11c) + (11d)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Cost limit (at current price levels) (12) [(12) = (10) + (11)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	
Discount factor (DF) (13)	DF^1	DF^2	DF^3	DF^n	See section 4.19
PV (14) [(14) = (12) × (13)]	$£Y_1$	$£Y_2$	$£Y_3$	$£Y_n$	See section 4.19

Constituent (cost centre)	£Y_1	£Y_2	£Y_3	£Y_n	Reference
	£k	**£k**	**£k**	**£k**	
NPV (total cost limit) (15)					
[(15) = ∑(PV) (14))]	£Y_1	£Y_2	£Y_3	£Y_n	See section 4.19

Table 4.1: Constituents of a cost plan

Notes on Table 4.1:

1 VAT and other taxation incentives are excluded (see section 4.20).

2 Other considerations (as defined in section 4.21) are to be considered, if required in scope.

3 **£Y_1** = Year 1 costs

4 **£Y_2** = Year 2 costs

5 **£Y_3** = Year 3 costs

6 **£Y_n** = Final year costs in which either maintenance or replacement works are to be undertaken

7 **DF^1** = Year 1 discount factor

8 **DF^2** = Year 2 discount factor

9 **DF^3** = Year 3 discount factor

10 **DF^n** = Discount factor for final year in which either maintenance or replacement works are to be undertaken

The base cost estimate is the total estimated cost of the maintenance works, the maintenance contractor's management and administration costs, and the maintenance contractor's overheads and profit. The base cost estimate should contain no allowances for risk, inflation and taxation.

Allowances for risk and inflation should be calculated separately and added to the base cost estimate to determine the cost limit for the maintenance works for the defined project life cycle.

Reference should be made to the cost classification system set out in ICMS.

4.4 Formal cost planning stages

There are several formal cost planning stages that are comparable with the RIBA design and pre-construction work stages and OGC Gateways 3A (Design Brief and Concept Approval) and 3B (Detailed Design Approval) for a building project.

For most building projects, formal cost plans should be completed for each of the RIBA Stages or OGC Gateways and submitted to the client, or their appointed representative for approval (see Table 4.2).

Formal cost plan		RIBA Stage	OGC Gateway
1	For new built asset where LCCs considered	2: Concept Design	3A: Design Brief and Concept Approval
2		3: Spatial Coordination	3B: Detailed Design Approval
3		4: Technical Design	
4	For existing or new built asset	6: Handover 7: Use	3C: Readiness for Service 4: Operations Review and Benefits Realisation

Table 4.2: Formal cost plan, RIBA Stages and OGC Gateways

Formal cost plan 1 for a new built asset is prepared once the scope of the work is fully defined and the key criteria are specified, but no detailed design development or maintenance planning will have started.

Formal cost plans 2 and 3 for a new built asset do not involve the preparation of a completely new cost plan; each is a progression of the previous cost plan. They are developed through cost checking the R and M works costs applicable to the building elements and components and cost targets, as more design and maintenance information and any further information about the elements and components become available.

Formal cost plan 4 for a new built asset does not involve the preparation of a completely new cost plan; it is a progression of formal cost plan 3. It is developed through the cost checking of the R and M works costs applicable to the building elements and components and cost targets, when the quality, operational and performance criteria have been fully defined and specified. It is normally based on the as-built information (including asset schedules) as this becomes available from the construction contractor.

Formal cost plan 4 for an existing built asset is a newly developed cost plan. It is based on data derived from record drawings, asset registers and the findings and recommendations obtained from inspections (e.g. condition surveys, technical inspections and structural surveys).

Whether or not a formal cost plan is prepared at each RIBA Stage or OGC Gateway depends on the procurement strategy selected. For example, the preparation of an updated cost plan may not be required at RIBA Stage 4 (Technical Design) where a 'design and build' contract strategy is selected.

The cost targets within each formal cost plan approved by the client will be used as the baseline for future cost comparisons. Each subsequent cost plan should be reconciled with the preceding cost plan and explanations relating to any changes made. In view of this, records of any transfers made to or from the risk allowances and any adjustments made to cost targets should be maintained, so that explanations concerning changes can be provided to both the client and the project team.

The client is required to 'approve' the cost plan on completion of each RIBA Stage before authorising commencement of the next RIBA Stage.

Renewal (R) costs are normally reported at the building element level, but the M costs are normally reported at the building level (in the absence of element 'maintenance' benchmarks). Information may be a mix of typical benchmark costs (EURs) for key elements, comparable cost modelling or approximate estimates during the concept stage. As more detailed design information is produced, more detailed elemental cost estimates can be produced. However, the level of services information may not be sufficient to effectively cost plan the building services element to the applicable asset levels during the pre-construction work stages.

Sub-elemental- and component-level cost planning at RIBA Stage 3 (Spatial Coordination) is commonly used for life cycle cost planning, specification, choices of systems, elements or component levels during design development, as well as for optimising the life cycle costing for the preferred options based on more detailed information. Costs to be included will depend on the purpose and scope of the study agreed, and the stage in the asset life cycle at which the study is carried out. Costs will also depend on the availability and level of information required to undertake the study (see Appendix D).

To avoid unnecessary conflict, clients and other project and design and maintenance team members should be aware of what is included in each element of the cost plan.

While the process of establishing the life cycle costing of C, R and M works will be the same at each stage, the context in which it is being prepared will set the level of detail, the need for iterations and the need for component option appraisals. It will also set the type of report (i.e. specific outputs and formats to suit the client's defined required outputs) and the requirement to share data and assumptions with other interested parties.

4.5 Reviewing and approving the maintenance cost plan

Prior to the client authorising the next RIBA Stage or OGC Gateway, the formal cost plan for the preceding RIBA Stage or OGC Gateway should be reviewed by the client and the project team to ensure that:

- capital costs and future R and M costs are affordable
- cost targets for each aspect of maintenance are reasonable and up to date, and
- the cost limit for the maintenance programme(s) has not been exceeded.

Following the review, the client will sign off the cost plan, give any necessary instructions and/or authorise commencement of the next RIBA Stage or OGC Gateway.

4.6 Cost control in procurement

The cost plan becomes a fundamental cost control mechanism where a maintenance programme of works is procured via several different work packages. By using codified cost plans, the R and M tasks can be easily reordered into the required work packages. This will provide cost targets for each work package, which in turn can be used to monitor and manage costs during the procurement of the maintenance programme(s).

The method of codifying and redistributing cost targets from elements to work packages is detailed in section 6.5.

4.7 Maintenance projects comprising multiple buildings

Where a building maintenance project, or programme of works, comprises more than one type of building or functional unit type, it is recommended that a separate cost plan is prepared for each building or functional unit type. This culminates in a 'summary cost plan' for the entire portfolio of buildings and/or estate and facilities detailed in the scope (see Figure 2.4 in section 2.8).

When used for maintenance cost planning, the functional unit method takes account of all maintainable assets applicable to each of the specific functional units or types of function being measured (e.g. office, house, shop, school, train station) that originate from an as-built or asset-specific maintenance-based cost plan. It uses the element, sub-element and component breakdown of the applicable maintenance items for each functional unit being measured, which is then used to calculate the applicable R and M work estimates and cost plans.

4.8 Information for inclusion in formal cost plans

The information required to prepare a formal cost plan for building maintenance works is contingent on whether it is a new, refurbished or existing building.

4.8.1 New or refurbished built asset or facility

The information base of building projects and the associated maintenance requirements will continue to expand during RIBA Stages 2 (Concept Design), 3 (Spatial Coordination), 4 (Technical Design) and the contractor engagement stages, and OGC Gateways 3A (Design Brief and Concept Approval) and 3B (Detailed Design Approval) as more project and design team, main contractor, specialist contractor and client interaction takes place.

A list of the key information required to enable preparation of formal cost plans for new and refurbished buildings or facilities is provided in Appendix D.

4.8.2 Existing built asset or facility

The information base will be as-built construction documents, as well as available records, asset maintenance registers, condition surveys, asbestos registers, operating and maintenance manuals, related inspection and audit documentation, and historical maintenance expenditure.

A list of the key information required to enable the preparation of formal cost plans for existing buildings, or construction assets, is provided in Appendix D.

4.9 Format, structure and content of formal cost plans

Examples of report templates showing the format, structure and content of elemental cost plans, based on level 1 and level 2 codes, are provided in Appendices E and F.

The quantities measured using the rules of measurement tables are used to inform LCCPs for both R and M works, the results of which can be presented in terms of the estimated NPV.

4.10 Maintenance cost planning

Capital building works are to be measured in accordance with NRM 1 as detailed in Part 6.

NRM 3 rules of measurement tables for building maintenance works align to those of NRM 1 at the component 'inclusions' level, creating a standardised cost breakdown data structure that integrates the capital building works with R and M cost structures.

The rules of measurement for maintenance cost planning for R and/or M works, i.e. group elements 0 to 8, are detailed in Part 6.

Measurement for cost planning of building R and M works is an iterative and progressive process. Limited information will be known about the maintenance requirements of the built asset or facility at the start of the cost planning process. However, detailed information about the individual components and subcomponents (the assets) that will be incorporated into the built asset or facility will be known on design completion and post-practical completion (the in-use phases). Depending on the contract strategy used, design completion will occur either before the building project is procured (where the building is fully designed before a contractor is selected) or during the design and construction phase (where a design and build strategy is used, or where works are based on a performance specification and subject to contractor design). Consequently, measurement should be carried out to increasing levels of detail as the design is developed.

The degree of detail to be measured for maintenance and renewal works should be related to the cost significance of the component (level 3) or subcomponent (levels 4/5/6 as applicable). Where enough information is available, cost-significant items should be measured using approximate quantities. Composite items are measured by combining or grouping together work items with a common unit of measurement. Non-cost-significant items (such as minor items and labour on cost-significant items) are ignored in measurement but are to be accounted for by increasing the applicable unit rate by an appropriate percentage.

Quantities should be given to the nearest whole unit, except that any quantity less than one whole unit will be given as one unit. Quantities measured in tonnes should be given to two decimal places.

For a new or refurbished building, or constructed asset, the method of measuring quantities for each formal cost plan is as follows.

4.10.1 Formal cost plan 1

a The first formal cost plan coincides with the completion of the concept design at the point where the scope of works is fully defined and key criteria are specified, but no detailed design has commenced.

b Formal cost plan 1 will provide the reference point for formal cost plan 2.

c Key information, such as the programme and procurement strategy, is required from the client and other project and design and maintenance team members to enable preparation of formal cost plan 1.

d For formal cost plan 1, a condensed list of elements is used, which will be developed into a full list of elements, sub-elements and components as more design and other information becomes available as the building project progresses.

e Quantities for R and M works should be determined in accordance with Part 6.

f Where there is insufficient design information from which to quantify maintenance and replacement works (in accordance with the rules of measurement for elemental cost planning), the quantity measured should be the GIFA. It is likely that several alternative concept designs will be considered at this stage.

4.10.2 Formal cost plan 2

a The second formal cost plan coincides with the completion of design development. Formal cost plan 2 is developed by cost checking the cost-significant elements as more detailed design information is made available from the design team.

b Cost plan 2 will provide the reference point for cost plan 3.

c Key information, such as programme and procurement strategy, is required from the client and other project and design and maintenance team members to enable preparation of formal cost plan 2.

d The cost checks are to be carried out against each pre-established cost target.

e Quantities for R and M works should be determined in accordance with Part 6.

f Where insufficient design and maintenance information is available from which to quantify the maintenance works (in accordance with the rules of measurement for elemental cost planning), the quantity measured should be the GIFA.

4.10.3 Formal cost plan 3

a The third formal cost plan is based on technical designs, specifications and detailed production information for construction.

b Cost plan 3 will provide the reference point for appraising tenders.

c Key information, such as programme and procurement strategy, is required from the client and other project and design and maintenance team members to enable preparation of formal cost plan 3.

d The cost checks are to be carried out against each pre-established cost target.

e The rules for measuring, describing and quantifying R and M works should be determined in accordance with Part 6.

f Where insufficient design and maintenance information is available from which to quantify maintenance works (in accordance with the rules of measurement for elemental cost planning), the quantity measured should be the GIFA.

4.10.4 Formal cost plan 4

a The fourth formal cost plan stage is for:

- new built assets or facilities: data is derived from the as-built information (including asset schedules) provided by the construction contractor, remaining-life data, specifications and other relevant information (as listed in Appendix D)
- existing built assets or facilities: data is derived from record drawings, asset registers and the findings and recommendations obtained from inspections (e.g. condition surveys, technical inspections and structural surveys), remaining-life data, specifications and other relevant information (as listed in Appendix C).

b Formal cost plan 4 will provide the reference point for annualised maintenance and forward renewal programmes of works.

c Formal cost plan 4 is not a one-off but covers the iterative cost planning throughout the life of the building or constructed asset during the in-use period (or the period of analysis).

d The cost checks are to be carried out against each pre-established cost target.

e The rules for measuring, describing and quantifying R and M works should be determined in accordance with Part 6.

f Where insufficient as-built maintenance information is available to quantify maintenance works (in accordance with the rules of measurement for elemental cost planning), the quantity measured is the GIFA.

Maintenance contractor-designed works include the following:

- Any works that require the maintenance contractor to undertake their design, whether directly or via a work package subcontractor. Contractor-designed work is sometimes referred to as the contractor-designed portion.
- Elements, sub-elements, and components for which the maintenance contractor is required to take responsibility for the design (such as replacement windows, roof trusses and/or mechanical and electrical engineering services) will be identified and described separately in the cost plan as contractor-designed works.
- Rules for dealing with contractor-designed work, where design liability for the entire life of the building should be transferred to the maintenance contractor, are covered in section 3.12.

4.11 Calculating annualised costs for maintenance works

The methods of calculating annualised costs for both R and M works are addressed in Part 5.

4.12 Unit rates used for cost renewal and maintenance works

The unit rates, including EURs and composite unit rates, used to estimate the total costs of building M and R works should include the cost of all materials (including consumables and spares), labour, and plant and equipment that are specifically required to undertake the maintenance work items. Costs also include any subcontractors' management and administration costs, subcontractors' overheads and profit, consultants' and specialists' fees and risk allowances.

Unit rates used to estimate the cost of maintenance works (i.e. R and M works estimates) should exclude maintenance contractors' management and administration, maintenance contractors' overheads and profit, and other allowances (such as project-specific costs/consultants' and specialists' fees, client-definable maintenance-related costs, risk allowances and, where applicable, inflation). These items should be assessed separately and added to the building maintenance works estimate.

When using unit rates from cost analyses and benchmark analyses, ensure that the rates have been adjusted to reflect current prices (i.e. adjusted to remove allowances included for inflation; see section 3.19).

4.13 Updating unit rates and other costs to current estimate base date

The estimate base date should be re-established for each formal cost plan. Therefore, unit rates (and other rates) used in the preceding order of estimates and formal cost plans should be updated to bring them into line with the estimate base date established for the next formal cost plan.

To do this, the unit rate (or other rate) is increased/decreased by the amount of inflation or deflation occurring during the period from the previous estimate base date to the current estimate base date. The equation for calculating the updated unit rate is therefore:

$$\mathbf{Ra2 = Ra1 + (Ra1 \times p)}$$

where:

- **Ra1** = unit rate (or other rate) at previous estimate base date
- **Ra2** = unit rate (or other rate) at current estimate base date
- **p** = percentage addition/reduction for inflation/deflation

The percentage addition/reduction for inflation/deflation (p) can be computed using published indices (i.e. tender price indices for maintenance works, the building maintenance cost profiles or retail prices indices). Alternatively, the percentage addition/reduction can be derived from in-house sources of indices. Using published indices, the equation for calculating the percentage addition/reduction for inflation/deflation is:

$$\mathbf{p = \frac{(Index\ 2 - Index\ 1) \times 100}{Index\ 1}}$$

where:

- **Index 1** = index at base date of cost data
- **Index 2** = index at current estimate base date
- **p** = percentage addition/reduction for inflation/deflation

Care should be taken not to update previous rates that were based on percentage additions/reductions (e.g. for maintenance contractors' management and administration costs, maintenance contractors' overheads and profits and consultants' and specialists' fees). Such items will be updated when the percentage addition/reduction is applied to the updated unit

rates (and other rates). Similarly, updating percentages should not be applied to items for which fixed costs have been agreed (e.g. consultants' and specialists' fees, where based on a fixed lump sum).

4.14 Maintenance contractors' management and administration costs

Maintenance contractors' management and administration cost estimates are a cost-significant element in most maintenance works contracts. The cost checking of these charges is an iterative process that is repeated for each formal cost plan.

The methods of estimating the management and administration cost estimate will vary according to the RIBA Stage or OGC Gateway reached. To begin with, for formal cost plan 1 (prepared for RIBA Stage 2, Concept Design, or OGC Gateway 1, Business Justification), the estimated cost will be based on a percentage addition derived from a considered assessment of cost analyses of previous similar maintenance contracts. However, as more information becomes available, a more detailed approach to cost checking the cost target for maintenance contractors' management and administration costs should be taken.

When preparing formal cost plans 2 and 3 at RIBA Stages 3 (Spatial Coordination) and 4 (Technical Design), or at OGC Gateways 3A (Design Brief and Contract Approval) and 3B (Detailed Design Approval), to ensure that the previous cost target was sufficient, thorough cost checks should be carried out on cost-significant items of maintenance contractors' management and administration costs. To facilitate the cost checking process, it is recommended that the checklist of charges included in NRM 3 is used as a memory aid.

Where the estimated cost of maintenance contractors' management and administration charges, or any part of those charges, is based on a percentage addition, the estimated cost should be calculated by applying the selected percentage addition for the charges to the cost of the building works estimate. The equations for calculating the total estimated cost of maintenance contractors' management and administration charges are listed as follows.

Renewal (R) works:

$$\mathbf{c2 = r \times p2}$$

where:

- **r** = renewal works estimate (i.e. total estimated cost of forward renewal works)
- **p2** = percentage for maintenance contractors' management and administration costs
- **c2** = maintenance contractors' management and administration cost estimate (i.e. total estimated cost of maintenance contractors' management and administration costs)

Maintain (M) works:

$$\mathbf{c1 = m \times p1}$$

where:

- **m** = maintenance works estimate (i.e. total estimated cost of maintenance works)
- **p1** = percentage for maintenance contractor's management and administration costs

- **c1** = maintenance contractor's management and administration cost estimate (i.e. total estimated cost of maintenance contractor's management and administration costs)

Alternatively, the estimated cost of all or part of the maintenance contractors' management and administration charges for either or both M works and life cycle R works can be assessed as a lump sum.

The maintenance contractors' management and administration charges estimate is added to the annualised maintenance works estimate or periodic renewal works estimate, as appropriate.

Allowance for subcontractors' management and administration charges should be made in the unit rates applied to measured quantities.

It is recommended that the allowance for maintenance contractors' management and administration charges is treated as a separate cost target.

4.15 Maintenance contractors' overheads and profit

When preparing a cost estimate for maintenance contractors' overheads and profit, it can be either combined as a single cost centre or treated as two separate cost centres (one for overheads and the other for profit). Maintenance contractors' overheads and profit are to be based on a percentage addition. The estimated cost of any overheads and profit should be calculated by applying the selected percentage addition to the combined total cost of the R and M works estimates and the maintenance contractors' management and administration charges estimate.

Where maintenance contractors' overheads and profit are to be combined as a single cost centre, the equation for calculating the total estimated cost of maintenance contractors' overheads and profit is:

$$e = (Rc + Mc + c) \times p$$

where:

- **Rc** = R works estimate (i.e. the total estimated cost of R works)
- **Mc** = M works estimate (i.e. the total estimated cost of M works)
- **c** = maintenance contractors' management and administration costs estimate (i.e. the total estimated cost of maintenance contractors' management and administration costs)
- **p** = percentage for maintenance contractor's overheads and profit
- **e** = maintenance contractors' overheads and profit estimate (i.e. the total estimated cost of the maintenance contractors' overheads and profit)

The percentage addition applied for combined maintenance contractor's overheads and profit should be derived from a considered assessment of maintenance contractor's overheads and profit found on previous maintenance projects.

The maintenance contractors' overheads and profit estimate is added to the combined total of the maintenance works estimate and the maintenance contractors' management and administration estimate. This gives the works cost estimate.

The equation for calculating the works cost estimate is therefore:

d = a + b + c

where:

- **a** = maintenance estimate (renewal and maintenance)
- **b** = maintenance contractor's management and administration charges estimate
- **c** = maintenance contractors' overheads and profit estimate
- **d** = maintenance works cost estimate

Where maintenance contractors' overheads and profit are to be treated as two separate cost centres, the equations for calculating the total estimated cost of maintenance contractor's overheads and profit are as follows.

Maintenance contractor's overheads:

d = (a + b) × c

where:

- **a** = maintenance estimate (i.e. total estimated cost of maintenance works)
- **b** = maintenance contractors' management and administration charges estimate (i.e. total estimated cost of maintenance contractors' management and administration charges)
- **c** = percentage for maintenance contractors' overheads
- **d** = maintenance contractors' overheads estimate (i.e. total estimated cost of maintenance contractor's overheads)

Maintenance contractor's profit:

d = (a + b) × c

where:

- **a** = maintenance estimate (i.e. total estimated cost of maintenance works)
- **b** = maintenance contractors' management and administration charges estimate (i.e. total estimated cost of maintenance contractors' management and administration charges)
- **c** = percentage for maintenance contractors' profit
- **d** = maintenance contractors' overheads estimate (i.e. total estimated cost of maintenance contractor's profit)

The percentage addition to be applied for maintenance contractors' overheads and maintenance contractors' profit should be derived from a considered assessment of maintenance contractors' overheads and profit found on previous maintenance works contracts.

Separate maintenance contractor's overheads and profit estimates are added to the combined total of the R works estimate, the M works estimate and the maintenance contractor's management and administration charges estimate. This gives the maintenance cost estimate.

The equation for calculating the maintenance cost estimate is therefore:

m = Rc + Mc + c + e

where:

- **Rc** = R works estimate (i.e. the total estimated cost of R works)
- **Mc** = M works estimate (i.e. the total estimated cost of M works)
- **c** = maintenance contractors' management and administration costs estimate (i.e. the total estimated cost of maintenance contractors' management and administration costs)
- **e** = maintenance contractors' overheads and profit estimate (i.e. the total estimated cost of the maintenance contractor's overheads and profit)
- **m** = maintenance cost estimate

It is recommended that the allowances for maintenance contractor's overheads and profit are treated as either a single cost target or two separate cost targets.

4.16 Consultants' and specialists' fees

Consultants' and specialists' fees are associated with the maintenance works during the pre-construction work stages and for the employment of consultants, or specialist contractors, to advise on and manage the procurement and implementation of maintenance programmes of works or subcontracts, or to execute specialist maintenance works and/or inspections and audits.

A list of typical consultants' and specialists' fees is included in Part 6. The tables are intended for use by the quantity surveyor/cost manager to assist in the cost estimating and cost checking process (group element 11: Consultants' and specialists' fees). These examples do not provide a definitive or exhaustive list of items but are simply a guide.

Consultants' and specialists' fees are to be included in cost plans unless specifically excluded at the request of the client.

Calculation of the consultants' and specialists' fees estimate is as follows.

The estimated cost of consultants' and specialists' fees should be calculated by applying the selected percentage addition for these fees to the maintenance cost estimate (i.e. the combined total of the R works estimate, the M works estimate, the maintenance contractor's management and administration charges and the maintenance contractor's overheads and profit estimate).

The equation for calculating the consultants' and specialists' fees is therefore:

$$\mathbf{c = m \times p}$$

where:

- **m** = maintenance cost estimate
- **p** = percentage for consultants' and specialists' fees
- **c** = consultants' and specialists' fees estimate (i.e. total estimated cost of consultants' specialists' fees)

The percentage addition to be applied for consultants' and specialists' fees should be derived from a considered assessment of these fees on similar previous maintenance projects.

Where actual consultants' and specialists' fees are known (e.g. for the consultant creating the asset register), the actual fee should be included in the cost plan. Any compensating adjustments should be made to the applicable cost targets.

4.17 Other client-definable maintenance-related costs

Other client-definable maintenance-related costs are those not necessarily directly associated with the maintenance works costs or consultants' fees. They form part of the total cost of maintenance to the client (e.g. training, insurances, statutory fees, fees in connection with party wall awards, decanting and relocation costs, move costs, procurement and mobilisation costs incurred by the client and other project-specific items identified by the parties).

Other maintenance-related costs should be included in the cost plan, unless specifically excluded at the request of the client. Other maintenance-related costs should be added as lump sum allowances. Examples are provided in Part 6. These examples do not provide a definitive or exhaustive list of items but are simply a guide.

The nature of other project-related maintenance costs, and the extent of the lump sum allowance to be included in the cost plan estimates, are to be agreed with the client.

The total estimated cost of other project-related maintenance costs is added to the combined total of the maintenance works estimate and the agreed 'in-scope' costs identified as other project-related cost items.

4.18 Risk

Risk allowances, based on the results of a formal risk analysis, should be included in each formal cost plan. Risk allowances should reflect the client's risk exposure. In setting the amount of the risk allowances, the possible consequences of the client's residual risk should be considered. The only satisfactory way to ensure that risk allowances provide for the risks to the project is to determine the size of the allowances from the results of a risk analysis. Risk allowances are not to be standard percentages, but a considered assessment of the risks, taking account of the completeness of the design and other uncertainties.

The need to undertake a formal risk analysis to identify the client's risk exposure and to make considered risk allowances for risks is explained in section 3.14.

Risk registers and risk estimates should be reassessed at regular intervals throughout the various RIBA Stages and OGC Gateways to ensure that estimates, formal cost plans and cash flows realistically reflect the potential impact of any residual risks.

Successive assessments will show decreasing risk due to reduced uncertainty because of the increasing definition of the project itself and the decisions that are made as the project progresses. However, it should be noted that risk does not always decrease.

It is recommended that risk allowances are treated as four separate cost targets that are used to 'top up' other overspending cost targets as the project progresses. As an element overruns its cost target, a transfer is made from the appropriate risk allowance to allow for the increase. Similarly, if a cost target is likely to underrun, the surplus is transferred into the appropriate risk allowance.

The recommended cost targets are:

- design development and associated installation risks
- maintenance risks (unplanned/unscheduled risks)

- client – change risks, and
- client – other risks.

See section 3.14 for definitions of the above categories of risk allowance. Examples of risks are provided in Part 6 (group element 13: Risks). These examples do not provide a definitive or exhaustive list of items but are simply a guide.

Where any allowances for design development and associated installation risks, maintenance risks (unplanned/unscheduled), client change risks and other client risks are to be based on a percentage addition, the allowances are to be calculated by multiplying the base cost estimate by the selected percentage additions. The equations for calculating the allowances for these risks are therefore:

- design development and associated installation risks: **R1 = a × p1**
- maintenance risks (unplanned/unscheduled) risks: **R2 = a × p2**
- client change risks: **R3 = a × p3**
- client other risks: **R4 = a × p4**

where:

- **a** = base cost estimate
- **p1** = percentage risk allowance for design development and associated installation risks
- **p2** = percentage risk allowance for maintenance (unplanned/unscheduled) risks
- **p3** = percentage risk allowance for client change risks
- **p4** = percentage risk allowance for client other risks
- **R1** = risk allowance estimate for design development and associated installation risks (i.e. total estimated cost of risk allowance for design development and associated installation risks)
- **R2** = risk allowance estimate for maintenance (unplanned/unscheduled) risks (i.e. total estimated cost of risk allowance for maintenance (unplanned/unscheduled) risks)
- **R3** = risk allowance estimate for client change risks (i.e. total estimated cost of risk allowance for client change risks)
- **R4** = risk allowance estimate for client other risks (i.e. total estimated cost of risk allowance for client other risks)

The equation for calculating the total risk allowance estimate is therefore:

RA = R1 + R2 + R3 + R4

The risk allowance estimate is added to the base cost estimate. This gives the proposed cost limit (excluding inflation). The equation for calculating this is therefore:

CL = a + b

where:

- **a** = base cost estimate
- **b** = risk allowances estimate
- **CL** = cost limit (excluding inflation)

4.19 Inflation

The rules for measuring the potential effects of inflation for cost planning are the same as those for order of cost estimating (see section 3.15).

4.20 VAT assessment

In the UK, capital allowances are given against the net capital cost to the taxpayer. Therefore, as VAT is part of that capital cost, clients will incur differing overall capital expenditure for the same item depending on whether they can recover the VAT (fully or partially).

VAT in relation to capital building works, and maintenance and replacement works, is a complex area. Therefore, it is recommended that VAT is excluded from cost plans.

It is recommended that specialist advice is sought on VAT matters to ensure that the correct rates are applied to the various aspects of the building maintenance works. If required by the client, provision for VAT assessment can be incorporated into the cost plan.

4.21 Other considerations

Other considerations include:

- capital allowances for taxation purposes
- grants, energy tariffs and carbon reduction commitments
- defects and warranty liabilities, and
- availability and non-performance penalties.

Asset depreciation and write-downs are not covered by NRM 3.

Taxation allowances, taxation relief and grants: these provide valuable financial aid to a client on certain types of building, as well as on maintenance and replacement programmes. However, due to the complexity of legislation, it is recommended that specialist advice is sought to maximise the availability and quantum of taxation allowances, taxation relief and grants. For that reason, unless specifically requested by the client, it is recommended that these allowances are excluded from cost plans.

Grants: these provide valuable, and possibly significant, financial aid to funding certain types of building maintenance works. It is recommended that specialist advice is sought to maximise the availability and quantum of the grants.

Defects and warranty liabilities: these are outside the scope of NRM 3.

Availability and non-performance penalties: these may be applied during the execution of the maintenance works and are often a contract condition, which entitles the client to make deductions from payments to the maintenance contractor for not performing some of the contracted maintenance services. It is recommended that these are excluded from the order of cost estimates and elemental cost planning.

4.22 Present value, inflation and discounting methods

The rules for dealing with present value (PV) and discounting for cost planning are the same as those of order of cost estimating. See section 3.19.

4.23 Reporting of maintenance cost plans

Costs are to be expressed as cost/m^2 of GIFA/pa and in functional unit cost/m^2/pa (e.g. cost per functional type, such as primary school). See Appendix A for common functional types.

Where appropriate and/or required by a client, costs can be expressed as cost/ft^2 of GIFA, or cost per functional unit (or functional unit cost) as an alternative, or in addition, to the cost/m^2 of GIFA. The functional unit may be a client-defined unit. It is therefore important that the functional unit is clearly identified when costs are expressed in this way. See Appendix A for types of functional units.

Items included and excluded from the estimated cost are to be clearly communicated to the client when reporting R or M and/or the combined maintenance cost plans (R and M).

Typical items to be included in maintenance cost plan reports are:

1. executive summary
2. project title
3. project description
4. status of cost plan
5. a statement of cost (including cost limit)
6. details of the information and maintenance standards on which the cost plan was prepared, recording any key assumptions and exclusions (i.e. items out of scope)
7. a statement of the floor areas
8. the cost plan
9. basis of cost estimates (i.e. assumptions)
10. estimate base date (i.e. to which inflation/discounting has been applied)
11. reasons for changes to previous cost targets (explaining the transfers and adjustments that have taken place against the previous cost plan)
12. value engineering option appraisals (e.g. lowest whole life costing, build specification versus maintenance)
13. estimated costs of, and a request for decisions on, any alternative proposals
14. cash flow forecast, where appropriate
15. inclusions and exclusions (i.e. a statement of what is included in and excluded from the order of cost estimate or elemental cost plans)

16 other items relevant to R or M and/or the total combined maintenance cost plans (R and M) over the period of analysis

17 risk and sensitivity analysis (optional)

18 input into wider sustainability/environmental assessments (e.g. carbon reduction, environmental assessment tools, BREEAM) and

19 input into wider life cycle costing or whole life cycle costing economic evaluations.

See Appendices E and F for standard templates for cost reporting and analysis.

4.24 Analysis, collection and storage of maintenance cost data

NRM 3 can be used as a basis for measuring elemental and/or asset-specific cost planning of R and M works, and creating EURs and EUQs for preparing detailed cost analysis of the maintenance works.

The cost data generated by the maintenance cost planning can be retrieved, analysed, stored and reprocessed in various ways (e.g. as distinct rates, detailed elemental cost analyses, EURs, cost/m^2 per annum of GIFA, and/or functional unit rates) for use in order of estimating and elemental cost plans. It can also be used for benchmarking purposes.

Asset-specific R and M works after completion are the best sources of real-time cost data, which can then be used by quantity surveyors/cost managers to provide evidence-based cost advice on the likely cost of future maintenance and life cycle repairs and replacement works. Moreover, they afford a complete cost model for maintenance and life cycle renewal and/or the combined total maintenance costs.

There are four levels of analysis of maintenance cost information collected for R and M works:

- total building
- group element (concise)
- detailed element (detailed) and
- sub-element (amplified).

Total building analysis will provide the following: building (sum of elements 0–7); external works (element 8); maintenance admin, overheads and profit (sum of elements 9–10); consultants' and specialists' fees (11); client-definable maintenance-related works (12); and risks (13).

Group element analysis will provide concise maintenance costs for the following:

- **facilitating works** (0)
- **substructures** (1)
- **superstructures** (sum of elements for group element 2)
- **finishes** (sum of elements for group element 3)
- **fittings, furnishings and equipment** (sum of elements for group element 4)
- **services** (sum of elements for group element 5)
- **works to existing building** (sum of elements for group element 7)

- **external works** (sum of elements for group element 8)
- **maintenance management and admin costs, and overheads and profit** (sum of elements for group elements 9 and 10)
- **consultants' and specialists' fees** (sum of group element 11)
- **client-definable maintenance-related works** (sum of group element 12)
- **risk** (sum of group element 13).

Detailed element analysis will collect and present the costs for each element separately. Sub-element analysis will collect and present the costs for each sub-element separately – for instance, where there is more than one specification for a single sub-element, the costs should be shown separately.

Where the consultants' and specialists' fees and client-definable other maintenance-related works costs are available, they should be stated and not form part of the building cost analysis.

Ancillary information and specification details should be provided with the level of detail cost analysis in accordance with the principles of cost analysis (as defined in the BCIS Standard Form of Cost Analysis).

5 Calculation of annualised costs for R and M works

5.1 Introduction

This section describes a method of calculating annualised costs for R and M works. It also explains the methodology for generating LCCPs and various metrics used for life cycle cost analysis and the benchmarking of maintenance works.

5.2 Calculating annualised costs of R works tasks from a capital building works cost plan

The information required, and the method of calculating the cost per annum of R works tasks, which is generated from a capital building works cost plan, are set out in Table 5.1.

Cost data structure	(a)	Group element
	(b)	Element
	(c)	Sub-element
	(d)	Component
Capital building works cost plan data	(e)	Component specification
	(f)	Quantity
	(g)	Unit of measure
	(h)	Construction unit rate
Quantification of renewal (R) works	(i)	In renewal (R) plan scope
	(j)	Renewal (R) descriptor
	(k)	Action required
	(l)	Scale of renewal (R)
	(m)	Renewal (R) quantity
	(n)	Renewal (R) unit of measurement
Event cycle	(o)	Reference service life (RSL)
	(p)	Life factor
	(q)	Interval

Renewal (R) costs	(r)	Adjustment to construction unit rate
	(s)	Renewal uplift
	(t)	Renewal (R) unit rate
	(u)	Cost per event
	(v)	Total renewal (R) cost

Table 5.1: Data table for calculating the cost of R works tasks

Notes on Table 5.1:

1. Columns (a) to (d): **cost data structure** – these are used to define the group elements, elements, sub-elements and components. The definitions are taken directly from the NRM 1 cost data structure.
2. Columns (e) to (h): **capital building works cost plan data** – these are used to define the data relating to components extracted from the capital building works cost plan.
3. Columns (i) to (n): **quantification of R works** – these are used to define the elements, sub-elements and components subject to R works, and to define the nature and extent of R works.
4. Columns (o) to (q): **event cycle** – these are used to define the interval at which R works tasks are carried out.
5. Columns (r) to (v): **Renew costs** – these are used to specify the unit rate to be applied to the R works task, the cost for each time the task is completed, and its total cost for the period of analysis.

Table 5.1 should be completed as follows.

Cost data structure:	
Column (a): group element	Insert the group element descriptor.
Column (b): element	Insert the element descriptor.
Column (c): sub-element	Insert the sub-element descriptor.
Column (d): component	Insert the component descriptor. For columns (a) to (d): the descriptors, which are defined in NRM 1 and NRM 3, are extracted from the capital building works cost plan.
Capital building works cost plan data:	
Column (e): component specification	Insert the specification of the component.
Column (f): quantity	Insert the total quantity of the component in the building or other built asset.
Column (g): unit of measurement	Insert the unit of measurement (nr, m, m^2, m^3) or item.

Column (h): construction unit rate	Insert the unit rate for building/installing the component (nr, m, m^2, m^3) or item. For columns (e) to (h): this information is extracted from the capital building works cost plan.
Quantification of R works:	
Column (i): R plan scope	State whether the component from the capital building works cost plan will be included in the scope of R costs. Insert 'Yes' or 'No' as applicable.
Column (j): R descriptor	Insert the R descriptor of the component that will be renewed as defined in Part 6.
Column (k): action required	Specify the nature of the works to be completed in connection with the R works.
Column (l): scale of R	Specify the extent of R works to be completed in connection with the component, in terms of a percentage. For example, internal doors replaced every X years and ironmongery renewed every Y years. The scale of renewal is sometimes referred to as the limit of renewal.
Column (m): R quantity	Insert the R quantity work to be undertaken. The calculation is: Renewal (R) quantity = quantity (column f) × scale of R (column l)
Column (n): R unit of measurement	Insert the unit of measurement (i.e. nr, m, m^2, m^3) or item.
Event cycle:	
Column (o): RSL	Assign an RSL to the R work item. RSL data can be derived from sources such as CIBSE Guide M, BCIS Life Expectancy of Building Components or client/ consultant and other specific data sources.
Column (p): Life factor	Insert life factor adjustments to the RSL to take account of any factors that may affect the frequency of R (i.e. hours in use, material quality, environment, usage, location, etc.). This can be expressed as a percentage, or as a fraction as indicated in Table 5.2.

Column (q): Interval	Insert the interval of R for the component. The calculation for this is: Interval = RSL (column o) × life factor (column p), for example: RSL = 25 years Life factor = 80% (or 0.80) Interval = 20 years (25 years × 80%) Therefore, R of the component is required in year 20 or at each 20-year cycle (e.g. year 20, year 40, etc.).
Renewal (R) costs:	
Column (r): Adjustment to construction unit rate	Insert, as a percentage, the proportion of the construction unit rate that reflects the actual R works undertaken. Example 1: A percentage split can be applied to the construction unit rate to reflect situations where a component is made up of various subcomponents with different lives. For example, external doors may be split 80% door and frame, 15% ironmongery and 5% seals. Example 2: A percentage adjustment can be applied to the construction unit rate in instances where the cost of renewal is less than construction. For example, the number of coats of paint for redecorations is likely to be less than that required at construction.
Column (s): renewal uplift	Insert the renewal uplift to the construction unit rate in terms of a percentage. This uplift is to take into consideration the costs relating to the renewal process (e.g. access, removal of existing asset, disposal, making good, preparing to receive new, working within an existing building, subcontractor's preliminaries, subcontractor's overheads and profit).
Column (t): renewal unit rate	Insert the rate to be applied to each R works task. The rate is generally calculated using the construction unit rate. The calculation for this is: Renewal unit rate = construction unit rate (column h) × adjustment to construction unit rate (column r) × (1 + renewal uplift (column s)) The R unit rate can also be generated using alternative rates, such as those taken from a schedule of rates, renewal quotations, etc.

Column (u): cost per event	Insert the cost per event. The calculation for this is: Cost per event = R quantity (column m) × R unit rate (column t) Any adjustment for inflation/indexation to the R unit rate can be carried out here (see rules on inflation in section 3.15).
Column (v): total R cost	Insert the total R cost for the period of analysis. The calculation for this is: Total R cost = cost per event (column u) × number of occurrences during the period of analysis.

5.3 Reference service life, life factors and predicted life calculations

5.3.1 Reference service life

The reference service life (RSL) is the service life that a building, other built asset, part of a building, maintainable asset type or component would expect (or is predicted) to have in a certain (reference) set of in-use conditions. The end of service occurs at the period after installation when a building or its parts no longer meet performance requirements and when physical failure is possible and/or when it is no longer practical or economical to continue with maintenance.

Sources of data for RSLs include:

- BCIS publication BMI Life Expectancy of Building Components
- CIBSE Guide M: Maintenance Engineering and Management
- Building Research Establishment (BRE)
- component manufacturers' data sheets and
- operating and maintenance manuals (project-specific data sheets).

5.3.2 Life factors

Life factors are those used to predict the life expectancy of an element, sub-element, component or subcomponent. There are several life factors used to define the life expectancy of an element, sub-element, component or subcomponent, such as quality of components, design level, work standard, indoor environment, exterior environment, in use condition and maintenance level.

Typical types of life factors are to be considered when assessing the life expectancy of elements, sub-elements, components or subcomponents, which should be used to adjust the RSL to a predicted life expectancy that suits the project situation, using the life factoring method.

5.3.3 Predicted life expectancy of elements, sub-elements, components and subcomponents

Table 5.2 illustrates a method of collating life factor data and calculating the predicted life of elements, sub-elements, components or subcomponents (e.g. a window).

Reference service life (RSL) of windows			
Factors	**RSL assumptions**	**Project conditions**	**Factors**
Quality of components	Average	High-quality specification	1.1
Design level	Not known	Average	1
Work standard	Good practice	Good practice	1
Indoor environment	Not relevant	Not relevant	1
Exterior environment	UK average	West coast of Scotland	0.8
In-use conditions	External envelope	External envelope	1
Maintenance level	Regular cleaning	No cleaning	0.8
Overall factor	1		0.704
RSL years	**25**	**Project life years**	**18**

Table 5.2: Example of an RSL factor table for windows (adapted from CIBSE Guide M and Table 6.1 in PD 156865:2008)

By using the individual life factors from the table, the overall life factor is calculated by cumulatively multiplying each individual life factor. The calculation for overall life factor is as follows.

OLF = LF1 × LF2 × LF3 … × LFn

where:

- **LF1** = first life factor
- **LF2** = second life factor
- **LF3** = third life factor
- **LFn** = last life factor
- **OLF** = overall life factor

The predicted life is calculated by multiplying the overall life factor by the RSL. The calculation for predicted life is:

PL = OLF × RSL

where:

OLF = overall life factor

RSL = reference service life

PL = predicted life

Considering the data in Table 5.2, the predicted life of the windows is:

PL = 0.704 × 25 = 17.6 years (say 18 years)

5.4 Calculating annualised costs of R work items from as-built, as-installed and/or asset registers and condition data

The information required and the method of calculating R works costs, ascertained from as-built, as-installed or other record information (e.g. asset register, condition survey reports, technical inspection and percentage asset remaining life (PARL) assessment, or other as-built records), are set out in Table 5.3.

Cost data structure	(a)	Group element
	(b)	Element
	(c)	Sub-element
	(d)	Component
Built asset data	(e)	Component specification
	(f)	Quantity
	(g)	Unit of measurement
Quantification of renewal (R) works	(h)	In renewal (R) plan scope
	(i)	Renewal (R) descriptor
	(j)	Condition asset rating
	(k)	Action required
	(l)	Scale of renewal (R)
	(m)	Renewal (R) quantity
	(n)	Renewal (R) unit of measurement
	(o)	Percentage asset remaining life (PARL)
Event cycle	(p)	Reference service life (RSL)
	(q)	Life factor
	(r)	Interval
Renewal (R) costs	(s)	Renewal (R) unit rate
	(t)	Cost per event
	(u)	Total R cost

Table 5.3: Data table for calculating the cost of R works tasks using as-built information (e.g. from an asset register and condition surveys/PARL assessments)

Notes on Table 5.3

1 Columns (a) to (d): **Cost data structure** – these are used to define the group elements, elements, sub-elements and components defined by the NRM 1 cost data structure.

2 Columns (e) to (g): **Built asset data** – these are used to define the data relating to components extracted from the asset register, condition survey reports, inspections and other as-built records.

3 Columns (h) to (o): **Quantification of R works** – these are used to define the elements, sub-elements and components subject to R works; to specify the condition of the component; and to define the nature and extent of R works.

4 Columns (p) to (r): **Event cycle** – these are used to define the interval at which the R works task will be carried out.

5 Columns (s) to (u): **Renewal (R) costs** – these are used to specify the unit rate to be applied to the R works task, the cost for each time the task is completed and its total cost for the period of analysis.

Table 5.3 should be completed as follows.

Cost data structure:	
Column (a): group element	Insert the group element descriptor.
Column (b): element	Insert the element descriptor.
Column (c): sub-element	Insert the sub-element descriptor.
Column (d): component	Insert the component descriptor. For columns (a) to (d): the descriptors, which are defined in NRM 1 and NRM 3, are extracted from the capital building works cost plan.
Built asset data:	
Column (e): component specification	Insert the specification of the component.
Column (f): quantity	Insert the total quantity of the component in the building or other built asset.
Column (g): unit of measurement	Insert the unit of measurement (nr, m, m^2, m^3) or item. For columns (e) to (g): This information should be extracted from the built asset data.
Quantification of R works:	
Column (h): in R plan scope	State whether the component from the built asset will be included in the scope of R cost plan. Insert 'Yes' or 'No' as applicable.
Column (i): R descriptor	Insert the R descriptor of the component that will be renewed as defined in Part 6.
Column (j): condition asset rating	Extract the condition asset rating for each of the components from the condition survey report.
Column (k): action required	Specify the nature of works to be completed in connection with the R works.

Column (l): scale of renewal (R)	Specify the extent of R works to be completed in connection with the component, in terms of a percentage. Note: the scale of renewal is sometimes referred to as the 'limit of renewal'.
Column (m): R quantity	Insert the R quantity work to be undertaken. The calculation for this is: Renewal (R) quantity = Quantity (column f) × Scale of renewal (R) (column l)
Column (n): R unit of measurement	Insert the unit of measurement (i.e. nr, m, m^2, m^3) or item.
Column (o): asset remaining life	Extract the asset remaining life (1st intervention) for each of the components as determined from the condition survey report.
Event cycle:	
Column (p): RSL	Assign an RSL to the R works item. RSL data can be derived from sources such as CIBSE Guide M, BCIS Life Expectancy of Building Components and/or client/ consultant and product supplier's-specific data.
Column (q): life factor	Insert life factor adjustments to the RSL to take into account any factors that may affect the frequency of R (i.e. hours in use, material quality, environment, usage, location, etc). This can be expressed as a percentage or as a fraction.
Column (r): interval Renewal (R) costs:	Insert the interval of R for the component. The calculation for this is: Interval = RSL (column p) × Life factor (column q) For example: RSL = 25 years Life factor = 80% (or 0.80) Interval = 20 years (25 years × 80%) Therefore, R of the component is required in year 20 or at each 20-year cycle (e.g. year 20, year 40, etc.).

Column (s): R unit rate	Insert the unit rate to be applied to each unit of R works task. The unit rate should be at current price levels. The R unit rate is generally based on specific estimates, quotations or similar, and accounts for the cost of undertaking renewal works in an existing building, e.g. removal/stripping out, disposal, redesign work, making good, access requirements (including access scaffolding), management of costs and allowances for out-of-normal-hours working.
Column (t): cost per event	Insert the cost per event. The calculation for this is: Cost per event = Renewal (R) quantity (column m) × Renewal (R) unit rate (column s) Any adjustment for inflation/indexation to the R unit rate can be carried out here.
Column (u): total R cost	Insert the total R cost for the period of analysis. The calculation for this is: Total R cost = Cost per event (column t) at 1st intervention + Cost per event (column t) × Number of occurrences during the period of analysis

5.5 Calculating annualised costs of M works from as-built, as-installed and/or asset register and planned preventative maintenance task schedules

The information required, and the method of calculating the M works costs ascertained from as-built or other record information (e.g. from an asset register, condition survey reports, technical inspection, inspection or other as-built records), are set out in Table 5.4.

Table 5.4 provides a structured basis for the measurement and quantification, task timing, task skilling and costing of M works.

See BESA publications for specific guidance and access to the applicable maintenance task specifications for building and engineering services. SFG20 is the accepted industry maintenance standard.

Cost data structure				Built asset data			Quantification of maintain (M) works								Event cycle		Task skilling by trade	Annual labour hours calculated by trade							
																		Trade 1		Trade 2		Trade […]		Trade X	
																		Normal hours	Out of hours working	Normal hours	Out of hours working	Normal hours	Out of hours working	Normal hours	Out of hours working
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)	(y)	(z)
Group element	Element	Subelement	Maintain descriptor	Component specification	Quantity	Unit of measure	In maintain (M) plan scope	Action required	Maintain (M) quantity	Maintain (M) unit of measurement	Task time (industry standard PPM time)	Amended task time (PPM time)	Access adjustment factor	Out of normal hours working	Task frequency	Interval	Trade description	Trade 1 – PPM task time in hours [=((l – o) × j × q) or ((m – o) × j × q) + 60]	Trade 1 – out of normal hours working: PPM task time in hours [= (o × j × q) + 60]	Trade 2 – PPM task time in hours [= ((l – o) × j × q) or ((m – o) × j × q) + 60]	Trade 2 – out of normal hours working: PPM task time in hours [= (o × j × q) + 60]	Trade […] – PPM task time in hours [= ((l – o) × j × q) or (m – o) × j × q) + 60]	Trade […] – out of normal hours working: PPM task time in hours [= (o × j × q) + 60]	Trade X – PPM task time in hours [= ((l – o) × j × q) or ((m – o) × j × q) + 60]	Trade X – out of normal hours working: PPM task time in hours [= (o × j × q) + 60]
Net total annual labour hours by trade																									
Reactive hours annualised (if in scope)																									
Site adjustment / access factor (%)																									
Gross total labour hours by trade																									
Trade labour rate (Normal working hours or out of normal working hours as applicable)																									
Total annualised trade labour cost															£										
Annualised consumables / plant and equipment															£										
Total annualised maintain (M) cost															£										

Source: The calculation template and rules of measurement for producing and annualised maintain costs plan from asset registers and SFG20 PPM task schedules has been reproduced with the permission of B&ES (formerly the HVCA).

Table 5.4: Data table for calculating the annualised cost of maintenance (M) works tasks from asset registers and task schedules

Notes on Table 5.4:

1 Columns (a) to (d): **Cost data structure** – these are used to define the group elements, elements, sub-elements and components defined by the NRM 1 and NRM 3 cost data structure.

2 Columns (e) to (g): **Built asset data** – these are used to define the data relating to components extracted from the asset register, condition survey reports, technical inspection, inspection and other as-built records.

3 Columns (h) to (o): **Quantification of M works** – these are used to define the elements, sub-elements and components subject to M works; to specify the nature of the works; and to define the extent of the works.

4 Columns (p) to (q): **Event cycle** – these are used to define the frequency and interval at which the M works task will be carried out.

5 Column (r): **Task skilling by trade** – this is used to specify the trade that is to carry out the M works task.

6 Columns (s) to (z): **Annual labour hours calculated by trade** – these calculate, by trade, the number of hours required to complete the works. Both works to be undertaken during normal working hours and out of normal working hours are addressed.

Table 5.4 should be completed as follows.

Cost data structure:	
Column (a): group element	Insert the group element descriptor.
Column (b): element	Insert the element descriptor.
Column (c): sub-element	Insert the sub-element descriptor. Note on columns (a) to (d): the descriptors, which are defined in NRM 3, are compiled from the built asset data.
Built asset data:	
Column (e): component specification	Insert the specification of the component.
Column (f): quantity	Insert the total quantity of the component to be maintained. For column (f): quantities should be measured in accordance with the rules of measurement tables in NRM 1 or, where different rules of measurement apply, in accordance with the rules of measurement tables in NRM 3.
Column (g): unit of measure	Insert the unit of measurement (nr, m, m^2, m^3) or item. For columns (e) to (g), this information should be extracted from the built asset data.

Quantification of M works:	
Column (h): in M plan scope	State whether the component will be included in the scope of the maintenance programme. Insert 'Yes' or 'No' as applicable.
Column (i): action required	Input the task code(s) relating to the work(s) to be completed in connection with the M works.
Column (j): quantity – M	Insert the total quantity of the component to be maintained. Notes on column (j): • Quantities should be measured in accordance with the rules of measurement tables in NRM 1 or, where different rules of measurement apply, in accordance with the rules of measurement tables in NRM 3. • Where the quantities of components to be maintained have been derived from asset survey reports, the quantities can be directly inserted. Where these have not been included in the asset survey report, the quantity surveyor/cost manager will be required to ascertain the quantity from record drawings or physically measure the works.
Column (k): unit of measurement	Insert the unit of measurement (nr, m, m^2, m^3) or item.
Column (l): task time	Insert the industry standard (coalface) task time required (in minutes).
Column (m): amended task time	Insert the amended task time (in minutes) should the industry standard task time not reflect the actual work required.
Column (n): access adjustment factor	This is an option to insert an access adjustment factor on an individual asset basis, rather than just a site-wide adjustment.
Column (o): out of normal hours working	Insert the number of minutes required to undertake the task outside of normal working hours.

Event cycle:	
Column (p): task frequency	Specify how often M tasks are required to be carried out (e.g. weekly, monthly, yearly). Notes on column (p): Sources of data for frequencies include: • BESA (SFG20 standard task schedules) • BCIS Occupancy cost plans • Specialist maintenance works contractors and • Component manufacturers' data sheets. Where applicable, apply a percentage adjustment to the task frequency to take into account factors that affect the frequency of repair or replacement (such as hours run, material quality, environment, usage, location, etc).
Column (q): Interval	Insert the task frequency by number of occurrences per year.
Task skilling by trade:	
Column (r): trade description	Insert the type of maintenance contractor that is to complete the M task.
Annual labour hours calculated by trade:	
Column headed: trade 1	Insert the title of the trade required.
Column (s): normal working hours	Insert the number of normal working hours relating to the trade.
Column (t): out of normal hours working Results:	Insert the number of out of normal hours relating to the trade.
Net total annual labour hours by trade	Calculate the sum of the working hours (both normal and out of hours) for each trade.
Reactive hours annualised (if in scope)	Insert the hours (annualised) for unscheduled maintenance work by trade (if in scope).
Site adjustment/access factor (%)	Insert the project-specific allowances for site-wide adjustments, such as access.
Gross total labour hours by trade	Insert the gross total labour hours by trade. The calculation for this is: *Gross total labour hours by trade = net total annual labour hours by trade + reactive hours annualised × (1 + site adjustment/access factor (%))*

Trade labour rate	Insert the estimated/agreed hourly labour rates (normal working hours and out of working hours for each trade).
Total annualised trade labour cost	Insert and summarise the total annualised trade labour cost for each trade. The calculation for this is: *Total annualised trade labour cost = gross total labour hours by trade × trade labour rate.*
Annualised consumables/plant and equipment	Insert and summarise the project-specific cost allowances for annualised consumables/plant and equipment.
Total annualised M costs:	Insert the total annualised M cost for each trade. The calculation for this is: Total annualised M costs = total annualised trade labour cost + annualised consumables/plant and equipment.

5.6 Creating a life cycle cost plan integrating C with R and M works

The rules of measurement for cost planning R and M works can be used as a basis for compiling life cycle cost plans (LCCPs) or used to inform a wider LCCP, whole life cost plan or other economic evaluation for a complete building or element/asset, as appropriate.

Report templates based on level 1 and level 2 codes are provided in Appendices E and F.

5.7 Metrics used for life cycle cost analysis and unit rate benchmarking of M works

Life cycle costs can be measured and reported using a variety of metrics, for example:

a whole building or elemental unit rate examples:

- cost/m^2/per annum of GIFA or NIA (as applicable)
- functional unit cost – by function types (see Appendix A)
- cost per unit/year (e.g. per bed, per hotel room, per pupil, etc.).

b system or element/asset or component unit rate examples:

- £/kW/year (boilers)
- £/point/year (sanitary ware)
- £/lift.

c function unit rate example:

- cost per bed space (hotels, houses)

- cost per pupil (schools)
- cost per functional types (e.g. offices, retail, prisons, stations, and many others).

Cost indexation for benchmarking and comparison can be derived by expressing the ratios of the functional maintenance index (FMI) and functional condition indexation (FCI) versus the capital reinstatement value or rebuild costs.

The FCI includes all identified actions from condition surveys (e.g. major repairs and replacements) and predicted life cycle remaining-life assessments, expressed over an agreed period of analysis. FCI indexation can be expressed in years, or in banding of years (e.g. years 5–10 totals) to profile the moving indexation over time that highlights the implications of the ageing of constructed assets.

6 Elemental cost planning

6.1 Introduction

This section comprises the rules of measurement for the elemental cost planning of maintenance works. It explains the use of tables and describes how to codify elemental R and M cost plans. Guidance is also given on how to reallocate costs from elements and sub-elements to work packages where building maintenance works are to be procured through use of discrete work packages and a combination of contract strategies.

The tables can also be used as a basis for measuring quantities for the application of whole life cycle costing.

6.2 Use of tables for elemental cost planning

The rules of measurement for elemental cost planning for maintenance works are set out in tables, which are provided for each group element listed below. In addition, to compartmentalise the different aspects of maintenance work, each group element has been allocated to a high-level WBS classification:

Facilitating works Group element 0:	Facilitating works
Substructure Group element 1:	Substructure
Superstructure Group element 2:	Superstructure
Internal finishes Group element 3:	Internal finishes
Fittings, furnishings and equipment Group element 4:	Fittings, furnishings and equipment
Services Group element 5:	Services

Work to existing buildings	
Group element 6:	Not applicable to NRM 3
Group element 7:	Work to existing buildings
External works	
Group element 8:	External works
Others	
Group element 9:	Maintenance contractors' management and administration costs
Group element 10:	Maintenance contractors' overheads and profit
Group element 11:	Consultants' and specialists' fees
Group element 12:	Client-definable maintenance-related costs
Group element 13:	Risks
Group element 14:	Inflation

To provide a consistent WBS, CBS, codification system and methodology for benchmarking, the group elements, elements, sub-elements and components are fully aligned with those defined in NRM 1. This common data structure integrates the C components with the R and M works.

The logic and levels table is available with the NRM suite, and defines the common data structure down to the lowest maintainable component.

6.2.1 Facilitating works, building structure and fabric, building engineering services and external works

The tables for group elements 0–8 inclusive comprise the rules of measurement for facilitating works (group element 0), building structure and fabric (group elements 1–4, 6 and 7), building services (group elements 5 and 6) and external works (group element 8). Each table is structured as follows.

1. The group element is given in the first heading.
2. The element is given in the second heading.
3. The left-hand column states the cost code for the sub-element.
4. The second column lists the sub-elements and contains the definition rules applicable to each sub-element.
5. The third and fourth columns list the components and the units of measurement for components, respectively.
6. The fifth column describes the items included within each element and sub-element.

7 The sixth and seventh columns comprise the maintenance descriptors for R and M works.

8 The last column comprises the rules for measuring R and M works items.

9 Horizontal lines divide the tables to denote the end of a sub-element.

10 The '/' symbol used between two or more units of measurement in the third column (unit of measurement) means 'or'.

The tables are based on four principal levels. Levels 1–3 in the rules are the headings under which actual work items are allocated (i.e. group element, element and sub-element). Levels 4 and 5 are applicable C elements and components for R or M descriptors.

1 Level 1: group element: the primary classification used for grouping elements (i.e. headings).

2 Level 2: element: a key part of a group element.

3 Level 3: sub-element: a part of an element. One or more sub-elements will constitute an element.

4 Level 4: component: an item that forms part of a sub-element. One or more components will be measured to ascertain the cost of an element or sub-element.

5 Levels 4 and 5: maintenance descriptors: for the applicable R or M work to be undertaken in connection with a sub-element or component.

These levels provide the basis of a codified framework for elemental cost planning for maintenance works, which can be used both as a reference point for cost checking targets and the overall cost limit as more information about the built asset or facility becomes available. They provide both a WBS and a CBS for the R and M works. The codification framework in NRM 3 is directly aligned to the NRM 1 codification framework.

6.2.2 Maintenance contractor's management and administration costs

The table for group element 9 comprises a list of typical items included in maintenance contractors' management and administration costs. The table is for use by the quantity surveyor/cost manager to assist in the cost estimating and cost checking process. These examples do not provide a definitive or exhaustive list of items but are simply a guide. The table is structured as follows.

1 The group element is given in the first heading.

2 The element is given in the second heading.

3 The sub-element is given in the third heading.

4 The first column states the cost code (for the sub-element).

5 The second column lists the sub-elements.

6 The third column lists the components.

7 The fourth column lists the unit of measurement.

8 The fifth column lists the included items.

9 The sixth column lists the excluded items.

10 Horizontal lines divide the table to denote the end of sub-elements or components.

6.2.3 Maintenance contractor's overheads and profit

The table for group element 10 is structured as follows.

1 The group element is given in the first heading.

2 The first column lists the elements.

3 The second column lists the included items for each element.

4 The third column lists the items excluded for each element.

5 Where an exclusion is stated, a cross-reference to the appropriate group element, element or sub-element is given.

6 Horizontal lines divide the tables to denote the end of the element.

6.2.4 Consultants' and specialists' fees

The table for group element 11 comprises lists of typical consultants' and specialists' fees. The table is for use by the quantity surveyor/cost manager to assist in the cost estimating and cost checking process. These examples do not provide a definitive or exhaustive list of items but are simply a guide. The table is structured as follows.

1 The group element is given in the first heading.

2 The element is given in the second heading.

3 The first column (component) comprises a list of typical project and design team fee headings.

4 The second column describes the appropriate unit of measurement for included items.

5 The third column describes the items included in each element and sub-element.

6 The fourth column describes the excluded items.

7 Where an exclusion is stated, a cross-reference to the appropriate group element, element or sub-element is given.

8 Horizontal lines divide the tables to denote the end of a component.

6.2.5 Client-definable maintenance-related costs

The table for group element 12 comprises a tabulated list of typical client-definable maintenance-related costs. These examples do not provide a definitive or exhaustive list of items but are simply a guide. The table is structured as follows.

1 The group element is given in the first heading.

2 The element is given in the second heading.

3 The first column (component) comprises a list of typical client-definable maintenance-related cost headings.

4 The second column identifies the appropriate unit of measurement for included items.

5 The third column describes the items included in each element and sub-element.

6 The fourth column describes the excluded items.

7 Where an exclusion is stated, a cross-reference to the appropriate group element, element or sub-element is given.

8 Horizontal lines divide the tables to denote the end of a component.

6.2.6 Risks

Group element 13 lists typical risks. These examples do not provide a definitive or exhaustive list of items, but are simply a guide.

1 The group element is given in the first heading.

2 The elements are listed as second level headings.

3 Lists set out typical examples of causes of potential risk.

6.2.7 Inflation

Group element 14 is structured as follows.

1 The group element is given in the first heading.

2 The element is given in both the second heading and the first column.

3 The second column describes the items included in each element.

4 The third column gives the unit of measurement.

5 The fourth column gives the items included in each element.

6 The fifth column gives the items excluded from each element.

7 Where an exclusion is stated, a cross-reference to the appropriate group element, element or sub-element is given.

8 Horizontal lines divide the tables to denote the end of an element.

6.3 Works not covered by the rules of measurement for elemental cost planning

If a different set of rules of measurement is adopted for those components not covered by these rules, this should be stated in the cost plan. Such rules should, as far as possible, conform to those rules given in NRM 3 for similar components.

6.4 Method of codifying elemental cost plans

The logic and arrangement of levels for elemental life cycle cost planning that integrate the construct (C) cost codes with applicable renewal (R) and maintain (M) task codes are shown in the logic and levels table available with the NRM suite.

Codes for levels 1–3 are provided by NRM 3 measurement rules (which align to the structure of NRM 1), while codes for levels 4 and 5 (which define the included components and sub-components) are listed as 'included' in the group tables that are applicable to renewal (R) or maintain (M). There are a considerable number of components that could be generated for any one sub-element. Therefore, each component included in the group tables is made up of two separate numbers.

This will allow a unique level 4 code to be established for each maintain and renewal component:

- Level 1 **Services**: group element number (5)
- Level 2 **Space heating and air conditioning**: element/system number (6)
- Level 3 **Central heating and cooling**: sub-element number (5)
- Level 4 **Combined heating and cooling system**: (1) lists included components.

Users select included components from list included in the group tables. Here are some examples:

- Level 4 **Terminal units fan coils**: component number (1)
- Level 4 **Terminal units VAV**: component number (2)
- Level 4 **Air handling unit**: component number (10)
- Level 5 **Air handling unit filters**: sub-component number (10.A)

Based on this example, the component codes would be (Level 4 code section is in brackets as an example):

- **Terminal unit fan coils**: 5.6.5.1.1
- **Terminal unit VAV**: 5.6.5.1.2
- **Air handling unit**: 5.6.5.1.10

For level 5 sub-component types, follow the level 4 code with an alphabetical code:

- **AHU filters**: 5.6.5.1.10.A

For maintain (M) works, the BESA standard list of the SFG20 maintenance PPM task schedules has been aligned with the NRM 3 maintain (M) descriptors to create a standardised level 3, 4 and 5 maintenance coding structure. Based on this, when undertaking annual maintenance on an air handling unit the applicable SFG20 code is 03–01, whereas for AHU filters the applicable SFG20 code is 21-02.

Further code levels can be added by the user because there can be several component **specifications** (types or makes) that could apply to each of the included components.

It is recommended that to codify the specification types, level 5 codes are sequentially numbered. For example, a user-defined level 5 code can be introduced if the specifications will

impact on the costs and/or have an effect on the life expectancy due to its location (internal or external), as shown here:

- Level 5 **AHU component** (**specification**: size/capacity). For example, the user selects from:
  - up to 1.2m^2 cross-sectional area: 5.6.5.1.10.1
  - 1.25m^2 to 1.7 m^2: 5.6.5.1.10.2
  - 1.75m^2 to 2.5m^2: 5.6.5.1.10.3
  - over 2.5m^2: 5.6.5.1.10.4.
- Level 5 **AHU specification**: state located **internal** (for each specification)
- Level 5 **AHU specification**: state located **external** (for each specification).

For renewal (R) works, the published industry sources of reference service life (RSL) data tables have been aligned with the NRM 3 R descriptors to create a standardised level 4 and 5 coding structure for the renewal of components (air handling unit code 5.6.5.1.10). For example, coding for two different locations of the asset, will determine the reference service life:

- Level 5 **Air handling unit** (**specification**: over 2.5m^2) component number NRM code is 5.6.5.1.10.4 for renewal cost planning. If cooling unit system is located **internal**, it has an **RSL of 20 years**.
- Level 5 **Air handling unit** (**specification**: over 2.5m^2) component and user-defined type is 5.6.5.1.10.4. If located **external**, the life expectancy would be an **RSL of 15 years**.

It is therefore essential that each component is sequentially numbered under the sub-element. Additional code levels can be integrated as necessary to meet specific user requirements. This will result in each component being given the applicable M and R standardised coding structure.

Alternatively, the user may adopt their own coding hierarchy for level 4 and 5 components and sub-components, but if user-defined codes are used, it will make it more difficult to perform an effective and robust cost analysis when trying to benchmark costs against other projects or business sectors.

6.5 Method of codifying elemental cost plans for work packages

If the building maintenance works are going to be procured through works packages due to the combination of contract strategies (e.g. a mix of operation and maintenance of plant and equipment contracts, measured term contracts, maintenance term contracts, specialist term contracts and lump sum contracts), the works allocated to elements and sub-elements can be reallocated to the applicable work package. This can be achieved by introducing one or more numeric suffixes to each item in the cost plan (see Table 6.1).

Alternatively, one or more characters can be used as a suffix to identify a work package.

If elements need to be further broken down, additional levels of code may be introduced to meet user requirements.

Work package	Suffix
Building structure	/001
Roofing	/002
Exterior and external works	/003
Interior finishes and fixtures, furnishings and equipment	/004
Heating, ventilation and air conditioning (HVAC) + mechanical	/005
Electrical	/006
Plumbing and sanitary	/007
Service equipment (catering)	/008
Lifts and conveyors	/009
Safety systems	/010
Communications, controls and security	/011
Fuel systems	/012
Specialist	/013
Management and administration	/014
Redecorations	/015
Overheads, fees and other contract costs	/016
Risk and inflation	/017

Table 6.1: Example of a work package codification framework

6.6 Alignment of NRM 3 to COBie II data structure and definitions for BIM

Data should be made interoperable, for example through the COBie data exchange format, to ensure that building maintenance cost data is accessible for life cycle costing of construction projects, and that output data from the LCC of maintenance models is accessible to other interoperable models (for BIM cost modelling and setting up asset information systems to deliver maintenance programmes of works).

Where M and R works unit rates are used for order of cost estimates and cost planning during the design and construction phases, the output from the cost analysis of post-construction maintenance works could be structured into a COBie format. This data would then be interoperable and enable the integration of the LCC for C and M works.

The building information maintenance model (whether generated pre-construction, or post-construction in use) should be provided in the same format and data referenced to physical assets or systems, types (specifications) and components – as well as linking to the building, blocks, zones, floors and spaces. Mapping of the NRM 1 data structure to COBie is included in the BS 8544 (2013) Guide for life cycle costing of maintenance during the in-use phases of building.

Table 6.2 shows that there is a close alignment of the COBie II data exchange format, used for BIM, with the NRM 3 data classifications for elemental cost planning. The main differences are in spatial and physical classifications (which are outside the scope of NRM 3).

NRM 3 elemental cost data classification aligns with the COBie II data classifications, apart from minor differences in the definitions stated below:

- element (or systems)
- component (or sub-element/systems)
- specification (which COBie calls 'type')
- tasks or actions required (which COBie calls 'jobs')
- resources
- spares (including materials and consumables)
- other costs (user-defined).

Table 6.2 also highlights the importance of classifying the cost and asset information back to the relevant space, building, locational and functional data conventions, to create robust maintenance and renewal cost plans.

When the design and construction process requires a BIM model to be used, it is important to ensure the elemental cost plan is interoperable. Classifications of asset classes, or grouping of elemental or system types, may need to be applied to named objects to support BIM cost modelling option studies.

More detailed guidance on BIM is provided in ISO 19650. How this relates to the LCC of maintenance in use is provided in BS 8544.

Sheet	Contents
Facility	Includes the project, site and building/structure
Floor	Sectors are the mandatory spatial structure
Space	The spatial locations where inspection, maintenance and operation jobs occur
Zone	The mandatory grouping of components as types or products, used to organise maintenance tasks
System	Additional functional groupings of components
Component	The physical assets

Sheet	Contents
Type	The mandatory grouping of components as types or products, used to organise maintenance tasks
Job	The processes used to maintain and operate the assets
Spare	The physical objects
Resources	Support the processes

Table 6.2: Definitions from COBie II data classifications (source: ISO 19650)

Group element contents

Group element 0: Facilitating works

Group element 0 comprises the following elements:

0.1 Toxic/hazardous/contaminated material treatment

0.2 Major demolition works

0.3 Temporary support to adjacent structures

0.4 Specialist groundworks

0.5 Temporary diversion works

0.6 Extraordinary site investigation works

Note: works associated with minor demolition works are included in group element 7. Works associated with general site preparation and groundworks, and permanent roads, paths and pavings are included in group element 8. The provision of temporary roads and services is included in group element 9.

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Not applicable: In the following tables, 'N/A' means not applicable to renewal or maintain works. This applies to specific items covered by NRM 1 and excluded from NRM 3.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals – and redecorations (if measured separately).
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Note: facilitating works may arise as a consequence of planned inspections of the building and services, included in group elements 1 to 8.

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

RETURN TO GROUP ELEMENT CONTENTS

Element 0.1: Toxic/hazardous/contaminated material treatment

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.1.1	Toxic or hazardous material removal. **Definition:** removal, employing special safety measures for toxic or hazardous material prior to demolition – for maintenance or renewal works.	**1** Toxic or hazardous material removal: details to be stated.	item	**1** Removal of toxic or hazardous parts of building fabric (e.g. asbestos-containing materials).	Toxic or hazardous material (THM), e.g. asbestos	(THM)	**Renewal actions** Removal: to include removal of affected area or item and safe disposal. **Maintain actions** Proactive: visual inspections and specialist surveys. Excluded: asbestos survey fees, etc. are to be included in group element 11. Note 1: control of toxic or hazardous materials regulations e.g. *The Control of Asbestos Regulations* 2012, etc. Note 2: where no asbestos survey records exist, an allowance should be made within the client's requirements and in the maintenance contractor's risk allowance (if part of the contract).
		2 Toxic or hazardous chemical removal: details to be stated.		**2** Removal of toxic or hazardous insulating materials or components from existing service installations, including storage tanks and vessels.	Toxic or hazardous insulation	(THM)	
				3 Removal of toxic or hazardous chemicals from existing service installations, including storage tanks and vessels.	Chemically hazardous material	(THM)	
				4 Safe disposal (included with items 1 to 3).	Safe disposal	N/A	
				5 Sundry items.	Sundry items (to be stated)	Sundry items (to be stated)	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Cost-significant components are to be described, identified and itemised separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) as appropriate. **M2** Works undertaken by a specialist contractor are to be described and identified separately.
0.1.2	Contaminated land. **Definition:** removal and/ or treatment of contaminated ground material.	**1** Contaminated ground material removal: details to be stated.	m^2/m^3	**1** Contaminated ground material removal using 'dig and dump' strategy and safe disposal to licensed tip (tipping charge).	Contaminated land (not part of NRM 3)	Contaminated land (not part of NRM 3)	Covered in NRM 1 for contaminated land in sub-element 0.1.2.
		2 Contaminated ground material treatment: details to be stated.	m^2	**2** Contaminated ground material treatment using in situ methods.			

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.1.3	Eradication of plant growth. **Definition:** eradication of Japanese knotweed, giant hogweed or other invasive plants.	**1** Eradication by dig and dump strategy: details to be stated.	m^2/m^3	**1** Eradication by dig and dump strategy.	Eradication of plant growth	N/A	Applying herbicides taken with external works item 8.3.2.1. **Renewal actions** Eradication of plant growth: by dig and dump strategy. Eradication by chemical treatment: to be described. **Maintain actions** N/A: dealt with by renewal actions, unless there is maintenance provision for this included as part of the specified grounds maintenance contract work package. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area designated as infected by the plant growth (in m^2).
		2 Eradication by chemical treatment: details to be stated.	nr/m^2	**2** Eradication by chemical treatment.	Eradication by chemical treatment	N/A	
			note	**3** Subcontractor on costs (where applicable).	Subcontractor on costs	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Where the volume of the excavation and disposal of ground material is measured, the volume measured is the surface area of the infected plant growth multiplied by the depth of the dig (in m^3). **M4** Quantities given for disposal of contaminated ground material are the bulk before excavating. **M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately.

RETURN TO GROUP ELEMENT CONTENTS

Element 0.2: Major demolition works

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.2.1	Demolition works. **Definition:** taking down to ground level and removing complete buildings/ structures or parts of buildings/ structures, including services, fittings and finishes.	**1** Demolition works of entire buildings.	m^2	Major demolition works are not covered by NRM 3.	Excluded from the maintenance works. Note: the major demolition works are covered by construction works.	Excluded from the maintenance works. Note: the major demolition works are covered by the construction works.	Covered in NRM 1 in sub-element 0.2.1.
		2 Demolition of major parts of existing buildings.					
		3 Temporary propping to existing basement retaining walls.	nr				
		4 Extra over temporary propping for providing wailings.	m				
		5 Periodic technical inspections of temporary propping.	nr				
		6 Returning to site to reposition temporary props.					
		7 Removal of temporary props.					
		8 Removal of wailings.	m				
		9 Grubbing up of anchor blocks/ foundations for temporary props and infilling voids.	nr				

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.2.2	Soft strip works. **Definition:** stripping out building components, services, fittings and finishes from a building as preparatory works to demolition or refurbishment.	**1** Preparatory to demolition: extent of works to be stated.	item/ m^2	Soft strip works are not covered by NRM 3.	Excluded from the maintenance works. (Demolition work included with the construction.)	Excluded from the maintenance works. (Demolition work included in with the construction.)	Covered in NRM 1 in sub-element 0.2.1.
		2 Preparatory to refurbishment: extent of works to be stated.					

Element 0.3: Temporary support to adjacent structures

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.3.1	Temporary support to adjacent structures. **Definition:** temporary or semi-permanent support for unstable structures (i.e. structures not to be demolished) adjacent to the building under construction.	**1** Support structures: details to be stated.	nr	Temporary support is not covered by NRM 3.	Excluded from the maintenance works. (Demolition work included in with the construction works.)	Excluded from the maintenance works. (Demolition work included in with the construction works.)	Covered in NRM 1 in sub-element 0.3.1.
		2 Taking down and repositioning support structures: details to be stated.					
		3 Periodic technical inspections of temporary support structures: details to be stated.					
		4 Removing support structures: details to be stated.					

Note: works arising from party wall awards/agreements are to be described and identified separately (see group element 7).
Excluded: facade retention works (included in element 7.4), temporary screens for alteration works (included in element 7.1), supports for small openings or after removal of internal walls, etc. (included in sub-element 7.1.1).

Element 0.4: Specialist groundworks

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.4.1	Site dewatering and pumping. **Definition:** temporarily lowering the groundwater level to facilitate maintenance and renewal works.	**1** Site dewatering and pumping: details to be stated.	item/ m^2	**1** Forming well points, including well pointing equipment and well point installation.	N/A	N/A	**Renewal actions** Repairs to drainage to include clearing obstructions, flushing out and applicable removal, repairs and replacement work actions. Replace sump pumps at end of life. Running costs: site dewatering costs over service life period. **Maintain actions** Planned maintenance to sumps and pumps (see the supplementary listing of pump types and related maintenance regimes included at the end of group element 5). Running costs: off-site water disposal charges, etc.
				2 Filling (gravel or other filling).	N/A	N/A	
			item/ nr	**3** Drain tubes and ring mains (installing and removing).	Drain tubes and ring mains	N/A	
			nr	**4** Sumps.	N/A	(Included with pumps)	
				5 Pumps and pumping, including standby pumps.	Pumps	Pumps	
			item	**6** Offsite disposal of water.	Offsite water disposal	N/A	
				7 Running costs.	Site dewatering	Site dewatering	
			inc.	**8** Attendance, including out of hours.	(Included with item)	(Included with item)	
			item	**9** Sundry items associated with site dewatering.	Sundry items	N/A	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Unit of measurement: The same as NRM 1 except for the pumps, which are to be enumerated (state type and capacity). **M1** Where components are to be itemised, the number of key elements comprising the component are to be identified, described and enumerated within the description of the component. **M2** The area measured is the area affected by the dewatering system employed. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **Note:** Offsite disposal of site water by tankerage or other means is to be included in running costs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.4.2	Soil stabilisation measures. **Definition:** stabilisation or improvement in bearing capacity or slip resistance of existing ground, to facilitate construction by injecting or otherwise introducing stabilising materials, power vibrating, soil nailing or using ground anchors.	**1** Soil stabilisation measures: details to be stated.	m^2	Soil stabilisation measures are not covered by NRM 3.	Excluded from the maintenance works	Excluded from the maintenance works	Covered in NRM 1 element 0.4.
0.4.3	Ground gas venting measures. **Definition:** systems to prevent accumulation of radon or landfill gases.	**1** Ground gas venting measures: details to be stated.	m^2	**1** Ground gas venting measures, including: • gas-proof membranes • perforated collection pipes • proprietary gas dispersal fin layers • radon sumps • vent pipes, including vertical risers to vent at a high level.	Ground gas venting measures	Ground gas venting measures	**Renewal actions** Remedial actions for gas venting measures in order to keep operational are to be identified and described. **Maintain actions** Planned and proactive monitoring regimes are to be stated.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**2** Sundry items associated with ground gas venting measures (to be stated).	Sundry items (to be stated)	N/A	**M1** The area measured is the area affected by the gas venting measure.
			note	**3** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	**M2** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately.

Element 0.5: Temporary diversion works

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.5.1	Temporary diversion works. **Definition:** temporary diversion of existing drainage systems, existing services installations and systems, rivers, streams, etc.	**1** Temporary diversion of drains: details to be stated.	item	**1** All works in connection with temporary diversion of drains.	Drain diversion – temporary works	N/A	**Renewal actions** Temporary diversion works are to be itemised and described as applicable. **Maintain actions** Not applicable. **M1** Works are to be itemised and described. **Note:** where insufficient information is available, such works are to be included in group element 13, as appropriate. **Note:** if statutory undertaker's fees and charges are required, they are to be included in management and administration costs in group element 10.
				4 Statutory undertaker's fees and charges in connection with diversion works.	(Taken with group element 10)	N/A	
				5 Sundry items.	Sundry items	N/A	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	N/A	
		2 Temporary diversion of services: details to be stated.	item	**2** All works in connection with temporary diversion of services (e.g. water, electricity, gas and communications).	Service diversion temporary works	N/A	
		3 Temporary diversion of waterways: details to be stated.	item	**3** All works in connection with temporary diversion of rivers, streams, etc.	Waterway diversion temporary works	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Element 0.6: Extraordinary site investigation works

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.6.1	Archaeological investigations. **Definition:** site-based archaeological investigation works.	**1** Excavation works: details to be stated.	item	**1** Physical archaeological investigation works.	Excluded (taken elsewhere)	Excluded (taken elsewhere)	Taken elsewhere (covered by other cost elements in group element 11).
		2 Temporary screens, etc.: details to be stated.	nr	**2** Provision for temporary screens.			
		3 Attendance by archaeologist.	per week	**3** Attendance by archaeologists.			
0.6.2	Reptile/wildlife harm mitigation measures. **Definition:** relocation of reptiles/wildlife and provision of fences/barriers to cordon off the working area.	**1** Physical reptile/ wildlife harm mitigation measures: details to be stated.	item	Reptile and wildlife harm mitigation measures are not covered by NRM 3.	Excluded from the maintenance works	Excluded from the maintenance works	Covered in NRM 1 as part of the capital building works in sub-element 0.6.2.
		2 Temporary fences, barriers, etc.: details to be stated.	nr/m				
		3 Attendance.	per week				

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
0.6.3	Other extraordinary site investigation measures.	**1** Physical site investigation work: details to be stated.	item	**1** Physical works in connection with extraordinary site investigation works carried out by the main contractor.	Extraordinary site investigation measures	T/E	T/E: taken elsewhere. Refer to group element 11 for site investigation works. **Renewal works** Physical works arising from extraordinary site measures. **Maintain actions** Site investigation measures (e.g. telltales for subsidence). **M1** Physical works arising from extraordinary site investigation measures are to be itemised and described, including provision of temporary screens, etc. and applicable attendance on specialists. **Excluded** Specialist consultants' fees and charges in connection with ascertaining and carrying out extraordinary site investigation works (included in group elements 11 or 12, as appropriate).
		2 Temporary screens, fences, barriers, etc.: details to be stated.	nr/m	**2** Provision of temporary screens, fences, barriers, etc. to cordon off working area.	(Taken with group element 11)	N/A	
		3 Attendance.	per week	**3** Attendance by specialists (where applicable).	(Taken with group element 12)	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Group element 1: Substructure

Group element 1 comprises the following elements:

1.1 Substructure

Note: where testing and commissioning of drainage installations is required to be measured under sub-element 1.1.3, the terms should include the following works:

1 Testing includes:

(1) air tests

(2) water tests

(3) dyes required for testing.

2 Temporary operation of drainage to client's requirements.

3 Setting all drainage installations to work after completion of commissioning.

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Not applicable: On the following pages, 'N/A' means not applicable to renewal or maintain works. This applies to specific items covered by NRM 1 and excluded from NRM 3.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work, removals and redecorations (if measured separately).
- Maintain (M): planned, proactive and reactive/minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Excluded: Specific works that are normal construction works as defined in NRM 1 are not covered by NRM 3 (as stated in the tables, e.g. foundations).

Planned inspections: Note: the planned inspections of superstructures will identify whether there are problems with substructures (e.g. subsidence) and may result in extra investigations (note: taken elsewhere in group element 2 – refer to planned superstructure inspections).

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

RETURN TO GROUP ELEMENT CONTENTS

Element 1.1: Substructure

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
1.1.1	Standard foundations. **Definition:** standard foundations up to and including the damp-proof course.	**1** Strip foundations: details, including depth of foundation, to be stated (if known).	m	**1** Wall and column foundations.	Standard foundations	Standard foundations	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs to the standard foundations (post-construction works). Full replacement of standard foundations excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. N/A: not applicable to renewal and/or maintain work.
				2 Foundation walls to underside of damp-proof course (to both perimeter and internal load-bearing walls).	N/A	N/A	
				4 Trench and pit excavations, including earthwork support (including insertion and extraction of steel sheet piling, if used).	N/A	N/A	
				5 Excavating below groundwater level.	N/A	N/A	
				6 Breaking out surface materials (e.g. hardstandings, pavements, etc.). Note: where no information relating to the ground conditions is available, an allowance is to be made within the construction risk allowance for the extra cost of removing unforeseen obstructions and dealing with unknown ground conditions.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**7** Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous material where not to be carried out as facilitating works). Note: where no contamination/remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	N/A	N/A	Note: evidence of subsidence will become apparent above ground, hence monitoring and inspections taken with superstructure elements, not in substructures. **Renewal actions** Replacement: not applicable for maintenance works. Remedial works: underpinning/damp-proofing works. Major repairs: to standard foundation systems arising from actions identified from visual inspections and specialist surveys/ investigations. **Maintain actions** Planned: N/A (inspections taken with superstructures). Proactive: monitoring cracks (e.g. install telltales). Reactive: N/A (physical investigation taken in element 11).
				8 Disposal of surface water and groundwater, where dewatering techniques are not employed.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**9** Consolidating and compacting formation level to receive foundations.	N/A	N/A	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** The linear length of components is measured on the centre line of the component. **M3** The volume of disposal of contaminated material measured is the surface area of the contaminated material multiplied by the average depth of the contaminated material. **M4** Quantity given for disposal is the bulk before excavating, and no allowance is made for subsequent variations to bulk or for extra space to accommodate earthwork support.
				10 Blinding.	N/A	N/A	
				11 Concrete, reinforcement, formwork (temporary and permanent) and excavating and backfilling of working space required to facilitate placement of formwork.	N/A	N/A	
				12 Specialist concrete grades, including waterproof concrete and additives.	N/A	N/A	
				13 Brickwork and blockwork walling, including air/ventilation bricks, etc.	N/A	N/A	
				14 Forming cavities, including wall ties.	N/A	N/A	
				15 Filling cavities.	Cavity insulation	N/A	
				16 Thermal insulation for cavities.	Cavity insulation	N/A	
				17 Damp-proof courses: details to be stated.	Damp proofing	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**18** Service ducts, etc. through foundation walls.	N/A	N/A	**M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M6** Curved work is to be described and identified separately. **M7** Contractor-designed work is to be described and identified separately.
			item	**19** Sundry items: details to be stated.	Actions arising from structural surveys, inspections and monitoring regime	N/A	
			note	**20** Subcontractor on costs (where applicable).	Subcontractor on costs	N/A	
		2 Isolated pad foundations: details, including size of and reinforcement rate (kg/m^3) to pile cap, to be stated (if known).	nr	**3** Isolated pad foundations.	N/A	N/A	
		3 Extra for disposal of contaminated/ excavated material: details to be stated.	m^2	(Covered in item 7 included above).	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
1.1.2	Specialist foundation systems. **Definition:** load-bearing foundation piles and caissons. Inserting additional foundation support under and around existing foundations.	**1** Piling mats/ platforms: details, including thickness of mat/platform (mm), to be stated.	m^2	**4** Piling mats and platforms (installing, moving, modifying and removing on completion).	N/A	N/A	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repair to the specialist foundations (post-construction works). Full replacement of specialist foundations excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to specialist foundation systems arising from actions identified from visual inspections and specialist surveys/ extraordinary site investigations.
		2 Piling plant: details to be stated.	item	**5** Piling rigs/other plant, including bringing to and removing from site, maintenance, erection, dismantling and moving piling rigs to each pile position. Note: where information about ground strata is unknown, an allowance is to be made within the construction risk allowance for breaking through obstructions.	N/A	N/A	
		3 Moving piling rig to pile position.	nr	(See item 5 included above.)	N/A	N/A	
		4 Piles: details, including type, diameter (mm) and depth (m) of piles, to be stated.		**1** Piles, including precast concrete reinforced piles, precast pre-stressed concrete piles, precast reinforced segmental concrete piles, bored cast-in-place concrete piles, driven cast-in-place concrete piles, steel-bearing piles, timber-bearing piles and mini piles.	N/A	N/A	
				10 Grouting.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**14** Trench and pit excavations for pile caps and ground beams, including earthwork support (including insertion and extraction of steel sheet piling, if used).	N/A	N/A	**Maintain actions** Planned: N/A (inspections taken with superstructures). Proactive: not applicable to piling and associated works. Reactive: N/A (physical investigations taken in element 11). **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The linear length of components is measured on the centre line of the component. **M3** The area measured for piling mats/platforms is the surface area of the piling mat/platform. **M4** The volume of disposal of excavated material arising from piling is the cross-sectional area of the pile multiplied by the depth of the pile.
				17 Consolidating and compacting formation level to receive pile caps and ground beams.	N/A	N/A	
				18 Blinding.	N/A	N/A	
				19 Protection boarding to underside of pile caps and ground beams (e.g. to provide heave protection).	N/A	N/A	
				20 Concrete, reinforcement, formwork (temporary and permanent) and excavating and backfilling of working space required to facilitate placement of formwork.	N/A	N/A	
				21 Specialist concrete grades, including waterproof concrete and additives.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**22** Sundry items: details to be stated.	Actions arising from structural surveys, inspections and monitoring regime	N/A	**M5** Quantity given for disposal is the bulk before excavating and no allowance is made for subsequent variations to bulk. **M6** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M7** Curved work is to be described and identified separately. **M8** Work to existing buildings is to be described and identified separately. **M9** Contractor-designed work is to be described and identified separately.
			note	**23** Subcontractor on costs (where applicable).	N/A	N/A	
		5 Extra for pile casings or linings: details, including material, length (m), diameter (mm) and if permanent or temporary, to be stated.	nr	(Covered with items included in component 4).	N/A	N/A	
		6 Caissons: details, including type, diameter (mm) and depth (m) of caisson, to be stated.		**2** Permanent caissons.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		7 Disposal of excavated material arising from piling.	m^3	**6** Disposal of excavated material arising from piling, including tipping charges and landfill tax. Note: where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	N/A	N/A	
				7 Disposal of surface water and groundwater, where dewatering techniques are not employed.	N/A	N/A	
				15 Disposal of excavated material, including tipping charges and landfill tax. (See note above about disposal of contaminated material.)	N/A	N/A	
		8 Extra for breaking through obstructions.	nr/m^3	(Covered with item 14 included above).	N/A	N/A	
		9 Cutting off tops of concrete piles and preparing pile heads.	nr	**8** Cutting off excess lengths of piles.	N/A	N/A	
				9 Cutting out concrete to tops of piles, and preparing pile heads and reinforcement for capping.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		10 Pile tests: details, including type of test, pile type, diameter of pile and number of piles, to be stated.	item	**11** Pile tests (e.g. load tests and integrity tests).	N/A	N/A	
		11 Vibro-compacted columns: details, including size (mm) and length (m) of column, to be stated.	nr	**3** Vibro-compacted columns.	N/A	N/A	
		12 Pile caps: details, including size and reinforcement rate (kg/m^3) of pile cap, to be stated.	m	**12** Pile caps.	N/A	N/A	**Maintain actions** Note: monitoring subsidence to include fixing telltales on cracks in the structures in excess of 5mm.
		13 Ground beams: details, including size and reinforcement rate (kg/m^3) of pile cap, to be stated.		**13** Ground beams.	N/A	N/A	
		14 Underpinning: details to be stated.		(See items 1–21 included above.)	Underpinning works	Monitoring subsidence	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
1.1.3	Lowest floor construction. **Definition:** the entire lowest floor assembly below the underside of screed or lowest floor slab.	**1** Lowest floor construction: details to be stated. Note: reinforcement rate (kg/m³ or kg/m², as appropriate) for concrete slabs and beds to be stated.	m²	**1** Lowest floor assemblies, such as: • ground slabs/beds • basement slabs/beds • raft foundations • suspended floors serving as lowest floor level systems, i.e. where void between ground slab/bed under and lowest floor slab (including suspended timber floor construction and precast/composite decking systems).	N/A	N/A	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repair to the lower floor construction (post-construction works). Full replacement of the lower floors is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to lowest floor construction arising from actions identified from visual inspections and specialist surveys/ extraordinary site investigations.
				2 Thickening of slabs/beds for load-bearing walls, machine bases, etc.	N/A	N/A	
				4 Inclined and stepped slabs/beds.	N/A	N/A	
				9 Surface area excavations (i.e. to remove topsoil and reduce levels), including earthwork support and surface treatments.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**11** Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous material where not to be carried out as facilitating works). Note: where no contamination/remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	N/A	N/A	**Maintain actions** Planned: N/A (inspections taken with superstructures). Proactive: monitoring damp and inspection of manholes. Reactive: N/A (physical investigations taken with group element 11). **Excludes:** extraordinary site investigations included in group element 0 cover the physical works needed to identify the extent of subsidence, damp-proofing problems, drainage leakages, etc. N/A: not applicable to renewal and/or maintain work. **M1** The area measured is the area of the floor construction measured to the internal face of the external perimeter walls.
				12 Disposal of surface water and groundwater, where dewatering techniques are not employed.	N/A	N/A	
				13 Consolidating and compacting formation level to receive floor construction.	N/A	N/A	
				14 Concrete, reinforcement, formwork (temporary and permanent) and working space for formwork.	N/A	N/A	
				15 Specialist concrete grades, such as waterproof concrete.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**16** Filling to make up levels.	N/A	N/A	**M2** The area of the floor construction should be measured in accordance with the rules of measurement for ascertaining the GIFA. **M3** Where more than one type of floor construction is employed, the area measured for each floor construction is the area covered by that floor construction. **M4** The length of retaining walls at changes in level is their extreme length, over all obstructions. The height measured is the distance from the top of the slab to the underside of the attached slab. **M5** The area measured for forming swimming pool tanks, etc. is the area of the swimming pool (or other similar facility) on plan, measured to the internal face of the swimming pool walls.
				17 Blinding beds.	N/A	N/A	
				18 Protection boarding to underside of floor/base slabs (e.g. to provide heave protection).	N/A	N/A	
				19 Damp-proof membranes, including gas-proof membranes serving as a damp-proof membrane.	(T/E)	N/A	
				20 Service ducts, etc. below the lowest floor construction.	N/A	N/A	
				21 Fixing devices cast into concrete (i.e. dowels, anchor bolts, anchor boxes, anchor fixing slots, etc.).	N/A	N/A	
				23 Worked finishes (i.e. in situ surface treatments), including the application of surface hardeners and power-floated finishes.	N/A	N/A	
				24 Structural screeds, including reinforcement.	N/A	N/A	
				25 Suspended timber floors, including floor boards, joists, joist struts, plates, etc. Also including supporting masonry/concrete walls under (i.e. load-bearing sleeper walls).	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**26** Precast/composite decking systems, including concrete components, in situ concrete, site-fixed formwork and reinforcement, filler units, fixing slips, metal clips and other fixings, joints (including grouting joints), worked finishes and performance tests.	N/A	N/A	**M6** The area measured for forming lift pits, etc. is the area of the lift pit on plan, measured to the internal face of the lift pit. **M7** The length of linear components measured is their extreme length, over all obstructions. **M8** The length of below-ground drainage pipelines measured is their extreme length, over all fittings, branches, etc. **M9** Where components are to be enumerated, the number of components is to be stated. **M10** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately.
				31 Trenches for pipework, including excavation, earthwork support, backfilling and disposal of surplus material.	N/A	N/A	
				32 Granular beds and surrounds, concrete beds, cradles, haunchings and surrounds, and foamed concrete backfill.	N/A	N/A	
				33 Venting below building (e.g. radon sumps under the ground slab/bed).	N/A	N/A	
				34 Special filling material beneath base slab/bed.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**35** Sundry items: details to be stated.	Actions arising from structural surveys, inspections and monitoring regime	Planned inspection	**M11** Curved work is to be described and identified separately. **M12** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the drainage installation. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. **M13** Contractor-designed work is to be described and identified separately. TE: taken elsewhere. Refer to group element 7.3 for works to existing damp-proof courses.
			note	**37** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Extra over lowest floor construction for forming ramps, etc.: details to be stated.	m^2	**5** Ramps in slabs.	N/A	N/A	
		3 Extra over lowest floor construction for forming of lift pits, etc.: details, including the number and size (m) of lift pits, to be stated.	nr	**3** Sumps, pits, chambers, etc. integral to the lowest floor construction.	N/A	N/A	
				7 Lift pits, etc. below the lowest floor, including waterproofing.	N/A	N/A	
				10 Pit excavations, including earthwork support.	N/A	N/A	
		4 Extra over lowest floor construction for forming swimming pool tanks, etc.: details, including the size (m), to be stated.		**8** Swimming pool tanks, including boom pits, etc., to include waterproofing.	Swimming pool tanking: details to be stated	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Retaining walls at changes in level: details, including thickness (mm), height (m) and reinforcement rate (kg/m^3), to be stated.	m	**6** Retaining walls at changes in level.	Lowest floor construction	N/A	
		6 Designed joints: details, including height (mm), to be stated.		**22** Design joints, including at intersection of base slab/bed and external perimeter wall, to provide bays, etc.	Designed joints to floor slabs	N/A	
		7 Drainage below ground: details, including average depth of trench (m), type and nominal size of pipe (mm), and materials for beds and haunchings/ surrounds, to be stated.		**27** Drainage below or within lowest floor assembly, including pipework, pipework ancillaries (e.g. gullies, gratings, rodding and access points) and fittings to pipework (to first manhole beyond the external enclosing walls).	N/A (as inaccessible)	N/A	
		8 Gullies, floor outlets, etc.: details to be stated.	nr	**29** Floor outlets.	Gullies, floor outlets	Gullies, floor outlets	
				30 Prefabricated floor channels and gratings in ground floor construction.	Prefabricated floor channels	Prefabricated floor channels	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		9 Internal manholes, catch-pits, petrol interceptors or the like: details to be stated.	nr	**28** Internal manholes, etc. including channels, benching, step irons, access covers and other accessories.	Internal manholes	Internal manholes	
		10 Testing of drainage installations.	%	**36** Testing and commissioning of drainage installations.	N/A	N/A	
		11 Commissioning of drainage installations.		(Covered by item 36 above.)	T/E	N/A	
1.1.4	Basement excavation. **Definition:** bulk excavation required for construction of floors below ground level.	**1** Basement excavation: details, including average depth of excavation, to be stated.	m^3	**1** Bulk excavation to form basements, etc.	N/A	N/A	N/A: not applicable to renewal and/or maintain work.
				4 Excavating below groundwater level.	N/A	N/A	
				6 Disposal of surface water and groundwater, where dewatering techniques are not employed.	N/A	N/A	
				7 Consolidating and compacting formation level to receive base slab/bed construction.	N/A	N/A	
			item	**8** Sundry items: details to be stated.	N/A	N/A	
			note	**9** Subcontractor on costs (where applicable).	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Disposal of excavated material: details to be stated.	m^3	**5** Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous material where not to be carried out as facilitating works). Note 1: where no information relating to the ground conditions is available, an allowance is to be made within the construction risk allowance for the extra cost of removing unforeseen obstructions and dealing with unknown ground conditions. Note 2: where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	N/A	N/A	
		3 Extra for disposal of contaminated excavated material: details to be stated.		See item 5 above.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Earthwork support: details to be stated.	m^2	**2** Temporary or permanent support to the bulk excavation (e.g. earthwork support, caissons, steel sheet piling, etc.), including insertion and extraction of temporary steel sheet piling and caissons.	N/A	N/A	
		5 Additional excavation: details to be stated.	m^3	**3** Additional excavation required to facilitate construction of basement retaining walls (e.g. where open excavation method is employed), including excavating, backfilling (e.g. with selected excavated material or granular material) and disposal of surplus excavated material.	N/A	N/A	
1.1.5	Basement retaining walls. **Definition:** external basement retaining walls in contact with earthwork up to and including the damp-proof course.	**1** Basement retaining walls: details to be stated. Note: reinforcement rate (kg/m^3) and formwork finish for in situ concrete walls to be stated.	m/m^2	**1** Concrete retaining walls, including concrete, reinforcement, and formwork, and excavating and backfilling working space required to facilitate construction of retaining walls.	Basement retaining walls	N/A	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repair. Full replacement of basement retaining wall is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist.
				2 Specialist concrete grades, such as waterproof concrete.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m/m^2	**3** Trench excavations for bases/ toes to basement retaining walls that commence below the level from which the construction of the basement base slab is to commence.	N/A	N/A	Note: structural survey and inspection fees, etc. are to be included in group element 11. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to basement retaining walls arising from actions identified from visual inspections and specialist surveys/investigations. **Maintain actions** Planned: N/A (inspections taken with superstructures). Proactive: monitoring of movement and water ingress. Reactive: minor isolated repairs to basement retaining walls.
				4 Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous material where not to be carried out as facilitating works). Note: where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	N/A	N/A	
				5 Fixings cast into/fixed to concrete retaining walls to retain masonry walls (e.g. brickwork, blockwork and stonework) facing wall.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m/m^2	**6** Masonry walls (e.g. brickwork, blockwork and stonework) forming an integral part of the basement retaining wall construction, including where used for the purpose of concealment (external and internal skins), to include reinforcement and design joints.	N/A	N/A	**M1** Where the area of the basement retaining wall is to be measured, the area measured is the surface area of the exposed face of the retaining wall. **M2** The height of the basement retaining wall should be measured from the top of the base slab/bed or the top of the basement retaining wall base/toe to the level at which the basement retaining wall connects with the external wall above ground (i.e. at the level at which the external wall changes from being a retaining wall to a non-retaining wall). **M3** Where the length of the basement retaining wall is to be measured, the length of the basement wall should be measured on the centre line.
				7 Waterproof tanking for walls.	Waterproof tanking	N/A	
				8 Applied protection to external tanking (e.g. protection boards): details to be stated.	Protective external tanking	N/A	
				9 Thermal insulation, damp-proof membranes, vapour barriers, etc.	Damp-proofing and vapour barriers	N/A	
				10 Groundwater pressure relief drains to basements and retaining walls connected to the drainage system (i.e. fin drains, filter drains and blanket drains) to soil connection.	N/A (inaccessible)	N/A	
			item	**11** Sundry items: planned inspections of basement retaining walls.	Actions arising from planned inspections	Planned inspections	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	**M4** Where more than one type of retaining wall construction is employed, each type of retaining wall construction is to be stated separately. **M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M6** Curved work is to be described and identified separately. **M7** Work within existing buildings is to be described and identified separately. **M8** Contractor-designed work is to be described and identified separately. This section of NRM 3 only includes isolated repair. Full replacement of embedded basement retaining wall is excluded.
		2 Embedded basement retaining walls: Piling mats/ platforms: details, including thickness of mat/platform (mm), to be stated.	m^2	**6** Piling mats and platforms (installing, moving and removing on completion).	Embedded basement retaining walls	N/A	
			item	**20** Sundry items: details to be stated.	Sundry items	Sundry items	
			note	**21** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		3 Piling plant: details to be stated.	item	**7** Pile rigs/other plant, including bringing to and removing from site, maintenance, erection, dismantling and moving piling rigs to each pile position.	N/A	N/A	
		4 Moving piling rig to pile position.	nr	See item 7 included above.	N/A	N/A	
		5 Guide walls: details to be stated.	m	See items 1 and 3 included below.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		6 Piles: details, including type, diameter (mm), depth (m), total length (m) and embedded length (m) of piles, to be stated.	nr	**1** Pile walls (i.e. contiguous bored pile walls, hard/hard secant pile walls, and hard/soft secant pile walls), including guide walls, trimming and cleaning faces, cutting out concrete to tops of piles, and preparing pile heads and reinforcement for capping, plus disposal of excavated material arising from piling. Note: where no contamination/ remediation strategy report exists, an allowance should be made within the construction risk allowance for the extra cost of disposing of contaminated material.	N/A	N/A	For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. **Scope covered by NRM 3** This section of NRM 3 only includes isolated repair. Full replacement of embedded basement retaining wall is excluded. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		7 Contiguous bored pile walls: details, including diameter (mm), depth (m), total length (m) and embedded length (m) of piles, to be stated.	m	See item 1 included above.	N/A	N/A	**Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to embedded basement retaining walls arising from actions identified from visual inspections and specialist surveys/investigations. **Maintain actions** Planned: N/A (inspections taken with superstructures). Proactive: monitoring subsidence and water ingress. Reactive: minor isolated repairs to embedded basement retaining walls. N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated.
		8 Disposal of excavated material arising from piling.	m^3	See item 1 above and item 3 included below.	N/A	N/A	
		9 Cutting off tops of concrete piles.	nr/m	See item 1 included above.	N/A	N/A	
		10 Steel sheet piling: details, including total area (m2) and total driven area (m2) to be stated.	m^2	**2** Steel sheet piling, including extensions and cutting off surplus lengths.	N/A	N/A	
		11 Cutting off surplus lengths of steel sheet piling.	nr	See item 2 included above.	N/A	N/A	
		12 Pile tests: details to be stated.	item	**8** Pile tests (e.g. load tests and integrity tests).	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		13 Diaphragm walls: details, including depth of excavation (m), thickness (mm) and wall reinforcement rate (kg/m^3), to be stated.	m^2	**3** Diaphragm walls, including excavating and disposal of excavated material, support fluid to uphold faces of excavation, concrete, reinforcement, formwork, joints and waterproof joints, guide walls, and trimming and cleaning faces. (See note above about disposal of contaminated material.)	N/A	N/A	**M2** The area measured for piling mats/platforms is the surface area of the piling mat/platform. **M3** Secant piles, etc. are to be enumerated. **M4** The linear length of guide walls and contiguous bored pile walls is measured on the centre line of the guide wall or contiguous bored pile wall, as applicable. **M5** The area measured for steel sheet piling is the total surface area of specified sheet pile length. **M6** The volume of excavated material for disposal arising from the measured piling is the cross-sectional area of the pile multiplied by the depth of the pile.
		14 Ground anchors: details, including type, to be stated.	nr	**4** Ground anchors.	N/A	N/A	
		15 Trimming and cleaning faces of piled and diaphragm walls.	m^2	See items 1 and 3 included above.	N/A	N/A	
		16 Temporary works: details to be stated.	item	**13** Temporary works (e.g. props and wailings to support contiguous bored piled walls) and removal, including any necessary temporary anchors, foundations, etc.	N/A	N/A	
		17 Removal of temporary works: details to be stated.		See item 13 included above.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		18 Capping beams: details, including beam size (mm) and reinforcement rate (kg/m^3), to be stated.	m	**5** Capping beams, including concrete, reinforcement and formwork.	N/A	N/A	**M7** Quantity given for disposal is the bulk before excavating and no allowance is made for subsequent variations to bulk. **M8** The area measured for trimming and cleaning faces of walls is the surface area of the exposed piled or diaphragm wall. **M9** The linear length of capping beams is measured on the centre line of the capping beam. **M10** The area measured for each basement retaining wall component is the area of the component, measured on the centre line of the component. **M11** The area measured for concrete applied by spray or gun is the surface area of the surface to which it is to be applied.
		19 Basement retaining wall components: details to be stated. Note: reinforcement rate (kg/m^3) and formwork finish for in situ concrete walls to be stated.	m^2	**9** Instrumentation and monitoring.	N/A	Instrumentation and monitoring	
				10 Groundwater pressure relief drains to basements and retaining walls connected to the drainage system (i.e. fin drains, filter drains and blanket drains) to soil connection.	N/A	N/A	
				11 Concrete walls forming an integral part of the embedded basement wall construction, including reinforcement and tying to piled wall formwork.	N/A	N/A	
				12 Specialist concrete grades, such as waterproof concrete.	N/A	N/A	
				14 Fixings cast into/fixed to concrete retaining walls to retain masonry walls (e.g. brickwork, blockwork and stonework) facing wall.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**15** Masonry walls/facings (e.g. brickwork, blockwork and stonework) forming an integral part of the embedded basement retaining wall.	N/A	N/A	**M12** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M13** Curved work is to be described and identified separately. **M14** Work within existing buildings is to be described and identified separately. **M15** Contractor-designed work is to be described and identified separately. **M16** The area measured for diaphragm walls is the area of the diaphragm wall, measured on the centre line of the diaphragm wall.
				16 Waterproof tanking for walls.	Waterproof tanking	N/A	
				17 Applied protection to external tanking (e.g. protection boards).	External tanking	N/A	
				18 Thermal insulation, damp-proof membranes, vapour barriers, etc.	Damp-proofing, etc.	N/A	
		20 Concrete applied by spray or gun: details, including thickness (mm), to be stated.		**19** Concrete applied by spray or gun, including reinforcement, formwork and design joints.	N/A	N/A	

Group element 2: Superstructure

Group element 2 comprises the following elements:

2.1 Frame

2.2 Upper floors

2.3 Roof

2.4 Stairs and ramps

2.5 External walls

2.6 Windows and external doors

2.7 Internal walls and partitions

2.8 Internal doors

Note: works requiring temporary services, security, safety and environmental protection (e.g. scaffolding internally), control and protection, mechanical plant, etc. to facilitate the measured work item are included in group element 9.

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Testing and commissioning: Where testing and commissioning of drainage installations is required to be measured under sub-element 2.2.3, the terms should include the following works:

1 Testing includes:

(1) plugging outlets and carrying out water tests

(2) water required for testing.

2 Commissioning and setting to work includes:

(1) commissioning, including preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of drainage to client's requirements

(3) setting all drainage installations to work after completion of commissioning.

Not applicable: On the following pages 'N/A' means not applicable to renewal or maintain works.

Works (action required): The work items, or actions required, within each section of the building superstructure elements have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals, plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Planned inspections of the superstructure elements include for identifying problems with substructures (e.g. foundation subsidence).

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Element 2.1: Frame

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.1.1	Steel frames. **Definition:** structural steelwork in frames, including all fittings, fixings and components.	**1** Structural steel frame, including fittings and fixings: details, including size of column grid (m), to be stated.	t/(item)	**1** Structural steel frame, including all components (e.g. columns, beams, composite columns and beams, lattice beams, braces, struts, etc.).	Frame – steel (SF)	Frame – steel (SF)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of steel frames is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. SF: included as part of the steel frame. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to steel frames arising from actions identified from visual inspections and specialist surveys/ investigations (e.g. repairing connections and fixings).
				2 Fittings and fixings.	(SF)	(SF)	
				3 Roof trusses, where an integral part of the frame and cannot be separated from the frame.	(SF)	(SF)	
				4 Floor and roof members or decks forming an integral part of the frame, which cannot be separated from the frame.	(SF)	(SF)	
				5 Fabrication, trial erection and permanent erection on-site (including holding-down bolts, assemblies, grouting under base plates, etc.).	(SF)	N/A	
		2 Fire protection for steel frame: details to be stated.	item	**6** Factory-applied coatings, including fire-protective coatings and paint systems.	Fire-protective coating	N/A	
		3 Factory-applied paint systems: details to be stated.			Fire-protective coating	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**7** Sundry items: planned inspection of frames.	Actions arising from planned inspections	Planned inspection	Fire-protective painting: in situ recoating or painting as appropriate (details to be stated) by specialist contractor. **Maintain actions** Planned: inspections of frames (non-invasive). Proactive: (taken with group element 0 or 11 surveys). Reactive: minor isolated repairs to steel frames. N/A: not applicable to renewal and/or maintain work. **M1** Works identified by a structural survey or specialist inspection are to be described and itemised separately.
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Cost-significant components are to be described and identified separately. Such components are to be measured by the total mass in tonnes (t), by area (m^2), linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M3** Planned inspections of frames are to be itemised.
2.1.2	Space frames/ decks. **Definition:** space frames/ decks, including structural support framework as well as all components.	**1** Space frame/deck, including structural support framework, fittings and fixings: details to be stated.	m^2/ (item)	**1** Space frames/decks, including fittings and fixings.	Frame – space deck (SDF)	Frame – space deck (SDF)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of steel frames is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist.
				2 Structural support framework.	(SDF)	(SDF)	
				3 Fittings and fixings.	(SDF)	(SDF)	
				4 Fabrication, trial erection and permanent erection on-site (including holding-down bolts, assemblies, grouting under base plates, etc.).	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**6** Sundry items: planned inspection of frames.	Actions arising from planned inspections	Planned inspection	Note: structural survey and inspection fees, etc. are to be included in group element 11. SDF: included as part of the space deck frame. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to steel frames arising from actions identified from visual inspections and specialist surveys/ investigations (e.g. repairing connections and fixings). Fire-protective painting: in situ recoating or painting as appropriate (details to be stated) by specialist contractor.
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Fire protection to steel frame: details to be stated.	item	**5** Factory-applied coatings, including fire-protective coatings and paint systems.	Fire-protective coating	N/A	
		3 Factory-applied paint systems: details to be stated.			Fire-protective coating	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: inspections of frames (non-invasive). Proactive: (taken with group element 0 or 11 surveys). Reactive: minor isolated repairs to steel frames. N/A: not applicable to renewal and/or maintain work. **M1** Works identified by a structural survey or specialist inspection are to be described and itemised separately. **M2** Cost-significant components are to be described and identified separately. Such components are to be measured by the total mass in tonnes (t) by area (m^2), linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M3** Planned inspections of frames are to be itemised.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.1.3	Concrete casings to steel frames. **Definition:** protective casings to columns and beams for structural or protective purposes, including fire protection.	**1** Column casings: details, including number of columns (nr), column size and type of formwork finish, to be stated.		**1** Concrete.	Frame concrete casings (CC)	Frame concrete casings (CC)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of steel frames is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. (SF): included as part of the steel frame. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: to steel frames arising from actions identified from visual inspections and specialist surveys/ investigations (e.g. repairing connections and fixings). Fire-protective painting: in situ recoating or painting as appropriate (details to be stated) by specialist contractor.
				2 Specialist concrete grades and additives.	N/A	N/A	
				3 Formwork.	N/A	N/A	
				4 Special formed finishes to in situ concrete.	(CC)	(CC)	
			item	**5** Sundry items: planned inspection of frames.	Actions arising from planned inspections	Planned inspection	
			note	**6** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	
		2 Beam casings: details, including number of beams (nr), beam size and type of formwork finish, to be stated.	m/item	(Included in items 1 to 6 above.)	Concrete casings	Concrete casings	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: inspections of frames (non-invasive). Proactive: (taken with group element 0 or 11 surveys). Reactive: minor isolated repairs to steel frames. N/A: not applicable to renewal and/or maintain work. **M1** Works identified by a structural survey or specialist inspection are to be described and itemised separately. **M2** Cost-significant components are to be described and identified separately. Such components are to be measured by the total mass in tonnes (t) by area (m^2), linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M3** Planned inspection of frames is to be itemised.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.1.4	Concrete frames. **Definition:** concrete columns and beams.	**1** Columns: details, including number (nr) of columns, column size (mm), concrete grade, reinforcement rate (kg/m^3) and type of formwork finish, to be stated.	m/ (item)	**2** Columns, blade columns, etc.	Frame – concrete (FC)	Frame – concrete (FC)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of steel frames is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. (FC): included as part of the concrete frame. (item): unit of measurement for maintain. **Renewal actions** Replacement: not applicable to maintenance works.
				4 Concrete.	(FC)	(FC)	
				5 Specialist concrete grades and additives.	N/A	N/A	
				6 Reinforcement, including starter bars, punching shear reinforcement, etc.	N/A	N/A	
				7 Reinforcement for precast, prestressed and post-tensioned concrete, including stressing cables, applying stressing, etc.	N/A	N/A	
				8 Formwork.	N/A	N/A	
				10 Worked finishes (i.e. in situ surface treatments), including the application of surface hardeners.	N/A	N/A	
				11 Special formed finishes to in situ concrete.	N/A	N/A	
				12 Grouting-up of frame components.	(FC)	(FC)	
				13 Forming openings for doors, windows, screens, etc.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**14** Sundry items: planned inspection of frames.	Actions arising from planned inspections	Planned inspection	Major repairs: to concrete frames arising from actions identified from visual inspections and specialist surveys/investigations (e.g. repairing connections and fixings). Fire-protective painting: in situ recoating or painting as appropriate (details to be stated) by specialist contractor. **Maintain actions** Planned: inspections of frames (non-invasive). Proactive: (taken with group element 0 or 11 surveys). Reactive: minor isolated repairs to steel frames. N/A: not applicable to renewal and/or maintain work. **M1** Works identified by a structural survey or specialist inspection are to be described and itemised separately.
			note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Beams: details, including number of beams (nr), beam size (mm), reinforcement rate (kg/m^3) and type of formwork finish, to be stated.	m/ (item)	**1** Beams.	Frame – concrete	Frame – concrete	
		3 Walls: details, including thickness of wall (mm), concrete grade, reinforcement rate (kg/m^3) and type of formwork finish, to be stated.	m/ (item)	**3** Walls and core walls forming an integral part of the structural assembly.	Frame – concrete	Frame – concrete	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Extra over walls for forming openings in walls for doors, windows, screens, etc.: details, including thickness of wall (mm), overall size of opening (m) and type of formwork finish, to be stated.	nr/ (item)	(Not applicable to building maintenance works.)	N/A	N/A	**M2** Cost-significant components are to be described and identified separately. Such components are to be measured by the total mass in tonnes (t) by area (m^2), linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M3** Planned inspections of frames are to be itemised.
		5 Designed joints: details to be stated.	m/ (item)	**9** Designed joints (e.g. to walls).	Designed joints	Frame – concrete	
2.1.5	Timber frames. **Definition:** timber frame systems, including all components.	**1** Timber frames: details to be stated.	m^2/ (item)	**1** Complete timber frame systems, including all components and fixings.	Frame – timber (TF)	Frame – timber (TF)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of components is excluded from NRM 3. Note 1: for large-scale and cost-significant major repairs and replacement works it will be necessary to seek advice from a structural specialist. Note 2: structural survey and inspection fees, etc. are to be included in group element 11.
				2 Panel systems, such as offsite manufactured timber frames.	(TF)	(TF)	
				3 Laminated timber structures, etc.	(TF)	(TF)	
				4 Roof trusses, where an integral part of the frame and cannot be separated from the frame.	(TF)	(TF)	
				5 Floor, roof and structural wall members, including wall linings and floor boarding, forming an integral part of the frame, which cannot be separated from the frame.	(TF)	(TF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/ (item)	**6** Specialist subcontractor/ supplier design of timber frame.	(TF)	(TF)	TF: to be included as part of timber frames. N/A: not applicable to renewal and/or maintain work. (item): unit of measurement for maintain. **Renewal actions** Replacement: partial replacement of timber frames. Major repairs: describe actions identified from inspections and specialist surveys/extra investigations of timber frames. **Maintain actions** Planned: inspections of timber frames (non-invasive). Proactive: timber treatment (localised or extensive). Reactive: minor repairs to timber frames, etc. **M1** Works identified by a structural survey or specialist inspection are to be described and itemised separately.
				7 Trial erection and permanent erection of timber frame on-site (when required).	(TF)	(TF)	
				8 Treatments to timber.	Timber treatment	(TF)	
				9 Site-applied fire-retardant paint.	Protective coating	N/A	
			item	**10** Sundry items: planned inspection of frames.	Actions arising from planned inspections	Planned inspection	
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Area measured to include the area of the upper floors. The area is measured using the rules of measurement for ascertaining the GIFA. **M3** Area measured to include area of roof where roof structure (including roof trusses) is an integral part of the frame. **M4** Details of floor roof (including trussed roofs) and wall members or decks, which cannot be separated from the frame, are to be stated. **M5** Cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M6** Planned inspections to be itemised.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.1.6	Specialist frames. **Definition:** specialist structural frame systems, including all components.	**1** Specialist frames: details to be stated.	m^2/ (item)	**1** Portal frames and similar individual structural units (e.g. steel, concrete, timber or other material).	Frames – specialist (FS)	Frames – specialist (FS)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of components is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. SF: to be included as part of specialist frames. (item): unit of measurement for maintain. **Renewal actions** Replacement: not applicable for maintenance works. Major repairs: to specialist frames arising from actions identified from visual inspections and specialist surveys/investigations.
				2 Specialist, proprietary and modular lightweight steel frame systems.	(FS)	(FS)	
				3 Cellular construction, such as tunnel (slip) form.	(FS)	(FS)	
				4 Components, fittings and fixings.	(FS)	(FS)	
				5 Roof trusses, where an integral part of the frame and cannot be separated from the frame.	(FS)	(FS)	
				6 Floor and roof members or decks forming an integral part of the frame, which cannot be separated from the frame.	(FS)	(FS)	
				7 Fabrication, trial erection and permanent erection on-site (including holding-down bolts, assemblies, grouting under base plates, etc.).	N/A	N/A	
				8 Factory-applied coatings, including fire protective coatings and paint systems.	Protective treatment	(FS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**9** Sundry items: planned inspection of frames.	Actions arising from planned inspections	Planned inspection	Replacement: not applicable for maintenance works. Major repairs: to specialist frames arising from actions identified from visual inspections and specialist surveys/investigations. **Maintain actions** Planned: inspections of frames (non-invasive). Proactive: protective treatment (localised or extensive). Reactive: minor isolated repairs (details to be stated). **M1** Works identified by a structural survey or specialist inspection are to be described and itemised separately. **M2** The area measured is the area of the upper floors. The area is measured using the rules of measurement for ascertaining the GIFA.
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on cost	Subcontractor on cost	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Cost-significant components are to be described and identified separately. Such components are to be measured by linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M4** Planned inspections are to be itemised.

Element 2.2 Upper floors

Note: where testing and commissioning of drainage installations is required to be measured under sub-element 2.2.3, the terms should include the following works:

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Testing and commissioning: Where testing and commissioning of drainage installations is required to be measured under sub-element 2.2.3, the terms should include the following works:

1 Testing includes:

(1) plugging outlets and carrying out water tests

(2) water required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of drainage to client's requirements.

Not applicable: On the following pages 'N/A' means not applicable to renewal or maintain works.

Works (action required): the work items, or actions required, within each section of the building superstructure elements have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals, plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Planned inspections of the superstructure elements include for identifying problems with substructures (e.g. foundation subsidence).

Note: this element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.2.1	Floors. **Definitions:** • reinforced and post-tensioned concrete • floor decks consisting of proprietary precast units, a combination of in situ concrete with filler units of other material • structural timber floor construction, including floor boards • structural screeds.	Concrete floors: **1** Suspended floor slabs: details, including thickness (mm), concrete strength (N/mm^2), reinforcement rate (kg/m^3) and type of formwork finish, to be stated.	m^2/ (item)	**1** Concrete suspended floors, including: • upper floors • podium slabs forming roofs to basements • transfer structures • balconies (internal and external) that are an integral part of the suspended floor construction • mezzanine floors • service floors, etc. • galleries, tiered terraces, etc. • walkways, internal bridges, etc. • external corridors/bridges forming links between buildings, including supporting frames • roofs to internal buildings, where an integral part of the upper floor construction.	Upper floor – concrete (CUF)	Upper floor – concrete (CUF)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of components is excluded from NRM 3. For large-scale and cost-significant repairs it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. CUF: to be included as part of concrete upper floors. (item): unit of measurement for maintain. **Renewal actions** Replacement: not applicable for maintenance works. Major repairs: identified actions from the inspections and specialist surveys/ investigations to floors.
				2 Reinforced concrete floors, including solid, waffle and trough slabs. Including all concrete; reinforcement (including punching shear reinforcement); and formwork to soffits, edges and openings.	(CUF)	(CUF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/ (item)	**3** Post-tensioned concrete floors, including concrete and reinforcement (i.e. stressing cables, formwork, applying stressing and grouting-up).	(CUF)	(CUF)	**Maintain actions** Planned: inspections of upper floors (non-invasive). Proactive: taken with group element 11. Reactive: minor repairs to upper floors (details to be stated). **M1** Works relating to a structural survey or specialist inspection are to be described and itemised separately. **M2** The area measured is the area of the upper floors. The area is measured using the rules of measurement for ascertaining the GIFA. No deduction is to be made for beams, which form part of the upper floor. **M3** Where more than one floor construction type is employed, the areas measured for each floor construction type should equal the total area of the upper floors.
			item	**7** Sundry items: planned inspection of floors.	Actions arising from planned inspections	Planned inspection	
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Edge formwork: details of formwork to be stated.	m	**5** Permanent formwork, including profiled sheet-metal decking.	N/A	N/A	
		3 Designed joints: details to be stated.		**6** Designed joints.	Designed joints	(CUF)	
		4 Surface treatment: details to be stated.	m^2	**4** Worked finishes (i.e. in situ surface treatments), including tamped finish, power-float finish and the application of surface hardeners.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Areas for balconies, galleries, tiered terraces, service floors, walk-ways, internal bridges, external links and roofs to internal buildings should be shown separately. **M5** Sloping surfaces to be measured flat on plan. **M6** The length of linear components measured is their extreme length. **M7** Curved work is to be described and identified separately. **M8** Planned inspections of upper floors are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		Precast/composite decking systems: **5** Suspended floor slab: details, including type, thickness (mm), span (m) and loading (kN/m²), to be stated.	m²/ (item)	**1** Suspended floors, including: • upper floors • podium slabs forming roofs to basements • balconies (internal and external) that are an integral part of the suspended floor construction • mezzanine floors • service floors, etc. • galleries, tiered terraces, etc. • walkways, internal bridges, etc. • external corridors/bridges forming links between buildings, including supporting frames • roofs to internal buildings, where an integral part of the upper floor construction.	Upper floor – precast concrete (PCDS)	Upper floor – precast concrete (PCDS)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of components is excluded from NRM 3 For large-scale and cost-significant re-pairs, it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. PCDS: to be included as part of precast concrete decking systems. **Renewal actions** Replacement: not applicable to maintenance works. Major repairs: actions identified from inspections and specialist surveys/ investigations to floors. **Maintain actions** Planned: inspections to upper floors (non-invasive).

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/ (item)	**2** Solid, hollow, tee or other section of precast and prestressed concrete plank and slab decks.	(PCDS)	(PCDS)	Proactive: taken with group element 11. Reactive: minor repairs to upper floors (details to be stated). N/A: not applicable to renewal and/or maintain work. **M1** Works relating to a structural survey or specialist inspection are to be described and itemised separately. **M2** The area measured is the area of the upper floors. The area is measured using the rules of measurement for ascertaining the GIFA. No deduction is to be made for beams, which form part of the upper floor. **M3** Where more than one floor construction type is employed, the areas measured for each floor construction type should equal the total area of the upper floors.
				3 Composite decks of precast and prestressed concrete beams with filler blocks of precast concrete, in situ concrete and other materials.	(PCDS)	(PCDS)	
				4 Composite decks of precast and prestressed concrete beams with filler blocks of precast concrete, in situ concrete and other materials.	(PCDS)	(PCDS)	
				5 Hollow tile decks of in situ concrete with filler blocks of clay, precast concrete or other material.	(PCDS)	(PCDS)	
				6 Precast and prestressed concrete components.	(PCDS)	(PCDS)	
				7 In situ concrete.	N/A	N/A	
				8 Site-fixed formwork and reinforcement.	N/A	N/A	
				9 Filler units.	N/A	N/A	
				10 Fixing slips, metal clips and other fixings.	N/A	N/A	
				11 Joints, including grouting joints.	Re-grouting joints	(PCDS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m²/ (item)	**12** Worked finishes (i.e. in situ surface treatments), including the application of surface hardeners.	N/A	N/A	
				13 Performance tests.	N/A	N/A	
			item	**14** Sundry items: planned inspection of floors.	Actions arising from planned in-spections	Planned inspection	
			note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		6 Timber floors: details to be stated.	m²/ (item)	**1** Timber suspended floors, including: upper floors • balconies (internal and external) that are an integral part of the suspended floor construction • mezzanine floors, service floors, etc. • galleries, tiered terraces, etc. • walkways, internal bridges, etc. • external corridors/bridges forming links between buildings, including supporting frames • roofs to internal buildings, where an integral part of the upper floor construction.	Upper floors – timber (TUF)	Upper floors – timber (TUF)	**Scope covered by NRM 3** This section of NRM 3 only includes isolated repairs. Full replacement of components is excluded from NRM 3, unless included in scope of the maintenance refurbishment. For large-scale and cost-significant repairs, it will be necessary to seek advice from a structural specialist. Note: structural survey and inspection fees, etc. are to be included in group element 11. TUF: to be included as part of timber upper floors.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/ (item)	**2** Structural floor members, including joists, struts, trimmers, plates, etc.	(TUF)	(TUF)	SS: to be included as part of structural screeds. (item): unit of measurement for maintain. **Renewal actions** Replacement: replacement of timber floors agreed in scope. Major repairs: actions identified from inspections and specialist surveys/ investigations of timber floors. Timber treatment: eradication of infested timbers. **Maintain actions** Planned: as the scoping note statement above. Proactive: visual inspections or structural surveys of floors. Reactive: minor repairs to upper floors. N/A: not applicable to renewal and/or maintain work. (item): unit of measurement for maintain.
				3 Carpenter's metalwork, includ-ing strutting, joist hangers, straps, bolts, etc.	(TUF)	(TUF)	
				4 Floor surface where construction does not provide a platform (e.g. floor boarding to joisted floors).	(TUF)	(TUF)	
				5 Thermal insulation.	N/A (not accessible)	N/A (not accessible)	
			item	**6** Sundry items: planned inspection of floors.	Actions arising from planned inspections	Planned inspection	
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		7 Structural screeds: details, including thickness (mm), reinforcement rate (kg/m³) and surface treatments, to be stated.	m²/ (item)	**1** Screed.	Structural screeds (SS)	Structural screeds (SS)	**M1** Works relating to a structural survey or specialist inspection are to be described and itemised separately. **M2** The area measured is the area of the upper floors. The area is measured using the rules of measurement for ascertaining the GIFA. No deduction is to be made for beams, which form part of the upper floor. **M3** Where more than one floor construction type is employed, the areas measured for each floor construction type should equal the total area of the upper floors.
				2 Reinforcement.	N/A	N/A	
				3 Worked finishes.	N/A	N/A	
				4 Surface treatments (e.g. surface hardeners and non-slip inserts).	(SS)	(SS)	
			item	**5** Sundry items: planned inspection of floors.	Actions arising from planned inspections	Planned inspection	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Planned inspection	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.2.2	Balconies. **Definition:** internal and external balconies that are not an integral part of the upper floor construction.	**1** Balconies: details, including floor area (m^2), to be stated.	nr/ (item)	**1** Purpose-made balconies that are not an integral part of the upper floor construction, comprising bolt-on frame, decking, soffit panels, integral drainage/drainage trays and balustrades/handrails.	Balconies – purpose made	Balconies – purpose made	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of balconies, as appropriate. Major repairs: to include preparation, repair and making good of balconies, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of balconies, as appropriate. **Maintain actions** Planned: included as a proactive task. Proactive: visual inspections of balconies (non-invasive). Reactive: minor repairs to balconies (details to be stated). (item): unit of measurement for maintain.
				2 Protective coatings and paint systems	Protective coating	N/A	
				3 Surface treatments (e.g. surface hardeners and non-slip inserts).	N/A	N/A	
				4 Fittings and fixings.	N/A	N/A	
			nr	**5** Sundry items: planned inspection of balconies.	Actions arising from planned inspections	Planned inspection	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** Planned inspections of balconies to be enumerated (nr).

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.2.3	Drainage to balconies. **Definition:** piped internal or external disposal systems for taking rainwater from balconies to the first underground drain connection or gully.	**1** Rainwater downpipes: details to be stated.	m/(nr)	**1** Rainwater downpipes, including bends, swan necks and rainwater shoes, etc.	Downpipes	Downpipes	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of drainage to balconies, as appropriate. Major repairs: to include preparation, repair and making good of drainage to balconies, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of drainage to balconies, as appropriate. (nr): unit of measurement for maintain. **Maintain actions** Planned: PPM on drainage downpipes/outlets to balconies. Proactive: visual inspections of drainage to balconies. Reactive: minor repairs to drainage/outlets to balconies.
		2 Floor outlets: details to be stated.	nr	**2** Floor outlets.	Floor outlets	Floor outlets	
		3 Testing of installations.	%	**3** Testing and commissioning of aboveground surface water drainage systems. **5** Testing and commissioning: set to work.	(Included in drainage)	(Included in drainage)	
		4 Commissioning of installations.	item	**4** Sundry items: planned inspection of balconies.	Actions arising from planned inspections	Planned inspection	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all fittings, branches, etc. **M3** Contractor-designed work is to be described and identified separately.

Element 2.3: Roof

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.3.1	Roof structure. **Definition:** all components of the roof structure.	**1** Roof structure – pitched roofs: details, including design loads (kN/m²), spans (m) and angle of pitch (°), to be stated.	m²/ (item)	**1** Roof decks and slabs.	Roof structure – pitched (RSP)	Roof structure – pitched (RSP)	**Specification:** to be described for each item 1–18, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component included in scope. Note: full replacement of roof structures included in NRM 3. Excluded: providing temporary roofs and access scaffold (included in group element 9). Note: structural survey and inspection fees, etc. are to be included in group element 11. RSP and RSF: included as part of roof structures – pitched and roof structures – flat. (item): unit of measurement for renewal works.
		2 Extra over roof structure – pitched roofs for forming dormer.		**2** Trusses, purlins, rafters, binders, hangers, hip and valley rafters, ridge boards, wall plates, firings, ceiling joists, etc.	(RSP)	(RSP)	
				3 Dormer trusses.	(RSP)	(RSP)	
				5 Specialist-designed roof trusses.	(RSP)	(RSP)	
				6 Roof boarding.	(RSP)	(RSP)	
				7 Beams.	(RSP)	(RSP)	
				8 Carpenter's metalwork (details to be stated).	(RSP)	(RSP)	
				9 Eaves and verge structures.	(RSP)	(RSP)	
				10 Gable ends and internal walls above wall plate level.	(RSP)	(RSP)	
				11 Concrete (temporary or permanent).	(RSP and RSF)	(RSP and RSF)	
				12 Precast/composite decking systems.	(RSP and RSF)	(RSP and RSF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m²/ (item)	**13** Basement roofs.	(RSP and RSF)	(RSP and RSF)	**Renewal actions** Replacement: partial or full replacement of roof structure. Major repairs: works only arising from actions identified from inspections and specialist surveys/ investigations of roof structure. **Maintain actions** Planned: periodic timber treatment (arising from surveys). Proactive: inspections of roof structure (non-invasive). Reactive: minor repairs to the roof structure (localised). **M1** Works arising from a structural survey or specialist inspection are to be described and itemised separately. **M2** The area measured for pitched roofs is the area of the roof on plan, to the extremities of the eaves.
			14 Roofs to internal buildings.	(RSP)	(RSP)	
			15 Beams in unframed buildings.	(RSP)	(RSP)	
			16 Structural screeds to roofs.	(RSP)	(RSP)	
			17 Permanent formwork.	N/A	N/A	
			18 Thermal insulation laid in roof space (e.g. lagging).	Thermal insulation	Thermal insulation	
		item	**19** Sundry items: planned inspection of roofs.	Actions arising from planned inspections	Planned inspection	
		note	**20** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
	3 Prefabricated dormers: details to be stated.	nr	**4** Prefabricated dormers.	N/A	N/A	
	4 Roof structure – flat roofs: details, including design loads (kN/m²) and spans (m), to be stated.	m²/ (item)	(See items 1, 2, 5 to 16, and 18 to 20 included above).	(RSF)	(RSF)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Flat roofs (without parapet walls) – the area measured is the area of the roof on plan, to the extremities of the eaves and valleys. **M4** Flat roofs (with parapets walls) – the area measured is the area within the parapet walls measured to the internal face of the parapet walls to the roof. Note: roof housings (e.g. lift motor and plant rooms) should be broken down into the appropriate constituent components and measured in accordance with the measurement of the applicable components. **M5** Contractor-designed work is to be described and identified separately. **M6** Planned inspections of roofs are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.3.2	Roof coverings. **Definition:** protective cladding, coverings and coatings to roofs.	**1** Roof coverings, non-structural screeds, thermal insulation and surface treatments: details to be stated.	m^2/(nr)	**1** Roof cladding/coverings (e.g. tiling, slating, sheet coverings and thatching), including battening, underlay, vapour control layers, hip, valley, eaves and verge treatment, flashings, edge trims and other components required for the appli-cable cladding/ covering system.	Roof covering (RC) (state type and related specification)	Roof covering (RC) (state type and re-lated specification)	**Specification:** to be described for each item 1–10 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of roof coverings (specific areas or in full). Major repairs: to include preparation, repair and making good of roof coverings, as appropriate. **Maintain actions** Planned: PPM on applicable motorised photovoltaic solar and thermal devices. Proactive: inspections of roof coverings (non-invasive).
				2 Mastic asphalt roofing, liquid-applied roof coatings and built-up felt roof coverings, including underlay, vapour control layers, flashings, edge trims, skirtings, upstands and other boundary works required for the applicable roof covering system.	Roof covering – mastic asphalt	Roof covering – mastic asphalt	
		2 Extra over roof coverings for coverings to dormers, including cladding to dormer cheeks.	m^2/(nr)	**3** Photovoltaic devices.	Photovoltaic device	Photovoltaic device	
			nr	**4** Roof ventilation tiles.	(RC)	N/A	
			m^2/(nr)	**5** Non-structural screed. **6** Thermal insulation to roofs, including insulation overlays for inverted roofs.	(RC) Thermal insulation (to pitched roof areas)	N/A Thermal insulation (to pitched roof areas)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/(nr)	**7** Surface treatments to roof coverings (e.g. solar reflective painting, chippings, etc.).	Surface treatment (state type)	Surface treatment (state type)	Reactive: minor repairs to roof coverings. N/A: not applicable to renewal and/or maintain work. **M1** The area to be measured for roof coverings, etc. is the surface area of the roof covering to the extremities of the eaves or to the internal face of the parapet wall, whichever is applicable, excluding the area of roof lights, skylights and openings. No deduction is made for voids less than 1.00m^2. **M2** The area to be measured for dormer coverings is the surface area of the dormer roof coverings to the extremities of the eaves. No deduction is made for voids less than 1.00m^2. **M3** Where more than one type of roof covering system is employed, the area measured for each system is the area covered by the system.
				8 Paving tiles, paving slabs, etc. to form service walkways, roof terraces, etc. on roof surfaces.	Roof paving	Roof paving	
				9 Green roofs and roof gardens, including protection layer, drainage layer, filter membranes and growing medium.	Green roofs/ gardens	Green roofs/ gardens	
				10 Planting for green roofs/ roof garden.	Roof planting	Roof planting	
			item	**11** Sundry items: planned inspections of roofs.	Actions arising from planned inspections	Planned inspection	
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		3 Eaves and verge treatment to pitched roofs: details to be stated.	m	(Items are included in items 1 and 2 above.)	(RC)	N/A	
		4 Edge treatment to flat roofs: details to be stated.			(RC)	N/A	
		5 Flashings: details to be stated.			Flashings	Roof covering	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 The length of linear components measured is their extreme length. **M5** Curved work is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. **M7** Planned inspections of roof coverings are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.3.3	Specialist roof systems. **Definition:** glazed roof systems.	**1** Specialist roof systems: details to be stated.	m^2/(nr)	**1** Patent glazing.	Patent glazing	Specialist roof system (SRS)	**Specification:** to be described for each item 1–4 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. SRS: to be included as part of specialist roof systems. (nr): unit of measurement for maintain. Refurbish: to include removal of ex-isting, preparation and refurbishment of specialist roof systems, as appro-priate. **Maintain actions** Planned: to roof system manufacturer's requirements. Proactive: visual inspections of specialist roof systems. Reactive: minor repairs to roof systems.
				2 Glazed roof systems.	Glazed roof system	(SRS)	
				3 Perspex roof systems.	Perspex roof system	(SRS)	
			m^2/m	**4** Roof components, including flashings, cover strips, integral drainage channels, perimeter treatments, etc.	Roof components: details to be stated	(SRS)	
			item	**5** Sundry items: planned inspections of roofs.	Actions arising from planned inspections	Planned inspection	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 The area measured is the area of the glazed roof on plan. **M2** Curved work is to be described and identified separately. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of roofs are to be itemised.
2.3.4	Roof drainage. **Definition:** piped internal or external disposal for taking rainwater from roofs, etc. to the first underground drain connection or gully.	**1** Gutters: details to be stated.	m^2/(nr)	**1** Gutters (other than those forming an integral part of a cladding or curtain walling system), including fittings, gutter outlets, balloons and gratings to outlet, etc.	Gutters	Gutters	**Specification:** to be described for each item 1–5 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of roof drainage, as appropriate.
				3 Syphonic roof drainage pipework systems.	Syphonic roof drainage	Syphonic roof drainage	
				4 Rainwater heads, including gratings.	Rainwater heads	Rainwater heads	
			m^2/m	**5** Painting and anti-corrosion treatments for gutters and rainwater downpipes.	Redecoration	N/A	
			item	**7** Sundry items: planned inspection of roofs.	Actions arising from planned inspections	Planned inspections	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	Major repairs: to include preparation, repair and making good of roof drainage, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of roof drainage, as appropriate. Redecorations: to gutters and downpipes, as appropriate. **Maintain actions** Planned: PPM on applicable motorised roof systems and drainage channels. Proactive: visual inspections of roof drainage. Reactive: minor repairs to roof drainage. **M1** The length of linear components measured is their extreme length, over all fittings, branches, etc.
		2 Rainwater pipes: details to be stated.	m/(nr)	**2** Rainwater downpipes, including bends, swan necks and rainwater shoes.	Downpipes	Downpipes	
		3 Testing of installations.	%	**6** Testing and commissioning.	Included in items 1–5 (setting to work)	Included in item 1–5 (setting to work)	
		4 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M3** Curved work is to be described and identified separately. **M4** Contractor-designed work is to be described and identified separately. **M5** Planned inspections of roofs are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.3.5	Roof lights, skylights and openings. **Definition:** roof lights, skylights and openings to roof (type and size to be stated).	**1** Roof lights, skylights and openings: type and size to be stated.	nr/m^2	**1** Roof lights, skylights, etc.	Roof lights, skylights	Roof lights, skylights	**Specification:** to be described for each item 1–8 in order to apply the appropri-ate reference service life (RSL) and to as-sign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of roof lights, skylights and openings, as appropriate. Major repairs: to include preparation, repair and making good of roof lights, skylights and openings, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of roof lights, skylights and openings, as appropriate. Redecoration: for roof lights and skylights, as appropriate.
			nr	**2** Opening gear, frames, kerbs and glazing.	Opening gear	(Included in skylights)	
				3 Sun pipes/tubes.	Sun pipes/ tubes	(Included in skylights)	
			nr/m^2	**4** Pavement lights.	Pavement lights	Pavement lights	
			nr	**5** Roof hatches.	Roof hatches	Roof hatches	
				6 Access hatches to roof spaces.	Access hatches	Access hatches	
				7 Smoke vents.	Smoke vents	Smoke vents	
				8 Roof vents and roof cowls.	Roof vents	(Included in roof covering)	
			item	**9** Sundry items: planned inspections of roofs.	Actions arising from planned inspections	Planned inspection	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: PPM on the motorised roof lights and openings. Proactive: inspections of roof lights, skylights and openings. Reactive: minor repairs to roof lights, skylights and openings. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area of rooflights, skylights and openings. **M3** Curved work is to be described and identified separately. **M4** Contractor-designed work is to be described and identified separately.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Cost-significant components are to be described and identified separately. Such components are to be measured by linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate. **M6** Planned inspections are to be itemised.
2.3.6	Roof features. **Definition:** roof features not forming part of the roof structure.	**1** Roof features: details to be stated	nr/ (item)	**1** Turrets.	Turret	Roof features (RF)	**Specification:** to be described for each item 1–10, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. RF: to be included as part of roof features. (item): unit of measurement for maintain.
				2 Wind vanes.	Wind vanes	(RF)	
				3 Spires.	Spires	(RF)	
				4 False chimneys.	False chimney	(RF)	
				5 Enclosures designed solely to conceal plant, rooflines, etc. (complete structure, including wall louvers).	Roof enclosure	(RF)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
				6 Fall arrest systems.	Fall arrest system	(RF)	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of roof features and openings, as appropriate. Major repairs: to include preparation, repair and making good of roof features, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of roof features, as appropriate. Redecoration: for roof features, as appropriate.
				7 Access systems for cleaning roof.	Roof access system	(RF)	
				8 Roof edge protection (permanent).	Roof edge protection	(RF)	
				9 Balustrades, handrails to roof edges and walkways.	Roof balustrades	(RF)	
				10 Service walkways within roof voids.	Roof service walkways	(RF)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**11** Sundry items: planned inspection of roofs.	Actions arising from planned inspections	Planned inspection	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** Cost-significant components are to be described and identified separately. Such components are to be measured by linear measurement (m) or enumerated (nr) and the number and sizing of each component is to be stated, as appropriate.
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Element 2.4: Stairs and ramps

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.4.1	Stair/ramp structures. **Definition:** construction of staircases, ramps and landings.	**1** Stair structures: details, including vertical rise (mm) of staircase, to be stated.	nr/ (item)	**1** Staircases, including spiral staircases, etc.	Staircase (SC) structures	Stair/ramp (SR) structures	Specification: to be described for each item 1–6 to determine the appropriate reference service life and to assign the applicable planned maintenance task schedules to the component. SC: to be included as part of staircases. SR: to be included as part of stair/ramp structures. (item): unit of measurement for maintain. **Renewal actions** Replacement: removal of existing structure and replace with equivalent stair/ramp structures and landings. Major repairs: arising from actions identified from inspections and specialist surveys/investigations. Refurbish: N/A Redecoration: of stair/ramp structures, as appropriate.
				3 Landings between floor levels.	(SC)	(SR)	
				4 Fire escape staircases.	(SC)	(SR)	
				5 In situ and precast concrete stair/ramp structures, including concrete, reinforcement, formwork, worked finishes and grouting of precast units.	Steps	(SR)	
				6 Staircases fabricated from steel, timber or other materials, including offsite-applied coatings and paint systems.	(SC) state type	(SR)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Ramp structures: details, including vertical rise (mm) of ramp, to be stated.	nr/ (item)	**2** Access ramps.	Ramps	(SR)	**Maintain actions** Planned: normally covered by visual inspections. Proactive: visual inspections of stair/ramp structures. Reactive: minor repairs to stair/ramp structures. **M1** Number of storey flights (i.e. the number of staircases or ramps multiplied by the number of floors served (excluding the lowest floor served in each case)). **M2** The vertical rise of stairs or ramps is the distance measured from top of structural floor level to top of structural floor level. **M3** Curved work is to be described and identified separately. **M4** Contractor-designed work is to be described and identified separately. **M5** Planned inspections to stairs and ramps are to be itemised, stating the number of stairs and ramps.
			item	**7** Sundry items: planned inspection of stairs and ramps.	Actions arising from planned inspections	Planned inspection	
			note	**8** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.4.2	Stair/ramp finishes. **Definition:** finishes to stairs, ramps and landings.	**1** Stair finishes: details, including vertical rise (mm) of staircase, to be stated.	nr/ (item)	**1** Finishes to treads and risers.	Stair finishes (SF)	Stair finishes (SF)	**Specification:** to be described for each item 1–4 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of stair/ramp finishes, as appropriate. Major repairs: to include preparation, repair and making good of stair/ramp finishes, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of stair/ramp finishes, as appropriate. Redecoration: for stair/ramp finishes, as appropriate.
				2 Finishes to landings between floor levels.	(SF)	(SF)	
				4 Finishes to strings.	(SF)	(SF)	
				5 Finishes to the soffits of staircase.	(SF)	(SF)	
			item	**6** Sundry items: planned inspection of stairs and ramp finishes.	Actions arising from planned inspections	Planned inspection	
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Ramp finishes: details, including vertical rise (mm) of ramp, to be stated.	nr/ (item)	**3** Finishes to ramp surfaces.	Ramp finishes	Ramp finishes	**Maintain actions** Planned: normally covered by visual inspections. Proactive: visual inspections of stair/ramp finishes. Reactive: minor repairs to stair/ramp finishes. **M1** Number of storey flights (i.e. the number of staircases or ramps multiplied by the number of floors served (excluding the lowest floor served in each case). **M2** The vertical rise of stairs or ramps is the distance measured from top of structural floor level to top of next structural floor level. **M3** Curved work is to be described and identified separately. **M4** Contractor-designed work is to be described and identified separately. **M5** Planned inspections of stairs and ramps are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.4.3	Stair/ramp balustrades and handrails. **Definition**: balustrades and handrails for stairs, ramps and landings.	**1** Wall handrails: details, including vertical rise of staircase or ramp, to be stated.	nr/ (item)	**1** Balustrades and handrails for stairs.	Stair/ramp balustrades and handrails (SRBH)	Stair/ramp balustrades and handrails (SRBH)	**Specification:** to be described for each item 1–4 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. SRBH: to be included as part of stair/ramp balustrades and handrails. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of stair/ramp balustrades and handrails, as appropriate. Major repairs: to include preparation, repair and making good of stair/ramp balustrades and handrails, as appropriate.
		2 Combined balustrades and handrails: details, including vertical rise (mm) of staircase or ramp, to be stated.		**2** Balustrades and handrails for landings between floor levels.	(SRBH)	(SRBH)	
				3 Balustrades and handrails for landings.	(SRBH)	(SRBH)	
				4 Applied coatings and paint systems.	Decoration	N/A	
			item	**5** Sundry items: planned inspection of stair and ramp balustrades and railings.	Actions arising from planned inspections	Planned inspection	
			item	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Refurbishment: to include removal of existing, preparation and refurbishment of stair/ramp balustrades and handrails, as appropriate. Redecoration: for stair/ramp balustrades and handrails, as appropriate. **Maintain actions** Planned: normally covered by visual inspection.
2.4.4	Ladders/chutes/ slides. **Definition:** access and escape ladders, etc.	**1** Ladders: details to be stated.	nr	**1** Fire escape ladders.	Ladders, chutes and slides (LCS)	Ladders, chutes and slides (LCS)	**Specification:** to be described for each item 1–4 in order to apply the appropriate RSL and to assign the applicable planned maintenance task schedules to the components included in scope. LCS: to be included as part of ladders/chutes/slides. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of ladders/chutes/slides, as appropriate.
				2 Access ladders.	(LCS)	(LCS)	
				3 Loft ladders, including hatch doors where an integral part of the loft ladder.	(LCS)	(LCS)	
				4 Applied coatings and paint systems.	Decoration	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		item	**5** Sundry items: planned inspection of ladders, chutes and slides.	Actions arising from planned inspections	Planned inspection	Refurbishment: to include removal of existing, preparation and refurbishment of stair/ramp balustrades and handrails, as appropriate. Redecoration: for stair/ramp balustrades and handrails, as appropriate. **Maintain actions** Planned: normally covered by visual inspection. Specification: to be described for each item 1–4 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. LCS: to be included as part of ladders/chutes/slides. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of ladders/chutes/slides, as appropriate.
		note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
	2 Chutes: details to be stated.	nr	**7** Fire escape chutes/slides.	Fire escape chute/slides	(LCS)	
	3 Slides: details to be stated.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Major repairs: to include preparation, repair and making good of ladders/ chutes/slides, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of ladders/ chutes/slides, as appropriate. Decorations: detail the specifications as appropriate. **Maintain actions** Planned: safety checks on ladders/chutes/slides. Proactive: visual inspections of ladders/chutes/slides. Reactive: minor repairs to ladders/chutes/slides. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** Planned inspections are to be itemised.

Element 2.5: External walls

Note: where testing and commissioning is required to be measured under sub-elements 2.5.5 and 2.5.6, the terms should include the following works:

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Testing and commissioning: Where testing and commissioning of drainage installations is required to be measured under sub-element 2.2.3, the terms should include the following works:

1 Testing includes:

(1) testing equipment and consumables

(2) calibration

(3) site installation tests, including water tests for drainage installations

(4) static testing, including testing records

(5) performance testing, including performance test records

(6) fuels and water required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements

(3) fuels and water required for commissioning.

3 Setting all drainage installations, and mechanical and electrical services and installations, to work after completion of commissioning (initial operation).

Not applicable: On the following pages 'N/A' means not applicable to renewal or maintain works.

Works (action required): the work items, or actions required, within each section of the building superstructure elements have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals – plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Planned inspections of the superstructure elements include for identifying problems with substructures (e.g. foundation subsidence).

Note: this element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.5.1	External enclosing walls above ground floor level. **Definition:** external enclosing walls above ground floor level.	**1** External walls: details, to be stated. Note: reinforcement rate (kg/m³) and formwork finish for in situ concrete walls to be stated.	m²/(nr)	**1** External enclosing walls (i.e. both internal and external skins).	External walls (EW)	External walls (EW)	**Specification:** to be described for each item 1–27, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. EW: to be included as part of external enclosing walls. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external enclosing walls above ground, as appropriate. Major repairs: to include preparation, repair and making good of external enclosing walls above ground, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of external enclosing walls above ground, as appropriate.
				2 Underside of returns in external walls.	N/A	N/A	
				3 Parapet walls, including copings and cappings, to roofs formed as part of the external walls.	Parapet walls	(EW)	
				4 Gable walls formed as part of the wall construction.	(EW)	Not maintained	
				5 Chimneys formed as part of external walls.	Chimneys	Chimneys	
				6 Columns and beams in unframed structures.	(EW)	Not maintained	
				7 Curtain walling designed and fixed as an integrated assembly, complete with opening lights, doors, ventilators, etc.	Curtain walling	Curtain walling	
				8 Structural glazing assemblies, etc. (i.e. glazing that forms an integral part of a cladding system).	Structural glazing	Structural glazing	
				9 Profiled sheet cladding systems, including cladding rails, etc.	Profiled sheet cladding	Profiled sheet cladding	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/(nr)	**11** Opening vents and panels for curtain walling system, or structural glazing assemblies or profiled sheet cladding systems.	Opening vents	Opening vents	Redecoration: for external walls, to be described and identified separately, as appropriate. **Maintain actions** Planned: PPM on applicable motorised opening vents, integral blinds and photovoltaic glazing. Proactive: visual inspections of external enclosing walls above ground. Reactive: minor repairs to external enclosing walls above ground. **M1** The area measured is the area of the external wall, measured on the centre line of the external wall. No deductions for windows or external doors. **M2** Where more than one type of external wall system is employed, the area measured for each external wall system is measured separately.
				12 Integral blinds for windows, curtain walling systems or structural glazing assemblies.	Integral blind	Integral blind	
				14 Rigid sheet cladding systems, including support framework.	Rigid sheet cladding	Rigid sheet cladding	
				16 Panelled walling systems, including panels for a frame structure.	Panelled walling	Panelled walling	
				17 Internal skins/backing walls for curtain walling systems, cladding systems, walling systems, etc. including window boards, cover strips, etc.	(EW)	Not maintained	
				18 Concrete walls including reinforcement and formwork.	(EW)	Not maintained	
				19 Masonry walls (i.e. brickwork, blockwork and stonework), including forming cavities, wall ties, thermal insulation, etc.	Masonry walls	Not maintained	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2/(nr)	**21** Lightweight steel frame systems, including cladding and insulation.	Lightweight steel frame	Not maintained	**M3** Where more than one external wall system is employed, the combined area of each external wall system should equal the total area of all external wall systems. **M4** The area measured for external wall finishes is the surface area of the external wall component to which the finish is to be applied. **M5** Other cost-significant subcomponents, such as decorative masonry or brickwork bands/panels, cover strips and window boards forming an integral part of internal skins/backing walls of curtain walling systems, cladding systems, etc., are to be measured by area (m^2), linear measurement (m) or enumerated (nr) and identified separately. **M6** The length of linear components measured is their extreme length, over all obstructions.
			22 Thermal insulation, membranes, etc.	(EW)	(EW)	
			23 Timber and plastic cladding systems (e.g. weatherboarding).	(EW)	(EW)	
			24 Insulating render systems.	(EW)	(EW)	
			25 Finishes applied to external wall (e.g. paint systems, coating systems, ceramic/stone cladding, tiling and other materials).	External decoration	N/A	
			26 Finishes to underside of returns in external walls.	N/A	N/A	
			27 Planted 'green' walls, including protection layer, drainage layer, filter membranes and growing medium.	Green walls	N/A	
			28 Forming openings in external walls for external windows and external doors, including lintels/ beams, head courses, damp-proof courses, cavity trays, closing cavities and all other work to soffits, sills and reveals of openings.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		item	**29** Sundry items: planned inspection of external walls.	Actions arising from planned inspections	Planned inspection	**M7** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M8** Curved work is to be described and identified separately. **M9** Contractor-designed work is to be described and identified separately. **M10** Planned inspections of external walls are to be itemised. Note: faceted cladding, or similar external wall constructions, is to be measured flat on elevation, with no allowance for forming facets. The unit rate applied is to allow for the nature of the walling system.
		note	**30** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
	2 Extra over external walls for plinths, cornices, ornamental bands, etc.: details to be stated.	m^2	**20** Plinths, cornices, ornamental bands and quoins that are formed with a different material from the general wall.	(EW)	(EW)	
	3 Extra over external walls for quoins: details to be stated.	m	Included in 20 above.	(EW)	(EW)	
	4 Extra over external walls for forming openings for windows: details, including overall size of opening (mm), to be stated.	nr	N/A	N/A	N/A	
	5 Extra over external walls for forming openings for external doors: details, including overall size of opening (mm), to be stated.		N/A	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		6 Extra over cladding or curtain walling system for integral photovoltaic panels: details including overall size of opening (mm), to be stated.	nr	**10** Photovoltaic glazing or cladding panels where an integral part of a curtain walling system, or structural glazing assemblies or profiled sheet cladding systems.	Photovoltaic glazing	(T/E) with curtain walling	
		7 Extra over cladding or curtain walling system for integral opening vents and panels: details, including overall size of opening (mm), to be stated.	nr/m^2	N/A	N/A	N/A	
		8 Projecting fins for cladding or curtain walling system: details, including overall size of panel (mm), to be stated.	nr	**15** Projecting fins for cladding systems, including any applied artwork.	(EW)	(EW)	
		9 Extra over projecting fins for applied artwork: details to be stated.	item	N/A	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		10 Safety barriers, handrails or combined balusters and handrails for facetted glazing or cladding systems: details to be stated.	nr/m	**13** Safety barriers, handrails or combined balusters and handrails for facetted glazing or cladding systems.	Safety barriers, etc.	Safety barriers, etc.	
		11 Finishes applied to external walls: details to be stated.	m^2	**25** Finishes applied to external walls (e.g. paint systems, coating systems, ceramic/stone cladding, tiling and other materials).	(EW)	(EW)	
2.5.2	External enclosing walls below ground level. **Definition:** external enclosing walls below ground floor level that are not formed by retaining walls.	**1** External walls: details, including reinforcement rate (kg/m^3) and formwork finish for in situ concrete walls, to be stated.	m^2/(nr)	**1** External basement walls below ground floor level not in contact with earthwork or part of an embedded retaining wall construction (i.e. not retaining walls).	External basement walls (EBW)	External basement walls (EBW)	**Specification:** to be described for each item 1–24, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. EBW: to be included as part of external enclosing walls. (nr): unit of measurement for maintain.
				2 External enclosing walls (i.e. both internal and external skins).	(EBW)	(EBW)	
				3 Underside of returns in external walls.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/(nr)	**4** Parapet walls, including copings and cappings, for roofs formed as part of external walls.	Parapet walls	(EBW)	**Maintain actions** Planned: normally covered by visual tours/surveys. Proactive: visual inspections of external enclosing walls below ground. Reactive: minor repairs to external enclosing walls below ground. **M1** The area measured is the area of the external wall, measured on the centre line of the external wall. No deductions for windows or external doors. **M2** Where more than one type of external wall system is employed, the area measured for each external wall system is measured separately. **M3** Where more than one external wall system is employed, the combined area of each external wall system should equal the total area of all external wall systems.
				5 Gable walls formed as part of wall construction.	(EBW)	(EBW)	
				6 Chimneys forming part of external walls.	Chimneys	(EBW)	
				7 Columns and beams in unframed structures.	(EBW)	(EBW)	
				8 Curtain walling designed and fixed as an integrated assembly, complete with opening lights, doors, ventilators, etc.	Curtain walling	(EBW)	
				9 Structural glazing assemblies, etc. (i.e. glazing that forms an integral part of a cladding system).	Structural glazing	(EBW)	
				10 Profiled sheet cladding systems, including cladding rails, etc.	(EBW)	(EBW)	
				11 Photovoltaic glazing or cladding panels where an integral part of a curtain walling system, or structural glazing assemblies or profiled sheet cladding systems.	(T/E) with curtain walling	N/A	
				12 Rigid sheet cladding systems, including support framework.	(EBW)	(EBW)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2/(nr)	**13** Panelled walling systems, including panels for a frame structure.	(EBW)	(EBW)	**M4** The area measured for external wall finishes is the surface area of the external wall component to which the finish is to be applied. **M5** Other cost-significant subcomponents, such as cover strips and window boards forming an integral part of internal skins/backing walls for curtain walling systems, cladding systems, etc., are to be measured by area (m^2), linear measurement (m) or enumerated (nr) and identified separately. **M6** The length of linear components measured is their extreme length, over all obstructions. **M7** Curved work is to be described and identified separately. **M8** Contractor-designed work is to be described and identified separately.
			14 Internal skins/backing walls for curtain walling systems, cladding systems, walling systems, etc., including window boards, cover strips, etc.	(EBW)	(EBW)	
			15 Concrete walls, including reinforcement and formwork.	(EBW)	(EBW)	
			16 Masonry walls (i.e. brickwork, blockwork and stonework), including forming cavities, wall ties, thermal insulation, etc.	(EBW)	(EBW)	
			18 Lightweight steel frame systems, including cladding and insulation.	(EBW)	(EBW)	
			19 Thermal insulation, membranes, etc.	(EBW)	(EBW)	
			20 Timber and plastic cladding systems (e.g. weatherboarding).	(EBW)	(EBW)	
			21 Insulating render systems.	(EBW)	(EBW)	
			23 Finishes to underside of returns in external walls.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/(nr)	**25** Forming openings in external walls for external windows and external doors, including lintels/ beams, head courses, damp-proof courses, cavity trays, closing cavities and all other work to soffits, sills and reveals of openings.	N/A	N/A	
				24 Planted 'green' walls, including protection layer, drainage layer, filter membranes and growing medium.	N/A	N/A	
			item	**26** Sundry items: planned inspections of external walls.	Actions arising from planned inspections	Planned inspection	
			note	**27** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Extra over external walls for plinths, cornices, ornamental bands, etc.: details to be stated.	m	**17** Plinths, cornices, ornamental bands and quoins that are formed with a different material from the general wall.	(EBW)	(EBW)	
		3 Extra over external walls for quoins: details to be stated.					

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Extra over external walls for forming openings for windows: details, including overall size of opening (mm), to be stated.	nr		(EBW)	N/A	
		5 Extra over external walls for forming openings for external doors: details, including overall size of opening (mm), to be stated.			(EBW)	N/A	
		6 Finishes to external walls: details to be stated.	m^2/(nr)	**22** Finishes applied to external wall (e.g. paint systems, coating systems, ceramic/stone cladding, tiling and other materials).	External decoration	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.5.3	Solar/rain screening. **Definition:** cladding systems, etc. attached to the exterior of the building to protect the external walls.	**1** Vertical solar/rain screening: details, including projection (mm), to be stated.	m^2/(nr)	**1** Vertical and horizontal exterior over cladding systems, including support systems.	Solar/rain screening	Solar/rain screening	**Specification:** to be described for each item 1 and 4, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of solar/rain screening, as appropriate. Major repairs: to include preparation, repair and making good of solar/rain screening, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of solar/rain screening, as appropriate.
			item	**2** Sundry items: planned inspection of external walls.	Actions arising from planned inspections	Planned inspection	
			note	**3** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Horizontal solar/rain screening: details to be stated	m^2/(nr)	**4** Brise soleil, etc., including supporting system.	Brise soleil system	Solar/rain screening	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: PPM on motorised solar/rain screen cladding. Proactive: visual inspections of solar/rain screening. Reactive: minor repairs to solar/rain screening. **M1** The area measured is the area of the over cladding system. **M2** Where more than one type of overcladding system is employed, the area for each overcladding system is measured. **M3** The length of linear components measured is their extreme length, over all obstructions. **M4** Curved work is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. **M6** Planned inspections are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.5.4	External soffits. **Definition:** external false ceilings and demountable suspended ceilings that form an integral part of a building envelope.	**1** External soffits: details to be stated.	m^2/(nr)	**1** In situ/board ceilings, including soffit linings and battens, fixed direct to underside of upper floor construction.	External soffits (ESF)	External soffits (ESF)	**Specification:** to be described for each item 1–8 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. ESF: to be included as part of external soffits. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external soffits, as appropriate. Major repairs: to include preparation, repair and making good of external soffits, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of external soffits, as appropriate.
				2 Demountable suspended ceiling systems, including suspension systems.	(ESF)	(ESF)	
				3 Insulation fixed directly to underside of upper floor construction or laid on soffit construction/soffit.	(ESF)	(ESF)	
				4 In situ coatings applied to false ceilings (e.g. plaster skim coats, render, roughcast and specialist coatings).	(ESF)	(ESF)	
			item	**9** Sundry items: planned inspection of external walls.	Actions arising from planned inspections	Planned inspection	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Cornices, covings, etc.: details to be stated.	m/(nr)	**6** Cornices, covings, etc.	(ESF)	(ESF)	**Maintain actions** Planned: normally covered by visual checks/surveys. Proactive: visual inspections of external soffits, cornices, covings and access hatches. Reactive: minor repairs to external soffits, cornices, covings and access hatches. **M1** The area measured for each type of external soffit is the surface area of the soffit to which the finish is to be applied. **M2** The area measured for each type of finish applied to external soffits is the surface area of the soffit to which the finish is to be applied. **M3** The length of linear components measured is their extreme length, over all obstructions.
		3 Shadow gaps, etc.: details to be stated.		**7** Shadow gaps, etc., including painting.	(ESF)	(ESF)	
		4 Access hatches, etc.: details to be stated.	nr	**8** Access hatches, etc. in external soffit construction.	Access hatches	(ESF)	
		5 Finishes applied to external soffits: details to be stated.	m^2	**5** Painting and decorating of false ceilings.	External decoration	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M5** Curved work is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. **M7** Planned inspections of external walls are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.5.5	Subsidiary walls, balustrades and proprietary balconies. **Definition:** subsidiary components that form an integral part of the building envelope.	**1** Walls: details to be stated.	m/(nr)	**1** Low-level or dwarf walls, balustrades, handrails and railings for external walkways and balconies built off the upper floor construction, which form an integral part of the building envelope (e.g. to provide walkway between external enclosing wall and edge of upper floor construction), including walls forming planters.	Subsidiary walls (SW)	Subsidiary walls (SW)	**Specification:** to be described for each item 1–8, to determine the appropriate reference service life and to assign the applicable planned maintenance task schedules to the component. SW: to be included as part of subsidiary walls. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of subsidiary walls, balustrades and proprietary balconies, as appropriate. Major repairs: to include preparation, repair and making good of subsidiary walls, balustrades and proprietary balconies, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of external soffits, as appropriate.
				8 All work, materials, components, etc. required to construct subsidiary components.	Subsidiary components	(SW)	
		2 Walls forming planters: details to be stated.		**2** Walls forming planters, including protection layer, drainage layer, filter membranes and growing medium.	Formed planters	(SW)	
		3 Combined balustrades and handrails: details to be stated.		**4** Combined balustrades and handrails.	Balustrades and handrails	Balustrades and handrails	
		4 Wall-mounted handrails: details to be stated.		**3** Wall handrails.	Wall handrails	Wall handrails	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Parapet railings: details to be stated.	m/(nr)	**5** Railings and barriers to tops of parapet walls.	Railings for parapet	Railings for parapet	Redecoration: for subsidiary walls, balustrades, etc. to be described, as appropriate. **Maintain actions** Planned: normally covered by visual checks/surveys. Proactive: visual inspections of subsidiary walls, balustrades and proprietary balconies. Reactive: minor repairs to subsidiary walls, balustrades and proprietary balconies. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** Where more than one type of component is employed, each component is measured.
		6 Proprietary bolt-on balconies: details to be stated.		**6** Proprietary bolt-on balconies (e.g. 'Juliet' balconies).	Juliet balconies	Juliet balconies	
		7 Rainwater pipes: details to be stated.		**7** Surface water drainage from external walkways, etc. attached from building to first underground drain connection or gully, including floor outlets.	Downpipes	Downpipes	
		8 Floor outlets: details to be stated.			Floor outlets	Floor outlets	
		9 Testing of rainwater drainage installation.	%	**9** Testing and commissioning of aboveground surface water drainage systems.	Included with items (set to work)	Included with items (set to work)	
		10 Commissioning of rainwater drainage installation.					
		1–10 As above	item	**10** Sundry items: planned inspection of external walls.	Actions arising from planned inspections	Planned inspection	
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M5** Work to existing buildings is to be described and identified separately. **M6** Curved work is to be described and identified separately. **M7** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the rainwater drainage installation. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. **M8** Contractor-designed work is to be described and identified separately. **M9** Planned inspections of external walls are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.5.6	Facade access/ cleaning systems. **Definition:** systems for accessing and cleaning facades.	**1** Facade cleaning systems: details to be stated.	nr	**1** Window and facade cleaning trolley/cradles (including twin track, manual and automatic systems).	Window/facade cleaning cradles	Window/facade cleaning cradles	**Specification:** to be described for each item 1–5, to determine the appropriate reference service life and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of facade access/cleaning systems, as appropriate. Major repairs: to include preparation, repair and making good of facade access/cleaning systems, as appropriate. Refurbish: to include removal of existing, preparation and refurbishment of facade access/cleaning systems, as appropriate.
				2 Combined facade and roof cleaning system.	Combined facade/roof cleaning system	Combined facade/roof cleaning system	
				3 Building maintenance units.	Building maintenance units	Building maintenance units	
				4 Other facade access systems.	Other facade access system	Other facade access system	
				5 Builder's work in connection with facade access/cleaning systems.	Included with all above items	N/A	
			item	**7** Sundry items: planned inspection of facade/access cleaning systems.	Actions arising from planned inspections	Planned inspection	
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Testing of installations.	%	**6** Testing and commissioning of facade access/cleaning systems.	Included in item (set to work)	Included in item (set to work)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: normally covered by visual checks/surveys. Proactive: visual inspections of facade access/cleaning systems. Reactive: minor repairs to facade access/cleaning systems. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.6.1	External windows. **Definition:** windows and openings in external walls for ventilation and light.	**1** Windows: details, including overall size of opening (mm), to be stated	m^2/(nr)	**1** Windows, including opening lights, fixed lights, frames, linings, window boards, cover trims, ironmongery and glazing.	External windows (EW)	External windows (EW)	**Specification:** to be described for each item 1–14, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. EW: included as part of external windows. (nr): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external windows (nr) or areas (m^2). Major repairs: to include preparation, repair and making good of external windows (nr) as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the external windows (nr) as appropriate.
				2 Windows for dormers.	(EW)	(EW)	
				8 Solar/rain screen overcladding systems for windows.	Solar/rain screening	Solar/rain screening	
				9 Photovoltaic glazing where an integral part of window system.	Photovoltaic glazing	(EW)	
				10 Canopies, etc. providing protection to windows and shop fronts, including any associated surface water drainage.	Canopies	Canopies	
				11 Protective film applied to windows.	Protective film	(EW)	
				13 Window boards, trims, etc., including those that are not an integral part of the window.	(EW)	(EW)	
				14 Painting and decorating.	External decoration	N/A	

Element 2.6: Windows and external doors

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	2 Louves: details, including overall size of opening (mm), to be stated.	m^2/(nr)	**3** Louvered windows and panels.	Louvered windows	(EW)	Redecoration: of external windows, etc. to be described and identified with the renewal actions, or stated separately if part of a decoration regime. (nr): unit of measurement for renewal. **Maintain actions** Planned: PPM on motorised solar/rain screening, photovoltaic glazing, canopy roller shutters and integral blinds. Proactive: visual inspections of external windows. Reactive: minor repairs to external windows. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Where the area of the component is to be measured, the area measured is the area of the component measured over frames.
	3 Shop fronts: details, including overall size of opening (mm), to be stated.	m^2	**4** External shop fronts, including temporary shop fronts.	Shop front	(EW)	
	4 Roller shutters, sliding shutters, grilles, etc. to window openings: details, including overall size of opening (mm), to be stated.	nr	**5** Roller shutters, sliding shutters, grilles, etc. providing security or protection to windows and shop fronts.	Roller/sliding door	Roller/sliding door	
			6 Fly screens and storm windows.	Screens/ shutters	Screens/ shutters	
			7 Integral blinds for windows.	Integral blinds	Screens/ shutters	
			12 External blinds, shutters, etc.	Blinds and shutters	Blinds and shutters	
		item/ (nr)	**15** Sundry items: planned inspection of external windows.	Actions arising from planned inspections	Planned inspection	
			16 Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Where more than one type of component is employed, each component is measured. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M5** Curved work is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. **M7** Planned inspections of external windows are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.6.2	External doors. **Definition**: doors and openings in external enclosing walls.	**1** External doors: details, including type, number of door leaves (nr), size of each door leaf (mm) and overall size of opening (mm), to be stated.	nr	**1** Entrance doors, door frames, door linings and door sets, including solid, glazed and partially glazed doors, louvre doors, etc. (proprietary and purpose-made).	External doors (ED)	External doors (ED)	**Specification:** to be described for each item 1–19, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. ED: included as part of external doors. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external doors, as appropriate. Major repairs: to include preparation, repair and making good of external doors, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the external doors, as appropriate. Redecoration: for external doors, etc. to be described and identified with the renewal works, or stated separately if part of a decoration programme of works.
				2 Entrance screens and doors, including frames.	(ED)	(ED)	
				4 Patio doors.	(ED)	(ED)	
				8 Manual and automatic doors.	Automatic door (manual with ED)	Automatic door (manual with ED)	
				11 Fanlights and sidelights/side panels integral to the door.	(ED)	(ED)	
				13 Ironmongery, including door closers, panic locks, etc.	Ironmongery	Ironmongery	
				14 Glazed vision panels.	(ED)	(ED)	
				15 Painting and decorating.	External decorations	N/A	
				16 Fly screens and storm doors.	Screens and storm doors	Screens and storm doors	
				17 Integral blinds for doors.	Integral blinds	(ED)	
				18 Solar/rain screen overcladding for doors.	Solar/rain screening	Solar/rain screening	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**20** Sundry items: planned inspections of external doors.	Actions arising from planned inspections	Planned inspection	**Maintain actions** Planned: PPM on applicable motorised doors, blinds and screens. Proactive: visual inspections of external doors. Reactive: minor repairs to external doors. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Where the area of a component is to be measured, the area measured is the area of the component measured over frames. **M3** The length of linear components measured is their extreme length. **M4** Where more than one type of component is employed, each component is measured.
			note	**21** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Revolving doors: details, including overall size of opening (mm), to be stated.	nr	**3** Revolving doors.	Revolving doors	Revolving doors	
		3 Shop front doors: details, including type, number of door leaves (nr), size of each door leaf (mm) and overall size of opening (mm), to be stated.		**7** External shop front doors.	External shop front doors	External shop front door	
		4 Roller shutters, sliding shutters, grilles, etc. for door openings: details, including overall size of opening (mm), to be stated.		**6** Rolling and sliding shutters, including integral access doors.	Roller/sliding shutter	Roller/sliding shutter	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Garage doors: details, including overall size of opening (mm), to be stated.	nr	**5** Garage doors.	Garage doors	Garage doors	**M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately.
		6 Canopies: details to be stated.		**9** Canopies, etc. providing protection to external doors, including any associated surface water drainage.	Canopies	Canopies	
				19 Canopies, etc. providing protection to doors.			
		7 Grilles: details, including overall size of opening (mm), to be stated.		**10** Grilles (fixed and folding), etc. providing security or protection to doors.	Grilles (fixed and folding)	Grilles (fixed and folding)	
		8 Architraves: details to be stated.		**12** Architraves (included with items).	(ED)	(ED)	

Element 2.7: Internal walls and partitions

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.7.1	Walls and partitions. **Definition:** internal walls and fixed partitions.	**1** Internal walls: details, including thickness (mm), to be stated.	m^2	**1** Internal walls, including full-height and low-level walls.	Walls and partitions (WAP)	Walls and partitions (WAP)	**Specification:** to be described for each item 1–17, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. WAP: included with walls and partitions. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of walls and partitions, as appropriate. Major repairs: to include preparation, repair and making good of walls and partitions, as appropriate.
				3 Internal shop fronts, etc., including temporary shop fronts.	Shop fronts	(WAP)	
				4 Columns and beams that are not an integral part of a frame structure.	(WAP)	N/A	
				5 Internal walls in roof formed as part of the wall construction.	(WAP)	(WAP)	
				6 Walls forming chimneys, stairwells and lift shafts.	(WAP)	(WAP)	
				7 Walls forming cubicles.	(WAP)	(WAP)	
				8 Walls forming planters, including protection layer, drainage layer, filter membranes and growing medium.	Planters	(WAP)	
				9 Borrowed lights, glazed screens, etc. that are an integral part of internal walls and partitions.	Borrowed lights/screens, etc.	Borrowed lights/screens, etc.	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
			10 Concrete walls, including reinforcement and formwork, that are not an integral part of the structural frame.	(WAP)	(WAP)	Refurbish: to include removal of existing, preparation and refurbishing of walls and partitions, as appropriate. Redecoration: for walls and partitions is to be described and identified with the renewal works, as appropriate. **Maintain actions** Planned: PPM on the applicable motorised blinds. Proactive: visual inspections of walls and partitions. Reactive: minor repairs to walls and partitions. **M1** The area measured is the area of internal walls and partitions, measured on the centre line of the internal wall or partition. No deduction is made for door openings, screens or the like. **M2** Where more than one type of component is employed, each component is measured.
			11 Masonry walls (i.e. brickwork, blockwork and stonework), including floor and head support systems.	(WAP)	(WAP)	
			15 Thermal insulation and membranes.	(WAP)	(WAP)	
			16 Cappings to low-level internal walls, including timber, stone, tiles and other materials.	(WAP)	(WAP)	
			17 Blinds, where an integral part of a proprietary partitioning system.	Integral blind in partitions	N/A	
			18 Forming openings for internal doors, etc. in internal walls, including work to soffits and reveals of openings.	N/A	N/A	
			19 Forming openings for internal doors, etc. in internal fixed partitions, including work to soffits and reveals of openings.	N/A	N/A	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		item	**20** Sundry items: planned inspections of internal walls and partitions.	Actions arising from planned inspections	Planned inspection	**M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M4** Curved work is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. **M6** Planned inspections of internal walls are to be itemised.
		note	**21** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
	2 Extra over internal walls for forming openings in walls for internal doors, etc.: details, including overall size of opening (mm), to be stated.	nr/ (item)	Included in works.	(WAP)	N/A	
	3 Fixed partitions: details, including thickness (mm), to be stated.	m^2/ (item)	**2** Fixed partitions, including demountable partition systems.	Fixed partitions	(WAP)	
			12 Timber stud partitions, including cavity insulation, board linings and filling lining joints.	(WAP)	(WAP)	
			13 Metal stud partitioning systems, including cavity insulation, board linings and filling lining joints.	(WAP)	(WAP)	
			14 Glazed partitioning.	(WAP)	(WAP)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Extra over fixed partitions for forming openings in partitions for internal doors, etc.: details, including overall size of opening (mm), to be stated.	nr	N/A	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.7.2	Balustrades and handrails. **Definition:** internal balustrades, handrails and other fixed non-storey height divisions.	**1** Combined balustrades and handrails: details to be stated.	m	**1** Balustrades and handrails for interior atriums, access walkways, galleries, etc., including off-site and on-site applied coating and paint systems.	Balustrades and handrails	Balustrades and handrails	**Specification:** to be described for each item 1, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of balustrades and handrails, as appropriate. Major repairs: to include preparation, repair and making good of balustrades and handrails, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the balustrades and handrails, as appropriate. Redecoration: for balustrades and handrails to be described and identified with the renewal works items.
			item	**2** Sundry items: planned inspections of balustrades and handrails.	Actions arising from planned inspections	Planned inspection	
			note	**3** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: normally covered by visual surveys. Proactive: visual inspections of balustrades and handrails. Reactive: minor repairs to balustrades and handrails. **M1** The length of linear components measured is their extreme length. **M2** Where more than one type of component is employed, each component is measured. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M4** Curved work is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. **M6** Planned inspection of balustrades/handrails to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.7.3	Moveable room dividers. **Definition**: moveable partitions intended to divide rooms into smaller spaces.	**1** Moveable room dividers and partitions: details, including height (m), to be stated.	m	**1** Moveable room dividers and partitions, including frames, linings, ironmongery, architraves, cover trims, etc. (proprietary and purpose-made).	Moveable room dividers	Moveable room dividers	**Specification:** to be described for each item 1–2, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of moveable room dividers, as appropriate. Major repairs: to include preparation, repair and making good of moveable room dividers, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of moveable room dividers, as appropriate. Redecoration: for moveable room dividers is to be described and identified with the renewal work items.
				2 Off-site and on-site applied coating and paint systems.	Internal decoration	N/A	
			item	**3** Sundry items: planned inspections of internal walls and partitions.	Actions arising from planned inspections	Planned inspection	
			note	**4** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: PPM on applicable motorised room dividers. Proactive: visual inspections of moveable room dividers. Reactive: minor repairs to moveable room dividers. **M1** The length of linear components measured is their extreme length. **M2** Where more than one type of component is employed, each component is measured. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M4** Curved work is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. **M6** Planned inspections of internal walls are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.7.4	Cubicles. **Definition:** proprietary pre-finished panels, assembled to form cubicles, complete with doors.	**1** Cubicles: details to be stated.	nr/m/m^2/(item)	**1** Proprietary pre-finished panel cubicles (e.g. toilet and changing), etc., including doors, trims, cover strips, ironmongery and fittings forming an integral part of the cubicle.	Cubicles	Cubicles	**Specification**: to be described for each item 1, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of cubicles, as appropriate. Major repairs: to include preparation, repair and making good of cubicles, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the cubicles, as appropriate. Redecoration: for cubicles to be described and identified with the renewal work items, as appropriate.
			item	**2** Sundry items: planned inspections of cubicles.	Actions arising from planned inspections	Planned inspection	
			note	**3** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Fixed partitions: details, including thickness (mm), to be stated.	nr/m/m^2/(item)	Included in items 1 – 3 above.	As items 1–3 above	As items 1–3 above	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: normally covered by visual checks/surveys. Proactive: visual inspections of cubicles. Reactive: minor repairs to cubicles. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length. **M3** The area measured is the area of moveable room dividers and partitions.

Element 2.8: Internal doors

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
2.8.1	Internal doors. **Definition:** doors, hatches, shutters and grilles and other openings in internal walls and partitions.	**1** Internal doors: details, including type, number of door leaves (nr), size of each door leaf (mm) and overall size of opening (mm), to be stated.	nr	**1** Doors, including standard doors, purpose-made doors, full-height doors and fire-resistant doors.	Internal doors (ID) – standard or purpose-made	Internal doors (ID) – standard or purpose-made	**Specification:** to be described for each item 1–10, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. ID: to be included as part of internal doors. N/A: not applicable to renewal and/or maintain work. **Renewal actions** Replacement: to include removal of existing, preparation of internal doors, as appropriate (e.g. doors, frames, linings and stops), and replacement with new (including redecorating new internal doors, etc.). Major repairs: to include preparation, repair and making good of internal doors (e.g. re-glazing panels), as appropriate.
				2 Frames, linings, architraves, stops, etc.	Frames, linings and architraves, stops	(ID)	
				5 Glazed vision panels, etc.	Glazed vision panel	(ID)	
				6 Sliding and folding doors in fixed partitions.	Sliding/folding doors	Sliding/folding doors	
				7 Hatches, including doors, frames, linings, architraves, stops, etc.	Hatches	Hatches	
			nr (prs)	**8** Ironmongery.	Ironmongery	Ironmongery	
			nr	**10** Painting and decorations.	Internal decoration	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Fire-resistant doors: details, including type, number of door leaves (nr), fire rating (hours), size of each door leaf (mm), and overall size of opening (mm), to be stated.	nr	**1a** Fire-resistant doors (see door description included in item 1 above).	Doors – fire-resistant	Doors – fire-resistant	Refurbish: to include removal of existing, preparation and refurbishing the internal doors, as appropriate. Redecoration: to be described and identified with the renewal work items, as appropriate. **Maintain actions** Planned: PPM on applicable motorised doors, hatches, shutters and grilles, etc., including security checks. Proactive: visual inspections of internal doors, etc., including protective measures (e.g. fix extra security and kick plates). Reactive: minor repairs to internal doors (e.g. overhaul ironmongery, ease/adjust doors and replace glazing). **M1** Where components are to be enumerated, the number of components is to be stated.
		3 Door sets: details, including type, number of door leaves (nr), size of each door leaf (mm) and overall size of opening (mm), to be stated.		**3** Door sets.	Door sets	(ID)	
		4 Composite door and sidelights/over-panel units: details, including type, number of door leaves (nr), size of each door leaf (mm), and overall size of opening (mm), to be stated.		**4** Fanlights, over panels and sidelights, etc. that are integral to the door set.	Composite doors and fanlights	(ID)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Roller shutters, sliding shutters, grilles, etc.: details, including overall size of opening (mm), to be stated.	nr	**8a** Internal roller shutters, sliding shutters, grilles, etc., including frames, linings, architraves, stops, etc.	Roller/sliding doors	Roller/sliding doors	**M2** Where more than one type of component is employed, each component is measured. **M3** Cost-significant subcomponents are to be described and measured linearly (m) or enumerated (nr) separately, as appropriate. **M4** The length of linear components measured is their extreme length. **M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately. **M6** Contractor-designed work is to be described and identified separately. **M7** Planned inspection of internal doors to be itemised.
		6 Architraves: details to be stated.	m	**9** Included in items 1 to 8 above.	(ID)	(ID)	
			item	**11** Sundry items: planned inspections of internal doors.	Actions arising from planned inspections	Planned inspection	
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Group element 3: Internal finishes

Group element 3 comprises the following elements:

3.1 Wall finishes

3.2 Floor finishes

3.3 Ceiling finishes

Note: Works requiring temporary services, security, safety and environmental control and protection (e.g. internal scaffolding), mechanical plant, etc. to facilitate the measured work item are included in group element 9.

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Descriptors: Maintain and renewal works descriptors for applicable included components in the tables.

Not applicable: On the following pages 'N/A' means not applicable to renewal and/or maintain works.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals, plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Non-invasive planned inspections are included in the internal finishes section and are normally undertaken as part of the maintain (M) regime. Actions arising from planned inspections are dealt with normally as renewal (R) works when they not covered by the maintenance minor repairs provisions.

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Element 3.1: Wall finishes

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
3.1.1	Wall finishes. **Definition:** applied finishes to internal wall surfaces, including specialist wall finishes for sports, public amenities, etc.	**1** Finishes to walls and columns: details to be stated.	m^2	**1** In situ coatings applied to walls (e.g. plaster, render and roughcast).	Wall finishes – (WF) in situ	Walls finishes (WF)	**Specification:** to be stated, in order to apply the appropriate reference service life (RSL) as appropriate to included item. WF: included as part of the wall finishes. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of wall finishes, as appropriate. Major repairs: to include preparation, repair and making good of wall finishes, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the wall finishes with modern equivalent components, as appropriate.
				2 Sprayed monolithic coatings for columns and walls (i.e. to provide fire protection, thermal insulation, condensation control and acoustic control).	WF – sprayed coating)	(WF)	
				3 Plasterboard or other sheet linings, including fixing systems, joint reinforcing scrim, plaster skim coats, etc.	(WF – plasterboard)	(WF)	
				4 Ceramic wall tiling.	(WF – ceramic tiling)	(WF)	
				5 Decorative sheet coverings, including lining paper, decorative paper, vinyl and plastic wall covering, and textile wall covering.	(WF – decorative sheet covering)	(WF)	
				6 Painting and decorating.	(WF – decorations)	N/A	
				9 Insulation that provides a wall finish.	(WF – insulation board)	(WF)	
				10 Applied finishes to columns.	(WF – applied finishes)	(WF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**11** Wall finishes to staircase areas/stairwells.	(WF – to staircases/ stairwells)	(WF)	**Maintain actions** Planned: normally covered by visual surveys. Proactive: visual inspections of wall finishes. Reactive: isolated patch repairs to wall finishes. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured for each type of wall finish is the surface area of the wall to which the finish is to be applied. No deduction is made for voids (e.g. door openings, screens, etc.). **M3** The length of linear components measured is the extreme length over all obstructions.
				12 Specialist wall finishes.	(WF – specialist)	(WF)	
			item	**13** Sundry items: planned inspections of wall finishes.	Actions arising from planned inspections	Planned inspection	
			note	**14** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	
		2 Picture rails, dado rails, etc.: details to be stated.	m	**7** Picture rails, dado rails, etc.	Picture and dado rails	(WF)	
		3 Proprietary impact and bumper guards, protection strips, corner protectors, etc.: details to be stated.	nr/m	**8** Proprietary impact and bumper guards, protection strips, corner protectors, etc.	Wall protection	(WF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Painting and decorating of walls to individual rooms within residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M5** Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M6** Curved work is to be described and identified separately. **M7** Planned inspections of wall finishes are to be itemised.

RETURN TO GROUP ELEMENT CONTENTS

Element 3.2: Floor finishes

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
3.2.1	Finishes to floors. **Definition:** applied finishes to floor surfaces, including specialist floors for sports facilities, public amenities, etc.	**1** Finishes to floors: details to be stated.	m^2/ (item)	**1** Non-structural screeds, including under-screed damp-proof membranes.	Floor finishes (FF) screed	Floor finishes (FF)	**Specification:** to be stated, in order to apply the appropriate reference service life (RSL) to the items included in scope. FF: included as part of floor finishes. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of floor finishes, as appropriate. Major repairs: to include preparation, repair and making good of floor finishes, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the floor finishes with modern equivalent components, as appropriate.
				2 Latex screeds (i.e. levelling screeds).	(FF – screed)	(FF)	
				3 Chemical surface hardeners and sealers applied to screeds.	(FF – surface hardener)	(FF)	
				4 Floating floors.	(FF – floating floor)	(FF)	
				5 Resin-bonded resilient layers.	(FF – resin)	(FF)	
				6 In situ floor finishes (e.g. granolithic and terrazzo).	(FF – in situ)	(FF)	
				7 Tiled floor finishes (e.g. stone, quarry, ceramic and mosaic tiles).	(FF – hard tile)	(FF)	
				8 Woodblock flooring, composition block flooring, parquet flooring, etc.	(FF – wood block)	(FF)	
				9 Proprietary thin-tiled and strip flooring, blockwood flooring, etc.	(FF – proprietary types)	(FF)	
				10 Floor painting and sealing.	(FF – painted floors)	(FF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/ (item)	**11** Edge-fixed carpeting, including underlay, rods, grippers, edgings, and cover and threshold strips.	(FF – carpets)	(FF)	**Maintain actions** Planned: normally covered by surveys. Proactive: visual inspections of floor finishes. Reactive: isolated repairs to specialist flooring systems. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is the extreme length over all obstructions. **M3** The area measured for each type of floor finish is the surface area of the floor to which the finish is to be applied.
				12 Fixed-flexible and semi-flexible tile and sheet coverings (e.g. carpet, vinyl, rubber, PVC, thermoplastic, cork, linoleum and antistatic flooring).	(FF – tile/sheet)	(FF)	
		2 Specialist flooring systems: details to be stated.	m^2	**13** Timber-sprung floors for sports halls, squash courts, etc.	Timber-sprung floors	(FF)	
				14 Specialist floor covering systems.	Specialist floor covering systems	(FF)	
				16 Floor finishes to internal and external balconies.	Floor finishes to balconies	(FF)	
			item	**20** Sundry items: planned inspections of floor finishes.	Actions arising from planned inspections	Planned inspection	
			note	**21** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	
		3 Skirtings, etc.: details to be stated.	m	**17** Skirtings.	Skirtings (unless part of floor finishes)	(FF)	
		4 Mat wells and mats: details to be stated.	nr	**18** Mat wells and mats.	Entrance matting	(FF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Finishes to swimming pool tanks, including tank linings: details to be stated.	m^2	**15** Finishes to swimming pool tanks, including tank linings.	Finishes to swimming pools	(FF)	**M4** The area measured for finishings to swimming pool tanks is the area of the swimming pool on plan, measured to the internal face of the swimming pool walls. **M5** Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M6** Curved work is to be described and identified separately. **M7** Planned inspections of floor finishes are to be itemised.
		6 Line markings: details to be stated.	m	**19** Line markings, numerals, letters, symbols, etc. (e.g. surface markings to denote car parking spaces in basement car park).	Line markings	(FF)	
		7 Numerals and symbols: details to be stated.	nr				

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
3.2.2	Raised access floors. **Definition:** platform floors or dry construction, raised above the structural floor to create space for the distribution of services.	**1** Raised access floor systems: details to be stated.	m^2	**1** Proprietary raised access floor systems, including adjustable pedestals/supports, floor panels, ventilation and access panels, cavity fire barriers, air plenum barriers, outlet boxes and trunking, skirtings/edge trims that form part of the proprietary system, risers and nosings at changes of level, adhesives, bearing pads and shims.	Raised access floor system	Raised access floor system	**Maintain actions** Planned: normally covered by surveys. Proactive: visual inspections of floor finishes. Reactive: isolated repairs to specialist flooring systems. **M1** The area measured for each type of raised access floor system is the surface area of the floor to which the finish is to be applied. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** Curved work is to be described and identified separately. **M4** Planned inspections of floor finishes to be itemised.
				2 Floor coverings/finishes (where factory-bonded or mechanically fixed on-site).	Floor coverings: to access floor systems	Floor finishes: to access floor systems	
		2 Skirtings, etc.: details to be stated.	m	(Included in item 1 above.)	Raised access floor system	Raised access floor system	
			item	**3** Sundry items: planned inspections of access flooring systems.	Actions arising from planned inspections	Planned inspection	
			note	**4** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Renewal actions Replacement: to include removal of existing, preparation and replacement of floor finishes, as appropriate. Major repairs: to include preparation, repair and making good of floor finishes, as appropriate.

Element 3.3: Ceiling finishes

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
3.3.1	Finishes to ceilings. **Definition:** applied finishes to ceiling surfaces, including specialist ceiling finishes to sports facilities, public amenities, etc.	**1** Finishes to ceilings: details to be stated.	m^2/ (item)	**1** Linings to ceilings (e.g. dry-lined plasterboard ceilings, pre-finished sheets, timber boarding, etc.).	Ceiling finishes (CF): state types of linings	Ceiling finishes (CF)	**Specification:** to be stated in order to apply the appropriate reference service life (RSL) to the components included. CF: included as part of the ceiling finishes. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of ceiling finishes, as appropriate. Major repairs: to include preparation, repair and making good of ceiling finishes, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing the ceiling finishes, as appropriate.
				2 Linings to sides and soffits of beams, bulkheads, etc.	(CF – linings)	(CF)	
				3 In situ coatings applied to ceilings (e.g. plaster skim coat, render, roughcast and specialist coatings).	(CF – plaster in situ)	(CF)	
				4 Sprayed monolithic coatings to beams and ceilings (i.e. to provide fire protection, thermal insulation, condensation control and acoustic control).	CF – sprayed coating)	(CF)	
				5 Painting and decorating of ceilings.	(CF – decorations)	(CF)	
				7 Specialist ceiling finishes.	(CF – specialist)	(CF)	
		2 Cornices, covings, etc.: details to be stated.	m^2/ (item)	**6** Cornices, covings, etc.	Cornices and covings	(CF)	
			item	**8** Sundry items: planned inspections of ceiling finishes.	Actions arising from planned inspections	Planned inspection	
			note	**9** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Redecoration: for ceiling finishes is to be described and identified with the renewal work item, or separately if part of a redecoration programme of works. **Maintain actions** Planned: normally covered by visual checks. Proactive: visual inspections of ceiling finishes. Reactive: isolated patch repairs, as appropriate. **M1** The area measured for each type of ceiling finish is the surface area of the ceiling/soffit to which the finish is to be applied. **M2** The length of linear components measured is the extreme length over all obstructions.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M4** Painting and decorating of ceilings for individual rooms are to be enumerated (nr). The type of room and size (by area dimensions) of unit is to be stated. **M5** Curved work is to be described and identified separately. **M6** Contractor-design work is to be described and identified separately. **M7** Planned inspections of ceiling finishes are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
3.3.2	False ceilings. **Definition:** false ceilings comprising soffit linings on battens, etc. fixed direct to underside of slabs, not demountable, including specialist false ceilings to sports facilities, public amenities, etc.	**1** False ceilings: details to be stated.	m^2/ (item)	**1** In situ/board ceilings, including soffit linings, battens, support framework or suspension system, fixed direct to underside of upper floor construction.	False ceilings (FCF)	False ceilings (FCF)	**Specification** to be stated in order to appropriate apply the reference service life (RSL) to the included components. FCF: included as part of the false ceiling finishes. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of ceiling finishes, as appropriate. **Maintain actions** Planned: normally covered by visual checks. Proactive: visual inspections of ceiling finishes. Reactive: isolated patch repairs, as appropriate.
				2 Insulation fixed direct to underside of upper floor construction or laid on false ceiling.	FCF – insulation	(FCF)	
				3 In situ coatings applied to false ceilings (e.g. plaster skim coats, render, roughcast and specialist coatings).	FCF – in situ coatings	(FCF)	
				4 Painting and decorating of false ceilings.	FCF – decorations	(FCF)	
				6 Shadow gaps, etc., including painting.	FCF – shadow gaps	(FCF)	
			item	**8** Sundry items: planned inspections of ceiling finishes.	Actions arising from planned inspections	Planned inspection	
			note	**9** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	
		2 Cornices, covings, etc.: details to be stated.	m/ (item)	**5** Cornices, covings, etc.	Cornices and covings	(FCF)	
		3 Access hatches, etc.: details to be stated.	nr/ (item)	**7** Access hatches, etc. in false ceilings.	Access hatches	(FCF)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 The area measured for each type of false ceiling is the surface area of the ceiling/soffit to which the finish is to be applied. **M2** The length of linear components measured is the extreme length over all obstructions. **M3** Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M4** Painting and decorating of ceilings to individual rooms to be enumerated (nr). The type of room and size (by area dimensions) of unit is to be stated.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
3.3.3	Demountable suspended ceilings. **Definition:** false ceilings of dry construction comprising a membrane of tiles, panels and trays supported by exposed or concealed suspended grids. Including specialist false ceilings for sports facilities, public amenities, etc.	**1** Demountable suspended ceilings: details to be stated.	m^2/ (item)	**1** Proprietary suspended ceiling systems, including suspension systems.	Demountable suspended ceilings (DSC)	Demountable suspended ceilings (DSC)	Major repairs: to include preparation, repair and making good of demountable suspended ceilings, as appropriate. Proactive: visual inspections of demountable suspended ceilings. **Specification:** to be stated, in order to apply the appropriate reference service life (RSL) to the components included in scope. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of demountable suspended ceiling, as appropriate. Reactive: isolated patch repairs, as appropriate.
				2 Integrated ceiling systems, including suspension systems.	(DSC – state type)	(DSC)	
				3 Acoustic suspended ceiling systems, including suspension systems.	(DSC – acoustic type	(DSC)	
				4 Specialist suspended ceiling systems, including suspension systems.	(DSC – specialist)	(DSC)	
				5 Insulation fixed directly to underside of upper floor construction or laid on suspended ceiling system.	N/A: included in suspended ceilings if replaced	N/A	
		2 Shadow gaps, etc.: details to be stated	m/ (item)	**6** Shadow gaps, etc., including painting.	N/A	N/A	
		3 Access hatches, etc.: details to be stated.	nr/ (item)	**7** Access hatches in suspended ceilings, etc.	Access hatches	(DSC)	
			item	**8** Sundry items: planned inspections of ceiling finishes.	Actions arising from planned inspections	Planned inspection	
			note	**9** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	

Group element 4: Fittings, furnishings and equipment

Group element 4 comprises the following elements:

4.1 Fittings, furnishings and equipment

Note 1: works requiring temporary services, security, safety and environmental control and protection (e.g. internal scaffolding), mechanical plant, etc. to facilitate the measured work item are included in group element 9.

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Descriptors: Maintain and renewal works descriptors for applicable included components in the tables.

Not applicable: In the following tables, 'N/A' means not applicable to renewal or maintain works.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals.
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Non-invasive planned inspections are included in element 4.1 and are normally undertaken as part of the maintain (M) regime.

Actions arising from the planned inspections are dealt with normally as renewal (R) works when they are not covered by the maintenance minor repairs provisions.

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised cost structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Element 4.1: Fittings, furnishings and equipment

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.1	General fittings, furnishings and equipment. **Definition:** fittings, furnishings and equipment fixed to the building fabric or provided loose within the building.	**1** Fittings: details to be stated.	nr	**1** Counters, desks, benches and worktops.	Counter, desks, benches and worktops	General fittings, furnishings and equipment (FFE)	**Specification:** to be described for each item 1–23, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. FFE: included in fittings, furnishings and equipment. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of general fittings, furnishings and equipment, as appropriate. Major repairs: to include preparation, repair and making good of general fittings, furnishings and equipment, as appropriate.
				2 Mirrors that are not an integral part of wall finishes, furnishings, fittings and equipment.	Mirrors	(FFE)	
				3 Curtains, curtain track rails, pelmets, etc.	Curtains and rails	(FFE)	
				5 Fireplace surrounds and hearths.	Fireplaces and hearths	(FFE)	
				8 Storage racks, shelves, shelving support systems, etc.	Storage racks and shelving	(FFE)	
				10 Fitted seating and upholstery.	Fitted seating	(FFE)	
				12 Bathroom furniture, including vanity units, cupboards, etc.	Bathroom furniture	(FFE)	
				21 Other general-purpose fittings and furnishings.	Other general FFE	(FFE)	
				22 Delivery, unpacking, sorting, checking all components, assembling, fixing in position (including all bolts and other fixing devices).	(Included with all above items)	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Furnishings: details to be stated.	nr	**4** Blinds and blind boxes that are not an integral part of the window system.	Blinds	(FFE)	Refurbish: to include removal of existing, preparation and refurbishing of general fittings, furnishings and equipment, as appropriate. **Maintain actions** Planned: normally covered by visual checks. Proactive: visual inspection of general fittings, furnishings and equipment. Reactive: minor repairs identified by inspections or arising from reactive requests. N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Descriptions should include the amount of any PC sum included in the unit rates applied to the item.
				6 Wall hangings.	Wall hangings	(FFE)	
				7 Loose carpets.	Loose carpets	(FFE)	
				9 Tables and chairs.	Table /chairs	(FFE)	
				11 Bedroom furniture, including beds, divans, wardrobes, dressers, vanity units, cupboards, cabinets, drawer units, etc.	Bedroom furniture	(FFE)	
				13 Lockers, hat and coat rails, etc.	Lockers, hat/ coat rails	(FFE)	
		3 Equipment: details to be stated.		**14** Hand-held firefighting equipment, including fire extinguishers, fire blankets, etc. (including backboards, fixings, etc.).	Firefighting equipment – state type	Firefighting equipment – state type	
				15 Bins, wheelie bins, continental bins, etc.	Bins	N/A	
				16 Safes, including building into structure.	Safes (if in scope)	N/A	
				17 Vacuum cleaners and cleaning equipment.	Cleaning equipment	N/A	
				18 Televisions, hi-fis and computers.	Televisions, etc.	N/A	
				19 Vending machines.	Vending machines	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**20** Telephone booths and enclosures (internal).	Telephone booths	(FFE)	**M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of FFE are to be itemised.
			item	**23** Sundry items: planned inspections of FFE.	Actions arising from planned inspections	Planned inspection	
			note	**24** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
4.1.2	Domestic kitchen fittings and equipment. **Definition:** domestic kitchen units and equipment of all kinds.	**1** Kitchen units: details to be stated.	nr	**1** Kitchen units, including base units, drawer units, worktops, cupboards, etc.	Domestic kitchen units (DKU)	Domestic kitchen units	**Specification:** to be described for each item 1–9 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenanc task schedules to the components included in scope. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of domestic kitchen fittings and equipment, as appropriate.
				2 Sinks, taps, waste fittings and waste disposal units where supplied as part of the kitchen fitting installation.	Sinks, taps, etc.	Sinks, taps, etc.	
				8 Kitchen equipment suites (i.e. comprising any combination of kitchen appliances items 3–7).	(Covered in 4.1.2.3 to 7)	T/E	
				9 Other kitchen fittings and equipment.	Other kitchen fittings and equipment	Other kitchen fittings and equipment	
				10 Delivery, unpacking, sorting, checking all components, assembling and fixing into position (including all bolts and other fixing devices).	(Included with all above items)	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Kitchen appliances: details to be stated.	nr	**3** Ovens, cookers, hobs, grills, microwaves, etc.	Catering equipment	Catering equipment	Refurbish: to include removal of existing, preparation and refurbishing of domestic kitchen fittings and equipment, as appropriate. **Maintain actions** Planned: applicable kitchen appliance checks and health and safety assessments, etc. Proactive: visual inspection of domestic kitchen fittings and equipment. Reactive: minor repairs identified by inspections or reactive requests. N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of FFE are to be itemised.
				4 Refrigerators, freezers, etc.	Refrigerators/ freezers	Refrigeration	
				5 Dishwashers.	Dishwashers	Dishwashers	
				6 Clothes washing machines, clothes dryers, ironing cabinets, etc.	White goods	White goods	
		3 Waste bins, towel rails, storage racks and other accessories: details to be stated.		**7** Waste bins, towel rails, storage rails and other accessories.	Waste bins, towel rails, etc.	N/A	
			item	**11** Sundry items: planned inspections of domestic kitchen fittings and equipment.	Actions arising from planned inspections	Planned inspection	
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on cost	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.3	Special-purpose fittings, furnishings and equipment. **Definition:** fittings, furnishings and non-mechanical or non-electrical equipment fixed to the building fabric or provided loose within the building. These are 'special' in the sense that they are designed for the particular purpose(s) of the building and are likely to be obtained from a specialist supplier or specialist contractor for use within the building.	**1** Fittings: details to be stated.	nr/ (item)	**1** Furnishings, fittings and non-mechanical or non-electrical equipment designed specifically for a particular type of building, such as: • agricultural, fishing and forestry buildings • communications, power supply, mineral supply and water supply buildings • defence, police, prison and fire service buildings • educational buildings, including workbenches, blackboards and gymnasia equipment • entertainment buildings, community centres and clubs, including bars • factories, industrial buildings for food, drink, chemicals, engineering, textiles, etc. • hospitals, dentist, medical, welfare and animal welfare buildings • laundry	Special-purpose fittings, furnishings and equipment (SFFE) Note: state specific FFE types for each particular building function	Special-purpose fittings, furnishings and equipment (SFFE)	**Specification:** to be described for each item 1–2 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. SFFE: included in special purpose fittings, furnishings and equipment. Note: details to be stated to define the special-purpose fittings, furnishings and equipment as applicable for specific types of buildings or functions (e.g. laboratory equipment). (item): unit of measurement for maintain.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr/ (item)	• rail, road, water and air transport buildings and terminals • record offices, museums, galleries and zoos • religious and funerary buildings, including seating • restaurants, snack bars, public houses and libraries • scientific research buildings, including laboratory workbenches • shops, showrooms, stores and shopping centres • special residential buildings, hotels and elderly care homes • sports buildings, swimming pools, marinas and stadia • warehouses.			**Renewal actions** Replacement: to include removal of existing, preparation and replacement of special-purpose fittings, furnishings and equipment, as appropriate. Major repairs: to include preparation, repair and making good of special-purpose fittings, furnishings and equipment, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of special-purpose fittings, furnishings and equipment, as appropriate. Redecoration: to be described and identified with the renewal work item, as appropriate.
				2 Other special-purpose fittings, furnishings and equipment.	(Other SFFE – state types)	(SFFE)	
				3 Delivery, unpacking, sorting, assembling and fixing into position (including all bolts and other fixing devices).	(Included with all above items)	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**4** Sundry items: planned inspections of SFFE.	Actions arising from planned inspections	Planned inspection	**Maintain actions** Planned: in accordance with special-purpose fittings, furnishings or equipment manufacturer's recommendations. Proactive: visual inspection of special-purpose fittings, furnishings and equipment. Reactive: minor repairs identified by visual checks or arising from reactive requests. N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of SFFE are to be itemised.
			note	**5** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.4	Signs/notices. **Definition:** directories, notice boards, letters, signs, plaques, symbols and emblems of all kinds for identification and directional purposes within or attached to the building.	**1** Component: details to be stated.	nr/ (item)	**1** Directional signboards.	Directional signboards	Signs and notices (SN)	**Component specifications:** to be described for each item 1–7, in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component included. SN: included in signs and notices. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of signs/ notices, as appropriate. Major repairs: to include preparation, repair and making good of signs/ notices, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of signs/ notices, as appropriate.
				2 Notice boards, white boards, etc.	Notice/white boards	(SN)	
				3 Sign writing.	Sign writing	(SN)	
				4 Shop front lettering, emblems and symbols.	Shop front lettering	(SN)	
				5 Door or floor numbering or lettering.	Door/floor numbering	(SN)	
				6 Nameplates, plaques and identification symbols.	Nameplates, plaques, etc.	(SN)	
				7 Lettering emblems and other identification/directional symbols carved into stone.	Lettering emblems	(SN)	
				8 Delivery, unpacking, sorting, checking all components, assembling and fixing into position (including all bolts and other fixing devices).	(Included with all above items)	N/A	
			item	**9** Sundry items: planned inspections of SN.	Actions arising from planned inspections	Planned inspection	
			note	**10** Work undertaken by subcontractors: on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: normally covered by safety checks. Proactive: visual inspection of signs/notices. Reactive: minor repairs identified by inspections or reactive requests. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspection of signs and notices to be itemised. N/A: not applicable to renewal and/or maintain work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.5	Works of art. **Definition:** objects d'art and other ornamental and decorative features within or attached to the building.	**1** Objects d'art and other ornamental features: details to be stated.	nr	**1** Objects d'art and other ornamental features.	Excluded from NRM 3	Excluded from NRM 3	**Excluded:** objects d'art and other ornamental features (as not normally a maintain or renewal work item). **Renewal actions** N/A: works of art are excluded from NRM 3 as they are not normally part of building maintenance works. **Maintain actions** N/A: not normally maintenance works. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of fish tanks are to be itemised.
				3 Fish tanks, including fish tanks set into internal walls and partitions.	Fish tanks	Fish tanks	
				4 Delivery, unpacking, sorting, checking all components, assembling and fixing into position (including all bolts and other fixing devices).	Included with all above items	N/A	
		2 Decorative features and panels: details to be stated.	nr	**2** Decorative features, including panels.	Decorative features	N/A	
			item	**5** Sundry items: planned inspections of fish tanks.	Actions arising from planned inspections	Planned inspection	
			note	**6** Work undertaken by subcontractors: on costs (where applicable).	Subcontractor on costs	Subcontractor on cost	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.6	Non-mechanical and non-electrical equipment. **Definition:** non-mechanical and non-electrical equipment for use within or to enter the building.	**1** Equipment: details to be stated.	nr/ (item)	**1** Removable disabled access equipment.	Disabled access equipment	Disabled access equipment	**Specification:** to be described for each item 1–3 in order to apply the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component included in scope. Note: other non-mechanical and non-electrical equipment: types to be stated. (item): unit of measurement for maintain. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of non-mechanical and electrical equipment, as appropriate. Major repairs: to include preparation, repair and making good of non-mechanical and electrical equipment, as appropriate.
				3 Other non-mechanical and non-electrical equipment.	Non-mechanical/ electrical equipment	Non-mechanical/ electrical equipment	
				4 Delivery, unpacking, sorting, checking all components, assembling and fixing into position (including all bolts and other fixing devices).	Included with all above items	N/A	
			item	**5** Sundry items: planned inspections of equipment.	Actions arising from planned inspections	Planned inspection	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on cost	
		2 Removable ladders, etc.: details to be stated.	nr	**2** Removable ladders, etc.	Ladders, etc.	Ladders, etc.	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: PPM on applicable non-mechanical and electrical equipment. Proactive: visual inspection of non-mechanical and electrical equipment. Reactive: minor repairs identified by inspections or reactive requests. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of equipment to be itemised. N/A: not applicable to renewal and/or maintain work.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.7	Internal planting. **Definition**: natural and artificial planting in internal environments, including containers.	**1** Plant and shrub beds: details to be stated.	nr/m^2	**2** Planting container-grown plants.	Internal planting (IP)	Internal planting (IP)	Note: may be part of a soft landscaping work package. IP: included as part of internal planting. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of internal planting, as appropriate. Major repairs: not applicable to internal planting. **Maintain actions** Planting: covered by internal planting regime. Proactive: visual inspection of internal planting. Reactive: minor repairs identified by inspections or reactive requests. **M1** Where components are to be enumerated, the number of components is to be stated.
				3 Planting shrubs.	(IP – shrubs)	(IP)	
				5 Plant containers that are an integral part of the building fabric, including drainage layers, separation layers, capillary matting and wicks, compost, hydro-culture supporting medium and nutrients.	(IP – plant containers)	(IP)	
				7 Watering, feeding and maintenance during the defects liability period (or period for rectifying defects, or the maintenance period, as appropriate).	N/A	Plant maintenance	
				8 Replacement planting.	(IP – replacement plants)	N/A	
				9 Artificial plants, preserved plants, etc., including fixing medium and covering medium for artificial plants.	IP – artificial plants)	N/A	
			item	**10** Sundry items: planned inspections of planting.	Actions arising from planned inspections	Planned inspection	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			note	**11** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on cost	**M2** The area measured is the surface area of planting. **M3** Where measured linearly, the length measured is the extreme length, over all obstructions. **M4** Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M5** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M6** Contractor-designed work is to be described and identified separately. **M7** Planned inspections of planting are to be itemised. N/A: not applicable to renewal and/or maintain work.
		2 Plant containers: details to be stated.	nr	**1** Internal prefabricated plant and tree containers, including drainage layers, separation layers, capillary matting and wicks, compost, hydro-culture supporting medium and nutrients.	Plant containers	(IP)	
		3 Trees: details to be stated.		**4** Planting trees.	Trees	(IP)	
		4 Tree planters: details to be stated.		**6** Planting containers, etc. to roof gardens, including the planting itself.	Tree planting containers to roof gardens	(IP)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
4.1.8	Bird and vermin control. **Definition:** installations and equipment to repel, trap or otherwise control birds or vermin that may be a nuisance or danger to health.	**1** Wires, nets, traps, etc.: details to be stated.	nr	**1** Wires, nets, traps, etc.	Bird and vermin control	Bird and vermin control	**Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of bird and vermin control, as appropriate. Major repairs: to include preparation, repair and making good of bird and vermin control, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of bird and vermin control, as appropriate.
		2 Electronic and sonic systems: details to be stated.	nr	**2** Electronic and sonic systems.	Bird and vermin control	Bird and vermin control	
			item	**3** Sundry items – planned inspection of bird and vermin control measures.	Actions arising from planned inspections	Planned inspection	
			item	**4** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Planned: normally covered by pest control programme of works, as appropriate. Proactive: visual inspection of bird and vermin control. Reactive: minor repairs identified by inspections or reactive requests. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Other cost-significant components are to be described and measured by area (m^2), linear measurement (m) or enumerated (nr) separately, as appropriate. **M3** Contractor-designed work is to be described and identified separately. **M4** Planned inspections of bird and vermin control are to be itemised.

Group element 5: Services

Group element 5 comprises the following elements:

5.1 Sanitary installations

5.2 Service equipment

5.3 Disposal installations

5.4 Water installations

5.5 Heat source

5.6 Space heating and air conditioning systems

5.7 Ventilation systems

5.8 Electrical installations

5.9 Fuel installations

5.10 Lift and conveyor installations

5.11 Fire and lightning protection

5.12 Communications, security and control systems

5.13 Specialist installations

5.14 Builder's work in connection with services

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Testing and commissioning: Where testing and commissioning is required to be measured under elements 5.1–5.13, the terms should include the following works:

1 Testing includes:

(1) equipment and consumables

(2) calibration

(3) site installation tests

(4) static testing, including testing records

(5) performance testing, including performance test records

(6) fuels required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installation to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements

(3) fuels required for commissioning.

3 Setting all mechanical and electrical services and installations to work after completion of testing and commissioning (following repairs, replacement and fitting new works).

Not applicable: On the following pages 'N/A' means not applicable to renewal and/or maintain works.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals, plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Non-invasive planned inspections are included in the services section and are normally undertaken as part of the maintain (M) regime. Actions arising from servicing and planned inspections are dealt with normally as renewal (R) works when they are not covered by the maintenance minor repairs provisions.

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Element 5.1: Sanitary installations

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.1.1	Sanitary appliances. **Definition:** appliances for health, hygiene and personal washing, together with their accessories.	**1** Sanitary appliance: details to be stated.	nr	**1** WC pans and cisterns, WC suites, slop hoppers, urinals and cisterns.	WC pans and cisterns, urinals, etc.	Sanitary appliances (SA)	**Component specifications:** to be described for each item 1–13 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Excluded: showers, including drench showers. Jacuzzi baths are covered in sub-element 5.13.3. N/A: not applicable to renewal and/or maintain work. SA: included in sanitary appliances. Note: state the types of taps and valves, etc. in the supplementary list at the end of this group element. **Renewal actions** Replacement: remove sanitary appliances and replace with new modern equivalent in position, including taps, wastes, plugs, etc.
				2 Sinks, including sinks not supplied as part of the kitchen fitting installation and catering sinks not supplied as part of the catering equipment installation.	Sinks	(SA)	
				3 Wash basins, hand rinse basins and wash fountains.	Wash basins	(SA)	
				4 Bidets.	Bidets	(SA)	
				5 Baths, including bath panels and trims.	Baths	(SA)	
				6 Shower trays.	Shower trays	Showers	
				7 Shower units, including shower heads and hoses.	Shower units	Showers	
				8 Shower booster pumps.	Shower booster pumps	Shower booster pumps	
				9 Shower valves.	Shower valves	Shower valves	
				10 Drinking fountains.	Drinking fountains	Drinking fountains	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**11** Taps and waste fittings.	Tap and outlet fittings	Tap and outlet fittings	Major repairs: overhauling sanitary appliances, cleaning and carrying out repairs on the appropriate component or subcomponent parts. Removal: remove sanitary appliances and seal off services. Note: sanitary appliances are part of the SFG20 48-05 task schedule (which also includes disposal and plumbing task activities). **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable sanitary appliance items. Proactive: visual inspection of sanitary appliances. Reactive: response to call outs and carry out unscheduled minor repairs.
			12 Water saving devices.	Water saving devices	Water saving devices	
			13 Automated controls and sensors.	Control and sensors	Control and sensors	
		N/A	**14** Final connections to sanitary appliances, including: stop cocks and stop taps, and final pipeline connection from stop cocks and stop taps to taps.	N/A	N/A	
		item	**15** Sundry items: planned inspections of sanitary appliances.	Actions arising from servicing and planned inspections	Planned inspection	
	2 Testing of installations.	%	**16** Testing and commissioning: set to work.	Setting to work	Setting to work	
	3 Commissioning of installations.					
		note	**17** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Planned inspections of sanitary appliances are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.1.2	Sanitary ancillaries. **Definition:** bathroom, toilet and shower ancillaries.	**1** Fittings: details to be stated.	nr/ (item)	**1** Shower cubicles, including shower curtains and rails.	Shower cubicles	Planned inspection	**Component specifications:** to be described for each item 1–9, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Included** Item 6: paper towel dispensers need to be identified as electric or manual. Manual dispensers are covered by visual inspection. Excluded: heated towel rails are covered in sub-element 5.6.1. (item): unit of measurement for maintain. **Renewal actions** Replacement: remove sanitary fittings and replace with new modern equivalent in position (including taps, wastes, plugs etc.).
				2 Bath/shower curtain rails, screens, etc.	Curtain rail/ screens	Planned inspection	
				3 Grab/support rails.	Grab/support rails	Planned inspection	
				4 Towel rails and holders (not connected to a heating or hot water supply installation).	Towel rails	Planned inspection	
			nr	**5** Hand dryers, including final connection to services.	Hand dryers	Hand dryers	
				6 Paper towel dispensers, toilet paper holders, waste bins, soap dispensers and holders.	Paper towel dispensers	Paper towel dispensers	
				7 Sanitary incinerators (i.e. sanitary towel disposal).	Sanitary incinerators	Sanitary incinerators	
				8 Sanitary macerators.	Macerators	Macerators	
				9 Other sanitary fittings (to be stated).	Other sanitary fittings	Other sanitary fittings	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**10** Sundry items: planned inspections of sanitary ancillaries.	Actions arising from servicing and planned inspections (include with item)	Planned inspection	Major repairs: overhaul sanitary fittings, clean and carry out repairs on the appropriate component or subcomponent parts. Refurbish: existing sanitary ancillaries, as appropriate. Removal: remove sanitary fittings/ancillaries and make good. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable sanitary ancillaries Proactive: visual inspection of various sanitary ancillaries. Reactive: respond and carry out unscheduled minor repairs. (PI): included with planned visual inspections of sanitary ancillaries.
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
			%	**12** Testing and commissioning: set to work.	(Included in item)	(Included in item)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Planned inspections of sanitary appliances are to be itemised.

Element 5.2: Service equipment

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.2.1	Service equipment. **Definition:** service equipment designed for use on a communal or commercial scale.	**1** Service equipment: details to be stated	nr	**1** Catering equipment designed for use in provision of food and drink on a communal or commercial scale.	Catering equipment (CE)	Catering equipment (CE)	**Component specifications:** to be described for each item 1–4, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. CE: to be included as part of catering equipment. **Renewal actions** Replacement: remove service equipment, replace with new modern equivalent in position (including taps, wastes, plugs and adjusting supply and waste pipework, etc.) and make good. Major repairs: overhaul service equipment including cleaning and carrying out repairs on the appropriate component or subcomponent parts.
				2 Sinks supplied as an integral part of catering equipment.	Sinks (part of CE)	(CE)	
				3 Food storage equipment.	Food storage equipment	Food storage equipment	
				4 Other free-standing/fixed mechanical and electrical equipment in: • hospital, dentist, medical, welfare and animal welfare buildings • entertainment buildings, community centres and clubs • sports buildings, swimming pools, marinas and stadia • religious and funerary buildings • educational buildings • scientific research buildings	Other service equipment (to be stated)	Other service equipment (to be stated)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	• rail, road, water and air transport buildings and terminals • special residential buildings, hotels and elderly care homes • agricultural, fishing and forestry buildings • communications, power, mineral and water supply buildings • laundry (including ironing machines, steam presses, tumble driers, washer extractors and washing machines • factories and industrial buildings for food, drink, chemicals, engineering, textiles, etc. • shops, showrooms, stores, shopping centres and warehouses • defence, police, prison and fire service buildings • restaurants, snack bars and public houses • libraries, record offices, museums, galleries and zoos.			Refurbish: overhaul and refurbish component parts. Removal: remove sanitary equipment and make good. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable service equipment. Proactive: visual inspection of service equipment; various. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**5** Sundry items: planned inspections of service equipment.	Actions arising from servicing and planned inspections	Planned inspection	**M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Other free-standing service equipment applicable to the facility type is to be identified and described separately, as appropriate. **M5** Planned inspections of service equipment are to be itemised.
		2 Testing of installations. **3** Commissioning of installations.	%	**6** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Element 5.3 Disposal installations

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.3.1	Foul drainage above ground. **Definition:** piped foul water drainage systems from sanitary appliances, sinks and kitchen appliances to the first underground drain connection.	**1** Drainage for sanitary appliances: details to be stated.	nr	**1** Waste pipes and fittings.	Foul drainage (FD)	Foul drainage (FD)	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (FD): included in foul drainage. Note: state types of pumps and valves, etc. in the supplementary listing at the end of group element 5. **Renewal actions** Replacement: remove soil and vent pipework (including all fittings and connections) and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials used.
		2 Drainage for service equipment: details to be stated.		**2** Discharge stacks and waste pipes.	(FD)	(FD)	
				3 Ventilating stacks and pipes.	(FD)	(FD)	
				4 Traps, access points, rodding eyes, collars, etc.	Traps, access points, etc.	(FD)	
				5 Prefabricated pipeline assemblies.	Pipeline assemblies	(FD)	
				6 Prefabricated floor channels and gratings, and drains in upper floor construction.	Floor channels/ gratings	Floor channels/ gratings	
				7 Sump pumps: type to be stated.	Sump pumps	Sump pumps	
			item	**8** Sundry items: planned inspections of disposal installations	Actions arising from servicing and planned inspections	Planned inspection	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		3 Testing of installations.	%	**9** Testing and commissioning: set to work.	(Included in items above)	(FD)	Minor new works: to be described and identified separately. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable foul drainage components above ground. Proactive: visual inspection of foul drainage above ground. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately.
		4 Commissioning of installations.					
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Planned inspections of disposal systems to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.3.2	Chemical, toxic and industrial liquid waste drainage. **Definition:** separate piped waste disposal systems where the waste needs special treatment or separate storage before disposal from appliance or equipment to external face of the external wall of the building.	**1** Drainage for appliance or equipment: details to be stated.	nr	**1** Distribution pipelines and fittings, including glass drainage.	Pipework systems	Pipework systems	**Component specifications:** to be described for each item 1–15, in order to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Note: state the types of pumps, valves and controls in the supplementary listing at the end of group element 5. N/A: not applicable to renewal and/or maintain work. **Renewal actions** Replacement: remove chemical, toxic and industrial liquid waste drainage, including all fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials used.
				2 Traps, access points, rodding eyes, collars, etc.	Traps, access points and rodding eyes	Traps, access points and rodding eyes	
				3 Gullies.	Gullies	Gullies	
			N/A	**4** Connections to tanks, etc.	Connections to tanks	N/A	
			nr	**5** Storage tanks and vessels.	Storage tanks and vessels	Storage tanks and vessels	
				6 Settlement tanks.	Settlement tanks	Settlement tanks	
				7 Effluent treatment plant.	Effluent treatment plant	Effluent treatment plant	
				8 Dosing equipment.	Dosing equipment	Dosing equipment	
				9 Sterilisation equipment.	Sterilisation equipment	Sterilisation equipment	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**10** Supports integral to the storage tanks and vessels, settlement tanks, etc.	Supports for storage tanks and vessels	N/A	Minor new works: to be described and identified separately. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable disposal components. Proactive: visual inspection of chemical, toxic and industrial liquid installations; various. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately.
			11 Thermal insulation.	Thermal insulation	Thermal insulation	
		N/A	**12** Connections to equipment.	(Included in item)		
		nr	**13** Control components located externally.	Control components located externally	Controls	
			14 Monitoring equipment located externally.	Monitoring equipment located externally	Monitoring equipment located externally	
			15 Painting, anti-corrosion treatments and coating systems for drainage pipelines.	Painting/ anti-corrosion treatments	Painting/ anti-corrosion treatments	
		item	**16** Sundry items: planned inspections of chemical, toxic and industrial liquid waste drainage.	Actions arising from servicing and planned inspections	Planned inspection	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**17** Testing and commissioning: set to work.	(Included in item)	(Included in item)	**M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Planned inspections are to be itemised.
		3 Commissioning of installations.					
			note	**18** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.3.3	Refuse disposal. **Definition:** refuse chutes, incineration plant, etc.	**1** Refuse disposal installations: details to be stated.	nr	**1** Refuse input devices.	Refuse input devices	Refuse collection and disposal equipment (RCDE)	**Component specifications:** to be described for each item 1–8, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (RCDE): included in refuse collection and disposal equipment. **Renewal actions** Replacement: remove refuse disposal, including all fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Refuse chutes and ducts.	Refuse chutes and ducts	(RCDE)	
				3 Plant for the compacting/ macerating of refuse ready for collection.	Plant for compacting/ macerating of refuse	(RCDE)	
				4 Refuse collection equipment, including bins and continental bins.	Refuse collection equipment	(RCDE)	
				5 Incineration plant and ancillaries, including refuse and waste handling equipment, afterburners, proprietary metal chimney and flues, and ash handling equipment.	Incineration plant	Incineration plant	
				6 Paper shredders.	Paper shredders	(RCDE)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**7** Safety devices.	Safety devices	Safety devices	Planned: PPM on applicable disposal components. Proactive: visual inspection of disposal installation; various. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately **M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Planned inspections are to be itemised.
				8 Painting/anti-corrosive treatments.	Painting/ anti-corrosion treatment	N/A	
			N/A	**9** Final connection to services.	Actions arising from servicing and planned inspections	N/A	
			item	**10** Sundry items: planned inspections of refuse disposal installations.	Actions arising from servicing and planned inspections	Planned inspection	
		2 Testing of installations.	%	**11** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Element 5.4: Water installations

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.4.1	Mains water supply. **Definition:** piped water supply systems from point of entry into building to appliance or equipment.	**1** Mains water supply: details, including the number of draw-off points (nr), to be stated.	nr/m²	**1** Pipelines and pipeline fittings.	Pipework systems	Pipework systems	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Note: state specific types of pumps and valves in the supplementary listing at the end of group element 5. N/A: not applicable to renewal and/or maintain work. Included: rising mains may require a booster pump; pumps to be measured under sundry items. **Renewal actions** Replacement: remove installations, including all fittings and connections, and replace with new modern equivalent in position.
			nr	**2** Valves: type to be stated.	Valves	Valves	
				3 Water meters (internal).	Water meters, internal	Meters	
				4 Rising main to storage tanks.	Rising main to storage tanks	(Included in pipework systems)	
				5 Water meters, where not provided as part of water mains supply and installation by the statutory undertaker.	Water meters	N/A	
			nr/m²	**6** Trace heating.	Trace heating	Trace heating	
				7 Thermal insulation.	Thermal insulation	Thermal insulation	
			item	**8** Sundry items: planned inspections of mains water supply.	Actions arising from servicing and planned inspections	Planned inspection	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	2 Testing of installations.	%	**9** Testing and commissioning: set to work.	(Included in item)	(Included in item)	Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately. Proactive: visual inspection of water installations. Reactive: respond and carry out unscheduled minor repairs. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on the applicable water installations. **M1** Where components are to be enumerated, the number of components is to be stated.
	3 Commissioning of installations.					
		note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Where more than one system is employed, the area served by each system is to be measured separately. Areas are to be measured using the rules of measurement for ascertaining the GIFA. **M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M4** Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing/set ting to work are to be applied to the total costs of the items comprising the sub-elements. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M6** Planned inspections of water systems to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.4.2	Cold water distribution. **Definition:** piped water supply systems to distribute cold water from point of storage to user point. Internal rainwater harvesting systems and piped water supply systems to distribute cold water from point of storage, including storage tanks, to user point.	**1** Cold water distribution: details, including the number of draw-off points (nr), to be stated.	nr/m^2	**1** Cold water distribution pipelines to sanitary appliances, sinks, equipment, etc., including fittings.	Cold water distribution pipelines	Pipework systems	**Component specifications:** to be described for each item 1–13, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Note: state specific types of pumps and valves, etc. in the supplementary listing at the end of group element 5. **Renewal actions** Replacement: remove installation, including all fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately.
			nr	**2** Valves.	Valves	Valves	
				3 Water saving devices.	Water saving devices	Water saving devices	
				4 Taps, where not part of a sanitary appliance or service equipment.	Taps	Taps	
				5 Pumps: type to be stated.	Pumps	Pumps	
				6 Pressurisation expansion units (expansion vessels).	Pressurisation expansion units	Pressurisation expansion units	
				7 Pressure booster sets.	Pressure booster sets	Pressure booster sets	
		2 Storage tanks: details, including type, material and capacity, to be stated.		**8** Water storage tanks and cisterns (details of tank size and capacity (litres) to be stated).	Cold water storage tanks and cisterns	Cold water storage tanks and cisterns	
			nr/m^2	**9** Trace heating.	Trace heating	Trace heating	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**10** Instrumentation and control components for cold water distribution systems.	Instrumentation and control	Instrumentation and control	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable water installation components. Proactive: visual inspection of water installations. Reactive: respond and carry out unscheduled minor repairs. **M1–M5** measurement rules are the same as sub-element 5.4.1. Note: sprinkler booster sets are covered in sub-element 5.11.2. Note: water meters and water economy valves are components that are normally included as subcomponents for maintain works.
		nr/m^2	**11** Thermal insulation.	Thermal insulation	Thermal insulation	
	3 Rainwater harvesting systems: details to be stated.	nr	**12** Rainwater harvesting systems (internal), including collection pipelines.	Rainwater harvesting systems	Rainwater harvesting systems	
	3a Grey water collection pipe systems: details to be stated.	nr	**13** Grey water collection pipe systems (internal), including collection pipelines.	Grey water collection systems	Grey water collection systems	
		item	**14** Sundry items: planned inspections of cold water distribution system.	Actions arising from servicing and planned inspections	Planned inspection	
	4 Testing of installations.	%	**15** Testing and commissioning/ set to work.	(Included in item)	(Included in item)	
	5 Commissioning of installations.					
		note	**16** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.4.3	Hot water distribution. **Definition:** piped water systems to distribute hot water to sanitary appliances, sinks, equipment and other appliances, and to distribute mixed water to water heaters and equipment.	**1** Hot water distribution: details, including the number of draw-off points (nr), to be stated.	nr/m²	**1** Hot water distribution pipelines to sanitary appliances, sinks, equipment, etc., including fittings.	Hot water distribution pipelines	Hot water systems (vented or unvented	**Component specifications:** to be described for each item 1–14, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Note: state specific types of pumps, taps and valves, etc. in the supplementary listing at the end of group element 5. **Included** Trace heating to include frost protection. Water softeners should state relevant type. **Renewal actions** Replacement: remove installation, including all fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
			nr	**2** Valves: type to be stated.	Valves	Valves	
				3 Water saving devices.	Water saving devices	Water saving devices	
				4 Taps, where not part of a sanitary appliance or service equipment (see the supplementary listing).	Taps	Taps	
				5 Pumps: type to be stated.	Pumps	Pumps	
				6 Heat exchangers: state type.	Heat exchangers	Heat exchangers	
				7 Storage cylinders and calorifiers.	Storage cylinders and calorifiers	Storage cylinders and calorifiers	
			nr/m²	**8** Trace heating: pipework.	Trace heating	Trace heating	
				9 Hot water storage vessels and expansion vessels (including domestic hot water system calorifiers).	Hot water storage vessels	Hot water storage vessels	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**10** Immersion heaters: state type.	Immersion heaters	Immersion heaters	Minor new works: to be described and identified separately. **Maintain actions** Note 1: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Note 2: hot water storage vessels and expansion vessels include expansion vessels, combination units and load levellers. Planned: PPM on applicable water system components. Proactive: visual inspection of water installations. Reactive: respond and carry out unscheduled minor repairs. Unit of measurement: the same as NRM 1 rules, except where specific variances are included in unit column (m^2 and nr). **M1–M5** measurement rules are the same as sub-element 5.4.1.
			11 Insulated combination units with their own feed and expansion tank.	Insulated combination units	Expansion tank	
			12 Water softeners, including ion exchange plant (commercial and domestic), magnetic water conditioners and reverse osmosis plant.	Water softeners: treatment	Water softeners	
			13 Instrumentation and control components for hot water distribution systems.	Instrumentation and controls	Instrumentation and controls	
		nr/m^2	**14** Thermal insulation.	Thermal insulation	Thermal insulation	
		items	**15** Sundry items: planned inspections of hot water distribution systems.	Actions arising from servicing and planned inspections	Planned inspection	
	2 Testing of installations.	%	**16** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**17** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.4.4	Local hot water distribution. **Definition:** systems where hot water is generated in the vicinity of the appliance being served.	**1** Water heaters: details to be stated.	nr	**1** Instantaneous water heaters (including shower heaters) and storage water heaters, including flue pipes and terminals.	Instantaneous water heaters	Instantaneous water heaters	**Component specifications:** to be described for items 1 and 2, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Wall- or floor-mounted, under-sink multipoint and over-sink units.	Under-sink, multipoint and over-sink units	Under-sink, multipoint and over-sink units	
			item	**3** Sundry items: planned inspections of local hot water distribution systems	Actions arising from servicing and planned inspections	Planned inspection	
		2 Testing of installations.	%	**4** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations					
			note	**5** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable water system components. Proactive: visual inspection of water installations. Reactive: respond to and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M4** Planned inspections are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.4.5	Steam and condensate distribution. **Definition:** steam distribution and condensate return pipelines to and from service equipment within the building.	**1** Steam and condensate distribution: details, including number of draw-off points (nr), to be stated.	nr/m^2	**1** Steam distribution pipelines to, and condensate return pipelines from, service equipment, including fittings.	Steam distribution pipeline system	Steam service pipework systems	**Component specifications:** to be described for each applicable item 1–11, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state specific types of pump sets, taps and valves in the supplementary listing at the end of group element 5. **Renewal actions** Replacement: remove installation, including all fittings and connections, and replace with new modern equivalent. Major repairs: carry out repairs to the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately.
			nr	**2** Valves, strainers pressure-reducing sets, etc.	Valves, strainers, pressure reducing sets	Valves	
				3 Steam reduction stations.	Steam reduction stations	Steam reduction stations	
				4 Condensate receivers and storage tanks.	Condensate receivers and storage tanks	Condensate receivers	
				5 Condensate pump sets.	Condensate pump sets	Condensate pump sets	
				6 Steam connection outlets.	Steam connection outlets	Steam connection outlets	
				7 Taps (where not part of service equipment).	Taps	Taps	
			N/A	**8** Heat exchangers.	Heat exchangers	Heat exchangers	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		N/A	**9** Storage cylinders and calorifiers (heated by steam).	Storage cylinders and calorifiers	Storage cylinders and calorifiers	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable water system components. Proactive: visual inspection of water installations; various. Reactive: respond and carry out unscheduled minor repairs. **M1–M5** measurement rules are all the same as sub-element 5.4.1. Included: hot wells and safety valves under sundry items. Note: Item 1: steam distribution pipelines include the traps. Item 8: heat exchangers are also included in sub-element 5.4.3. Item 9: storage cylinders/ calorifiers also included in sub-element 5.4.3.
		nr	**10** Instrumentation and control components for steam and condensate systems.	Instrumentation and controls	Instrumentation and controls	
		nr/m^2	**11** Thermal insulation.	Thermal insulation	Thermal insulation	
		item	**12** Sundry items: planned inspections of system.	Actions arising from servicing and planned inspections	Planned inspection	
	2 Testing of installations.	%	**13** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**14** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Element 5.5: Heat source

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.5.1	Heat source. **Definition:** a heat source supplying heat to one or more heating systems.	**1** Heat source: details, including output of heat source (kW), to be stated.	nr	**1** Biomass fuel boiler plant and ancillary items.	Boiler – biomass	Boiler – biomass	**Component specifications:** to be described for each applicable item 1–10 and 12–19, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components. For example: boiler gas/oil – gas-fired boiler MTHW up to 120°C or LTHW up to 95°C. Note 1: see the list of standard boiler types (included in the Building Engineering Services Association (BESA) SFG20 core library of maintenance schedules). Note 2: state the specific types of pumps, valves and controls; see the supplementary listing at the end of group element 5. Item 11: step-down calorifiers are also included with either storage vessel or exchanger in sub-element 5.4.3. Item 20: forced draft extractor is a duplication of item 17.
				2 Gas/oil-fired boiler plant and ancillary items, including burners, blow down facilities and pressurisation plant.	Boiler – gas/oil	Boiler – gas/oil	
				2a Boilers: steam (not included in NRM 1).	Boiler – steam	Boiler – steam	
				3 Coal-fired boiler plant and ancillary items, including burners, blow down facilities, coal distribution equipment, ash handling and storage equipment, grit arrestors and pressurisation plant.	Boiler – coal fired	Boiler – coal fired	
				4 Electric boiler plant and ancillaries, including blow down facilities and pressurisation plant.	Boiler – electric	Boiler – electric	
				5 Packaged steam generators and ancillaries, including blow down facilities and pressurisation plant.	Packaged steam generators	Packaged steam generators	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**6** Wood pellet boiler plant and ancillary items.	Boiler – wood pellet	Boiler – wood pellet	**Renewal actions** Replacement: remove heat source, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable heat source types, as per applicable items 1–19. Proactive: visual inspection of heat source items; various. Reactive: respond and carry out unscheduled minor repairs.
			7 Central combined heat and power (CHP) boiler plant.	Central (combined) heat and power (CHP) boiler plant	Central (combined) heat and power (CHP) boiler plant	
			8 Heat pumps, including domestic air-to-water heat pumps: type to be stated (see the supplementary listing).	Heat pumps	Heat pumps	
			9 Ground source heating (GSH), including boreholes and all ancillary components (including closed-loop and open-loop systems).	Ground source heating	Ground source heating	
			10 Water or steam mains, pumps, valves and other equipment from district heating systems.	Pumps, valves	Pumps, valves	
			11 Step-down/non-storage calorifiers connected to external heat source.	Step down/ non-storage calorifiers	Non-storage calorifiers	
			12 Building-mounted solar thermal panels.	Solar thermal panels	Solar thermal panels	
			13 Other heat sources (e.g. air source heating).	Other heat sources	Other heat sources	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**14** Water tanks (i.e. header tanks), including cold water distribution to heat source.	Water tanks	Tanks	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work.
			15 Vibration isolation mountings.	Vibration isolation mountings	N/A	
			16 Instrumentation and control components for heat source.	Instrumentation and controls	Instrumentation and controls	
			17 Forced draft fans.	Forced draft fans	Fans	
			18 Gantries.	Gantries	Gantries	
			19 Chimneys and flues (where not part of the building).	Chimneys and flues	Flues	
			20 Forced draft extractors.	(Covered in item 17)	(Covered in item 17)	
		item	**21** Sundry items: planned procedures for the system.	Actions arising from servicing and planned inspections	Planned procedures	
	2 Testing of installations.	%	**22** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**23** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Element 5.6: Space heating and air conditioning systems

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.1	Heat source. **Definition:** systems where heating is generated at a central point and distributed to the spaces and/or locations being treated.	**1** Central heating systems: details to be stated.	m^2/(nr)	**1** Heating systems from, including everything within, the plant room specifically related to the heating system, excluding the heat source (including domestic heating and hot water systems).	Central heating system	Central heating system	**Component specifications:** to be described for each item 1–23, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Note: state specific types of pumps, valves, ductwork, etc. in the supplementary listing at the end of group element 5. Item 12, distribution pipelines and fittings, and item 16, AHU, are excluded as these items are covered by sub-element 5.7.1. CS: included in convection systems. (nr): unit of measurement for maintain systems.
				2 Heat distribution pipelines from heat source to heat emitter or other equipment.	Pipework systems	Pipework systems	
				3 Heating emission units, such as: • heat emitters • skirting heaters (e.g. natural convectors and perimeter skirting heaters) • radiant strip heater systems • radiator systems • natural convectors • fan convectors • unit heaters • radiators • convector heaters • continuous convectors.	Heat emission units	Heat emission units	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2/(nr)	**4** In-screed embedded pipelines (i.e. underfloor heating).	Underfloor heating	Underfloor heating	**Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately. **Maintain actions** Note 1: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable central heating systems. Proactive: visual inspection of central heating systems; various. Reactive: respond and carry out unscheduled minor repairs.
			5 Heated ceiling panels.	Heated ceiling panels	Heat emitters	
			6 Warm air heating.	Warm air heating	Heat emitters	
			7 Convection systems.	Convection systems	Heat emitters	
			8 Fan-assisted convection systems, including underfloor systems.	Convection systems	Heat emitters	
			9 Cable heating systems.	Cable heating systems	Cable heating systems	
			10 Plenum air heating system.	Plenum air heating system	Plenum air heating system	
			11 Off-peak heating system, including storage radiators.	Off-peak heating system	Off-peak heating system	
		N/A	**12** Distribution pipelines and pipeline fittings.	(Covered in sub-element 5.7.1)	(Covered in sub-element 5.7.1)	
		nr	**13** Heated towel rails (where an integral part of a heating system).	Heated towel rails	Heat emitters	
			14 Valves and fittings: type to be stated.	Valves	Valves	
		m^2/nr	**15** Ductwork.	Ductwork	Ductwork	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		T/E	**16** Air handling equipment.	(Covered in 5.7.1)	(Covered in 5.7.1)	**M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA. **M2** Where more than one system is employed, the area served by each system is to be measured separately. **M3** Where components are to be enumerated, the number of components is to be stated. **M4** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, should be stated.
		nr	**17** Grilles, fans, filters and other ancillary components of central heating systems.	Grilles, etc.	Grilles and diffusers	
			18 Plate recuperator.	Plate recuperator	Plate recuperator	
			19 Thermal wheel – rotary recuperator.	Thermal wheel	Thermal wheel	
			20 Duct heater battery – electric.	Duct heater battery – electric	Duct heater battery – electric	
		m^2/(nr)	**21** Cables.	Cables	Cables	
			22 Instrumentation and control components for heating systems.	Instrumentation and control components	Instrumentation and control components	
			23 Thermal insulation.	Thermal insulation	Thermal insulation	
		item	**24** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations	%	**25** Testing and commissioning: set to work.	(Included in item)	(Included in item)	**M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing/setting to work are to be applied to the total cost of the items comprising the sub-elements. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M7** Planned procedures are to be itemised.
		3 Commissioning of installations.					
			note	**26** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.2	Local heating systems. **Definition:** systems where heating is generated in or adjacent to the spaces or locations being treated.	**1** Heaters: details to be stated.	nr	**1** Room heaters or fires, with or without boilers.	Room heaters or fires	Heat emitters	**Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state specific types of controls components in the supplementary listing at the end of this group element table. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately.
				2 Chimneys and flues, where not part of the building structure (e.g. proprietary chimneys and flue pipes).	Chimneys and flues	Flues	
				3 Instrumentation and control components for heating systems.	Instrumentation and control	Instrumentation and control	
			item	**4** Sundry items: planned procedures for local heating.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**5** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Maintain actions Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable local heating systems. Proactive: visual inspection of local heating systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M5** Planned procedures are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.3	Central cooling systems. **Definition:** systems where cooling is performed at a central plant and distributed to the spaces and/or locations being treated.	**1** Central cooling systems: details to be stated.	m^2/(nr)	**1** Chilled beams.	Chilled beams	Chilled beams	**Component specifications:** to be described for each item 1–17, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state types of pumps, valves and ductwork, etc. in the supplementary listing at the end of group element 5. (nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. Minor new works: to be described and identified separately.
				2 Fan coil systems for cooling only.	Fan coil systems	Terminal units – fan coils	
				3 Air-based systems – variable air volume (VAV) for cooling only.	VAV cooling systems	Terminal units – VAV	
				4 Variable refrigerant volume (VRV) systems	VRV systems	Terminal units – VRV	
			nr	**5** Chillers and packaged chillers.	Chillers	Chillers	
				6 Central refrigeration plant.	Central refrigeration plant	Refrigeration distribution system	
				7 Cooling towers, including adiabatic coolers.	Cooling towers	Cooling towers	
			m^2/(nr)	**8** Distribution pipelines and pipeline fittings.	Pipework systems	Pipework systems	
				9 Cold and treated water feeds.	Cold and treated water feeds	Pipework systems	
			nr	**10** Valves: type to be stated.	Valves	Valves	
				11 Pumps: type to be stated.	Pumps	Pumps	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2/(nr)	**12** Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Distribution ductwork and fittings	Distribution ductwork and fittings	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable central cooling systems. Proactive: visual inspection of central cooling systems. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA.
		nr	**13** Grilles, fans, filters and other ancillary components of central cooling systems.	Grilles, fans, filters and diffusers, etc.	Grilles, fans, filters and diffusers, etc.	
			14 Air handling units (AHUs).	Air handling units	Air handling units	
			15 Emission units, including fan coil units, chilled beam, etc.	Emission units	(Included with terminal units)	
			16 Instrumentation and control components for central cooling systems.	Instrumentation and controls	Instrumentation and controls	
		m^2/(nr)	**17** Thermal insulation.	Thermal insulation	Thermal insulation	
		item	**18** Sundry items: planned procedures to system.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**19** Testing and commissioning: set to work.	(Included in item)	(Included in item)	**M2** Where components are to be enumerated, the number of components is to be stated. **M3** Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing/setting to work are to be applied to the total cost of the items comprising the sub-elements. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work.
		3 Commissioning of installations.					
			note	**20** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.4	Local cooling systems. **Definition**: systems where cooling is performed in or adjacent to the spaces or locations to be treated.	**1** Cooling units: details to be stated.	nr	**1** Local cooling units, including those with remote condensers.	Local cooling units	Air conditioning units	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state types of pumps, valves, fans and ductwork etc. in the supplementary listing at the end of group element 5. (m^2): unit of measure for some maintain items. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
			nr/(m^2)	**2** Distribution pipelines and pipeline fittings.	Pipework systems	Pipework systems	
			nr	**3** Valves: type to be stated.	Valves	Valves	
			nr/(m^2)	**4** Distribution ductwork and ductwork fittings.	Ductwork system	Ductwork system	
			nr	**5** Grilles, fans, filters and other ancillary components of local cooling systems.	Grilles, fans, filters and diffusers, etc.	Grilles, fans, filters and diffusers, etc.	
				6 Instrumentation and control components for local cooling systems.	Instrumentation and controls	Instrumentation and controls	
			nr/(m^2)	**7** Thermal insulation.	Thermal insulation	Thermal insulation	
			item	**8** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	2 Testing of installations.	%	**9** Testing and commissioning: reset to work.	(Setting to work include in items)	(Included in item)	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable local cooling systems. Proactive: visual inspection of local cooling systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA.
	3 Commissioning of installations.					
		note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M4** Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.5	Central heating and cooling systems. **Definition:** combined systems where heating and cooling are performed at a central point and distributed to the spaces and locations being treated.	**1** Combined central heating and cooling systems: details to be stated.	m^2/(nr)	**1** Fan coil systems for heating and cooling.	Fan coil units 1	Termination units – fan coil units 1	**Component specifications:** to be described for each item 1–14, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note 1: State types of pumps, valves, fans and ductwork, etc. in the supplementary listing at the end of this group element. Note 2: items 1 and 11 are alternative types of fan coil systems (denoted fan coil units 1 and 2). (nr): unit of measure for maintaining systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Air based systems – variable air volume (VAV) for heating and cooling.	VAV systems	Termination units – VAV systems	
				3 Reverse-cycle heat pump systems.	Reverse-cycle heat pump systems	Reverse-cycle heat pump systems	
			nr	**4** Chillers, including vapour compression chillers, absorption chillers (run using low-grade waste heat from other industrial processes), solar thermal absorption chillers, etc.	Chillers	Chillers	
			m^2/(nr)	**5** Distribution pipelines and pipeline fittings.	Pipework systems	Pipework systems	
			nr	**6** Valves: type to be stated.	Valves	Valves	
				7 Pumps: type to be stated.	Pumps	Pumps	
			$m/(nr)^2$	**8** Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Distribution ductwork and fittings	Ductwork systems	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**9** Grilles, fans, filters and other ancillary components of central heating and cooling systems.	Grilles, diffusers, fans and filters	Grilles, diffusers, fans and filters	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable central heating and cooling systems, as per items 1–14. Proactive: visual inspection of central heating and cooling systems. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA. **M2** Where more than one system is employed, the area served by each system is to be measured separately.
			10 Air handling units.	Air handling units	Air handling units	
		$m/(nr)^2$	**11** Emission equipment, including fan coil units, etc.	Fan coil units 2	Termination units – fan coil units 2	
		nr	**12** Vibration isolation mountings.	Vibration isolation mountings	N/A	
			13 Instrumentation and control components for central heating and cooling systems.	Instrumentation and controls	Instrumentation and controls	
		$m/(nr)^2$	**14** Thermal insulation.	Thermal insulation	Thermal insulation	
		item	**15** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**16** Testing and commissioning: set to work.	(Included in item)	(Included in item)	**M3** Where components are to be enumerated, the number of components is to be stated. **M4** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, should be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing/setting to work are to be applied to the total cost of the items comprising the sub-elements. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work.
		3 Commissioning of installations.					
			note	**17** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.6	Local heating and cooling systems. **Definition:** combined systems where heating and cooling are performed in or adjacent to the space to be treated.	**1** Local heating and cooling units: details to be stated.	nr	**1** Local heating and cooling units, including those with remote condensers.	Local heating and cooling units	Split systems	**Component specifications:** to be described for each item 1–9, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. Note: state specific types of pumps, valves and ductwork in the supplementary listing at the end of group element 5. (m^2): unit of measure for specific maintain items. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Distribution pipelines and pipeline fittings.	Pipelines and fittings	Pipework systems	
				3 Valves: type to be stated.	Valves	Valves	
				4 Pumps: type to be stated.	Pumps	Pumps	
			nr/(m^2)	**5** Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Distribution ductwork system	Ductwork system	
			nr	**6** Grilles, fans, filters and other ancillary components of local heating and cooling systems.	Grilles, diffusers, fans and filters	Grilles Diffusers Fans	
				7 Vibration isolation mountings.	Vibration isolation mountings	N/A	
				8 Instrumentation and control components for local heating and cooling systems.	Instrumentation and controls	Instrumentation and controls	
			nr/(m^2)	**9** Thermal insulation.	Thermal insulation	Thermal insulation	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		item	**10** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	Minor new works: to be described and identified separately. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable local heating and cooling systems. Proactive: visual inspection of local heating and cooling systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated.
	2 Testing of installations.	%	**11** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA. **M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.7	Central air conditioning systems. **Definition:** systems where air treatment is performed at a central point and air is distributed to the spaces and locations being treated.	**1** Central air conditioning systems: details to be stated.	m^2/(nr)	**1** Plenum air heating systems.	Plenum air heating systems	Plenum air heating systems	**Component specifications:** to be described for each item 1–16, to determine the appropriate reference service life and to assign the applicable planned maintenance task schedules to the component. Note: state the types of pumps, valves, and ductwork and controls in the supplementary listing at the end of group element 5. (ACS): to include VAV, multi-zone, induction and hybrid. (nr): unit of measure for maintain. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 VAV (variable air volume) and constant volume air conditioning systems.	VAV systems	Central air conditioning systems (CACS)	
				3 Dual-duct and induction air conditioning systems.	Dual-duct air induction conditioning systems	(CACS) Humidifiers	
				4 Multi-zone air conditioning systems.	Multi-zone conditioning systems	(CACS)	
				5 Induction air conditioning systems.	Induction air conditioning systems	(CACS)	
				6 Hybrid air conditioning systems (i.e. systems based on a combination of a number of other air conditioning systems).	Hybrid air conditioning systems	(CACS)	
			nr	**7** Chillers.	Chillers	Chillers	
				8 Air handling units.	Air handling units	Air handling units	
				9 Terminal units/emitters.	Terminal units/ emitters	Terminal units	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2/(nr)	**10** Distribution pipelines and pipeline fittings.	Pipelines and fittings	Pipework systems	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable central air conditioning systems. Proactive: visual inspection of central air conditioning systems. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA.
			nr	**11** Valves: type to be stated.	Valves	Valves	
				12 Pumps: type to be stated.	Pumps	Pumps	
			m^2/(nr)	**13** Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Ductwork and fittings	Ductwork system	
				14 Grilles, fans, filters and other ancillary components of central air conditioning systems.	Grilles, fans, filters and diffusers, etc.	Grilles and diffusers Fans	
				15 Instrumentation and control components for central air conditioning systems.	Instrumentation and controls	Instrumentation and controls	
				16 Thermal insulation.	Thermal insulation	Thermal insulation	
			item	**17** Sundry items: planned procedures for air conditioning system.	Actions arising from servicing and planned inspections	Planned procedures	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**18** Testing and commissioning; reset to work.	(Included in item)	(Included in item)	**M2** Where more than one system is employed, the area served by each system is to be measured separately. **M3** Where components are to be enumerated, the number of components is to be stated. **M4** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, should be stated. **M5** Contractor-designed work is to be described and identified separately.
		3 Commissioning of installations.					
			note	**19** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.6.8	Local air conditioning systems. **Definition:** systems where air treatment is performed in or adjacent to the space to be treated.	**1** Self-contained air conditioning units: details to be stated.	nr	**1** Self-contained air conditioning units providing conditioned air to rooms or areas, including units with remote condensers.	Self-contained air conditioning units	Room air conditioning units	**Component specifications:** to be described for each item 1–11, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: for pumps, valves, ductwork and controls, etc., see the supplementary listing at the end of group element 5. Air conditioning unit: to include air conditioning unit types, in-room and clean-room local air conditioning systems. (m^2): unit of measure for maintain. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position.
		2 Other local air conditioning systems: details to be stated.		**2** Separate clean-room or other local air conditioning systems requiring air management (e.g. terminal reheat and terminal heat pump air conditioning systems).	Separate clean-room or other local air conditioning systems	Room air conditioning units	
			nr/(m^2)	**3** Distribution pipelines and pipeline fittings.	Pipework systems	Pipework systems	
			nr	**4** Valves: type to be stated.	Valves	Valves	
				5 Pumps: type to be stated.	Pumps	Pumps	
			nr/(m^2)	**6** Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Ductwork system	Ductwork system	
				7 Grilles, fans, filters and other ancillary components of local air conditioning systems.	Grilles, diffusers, fans, filters	Grilles and diffusers Fans	
				8 Vibration isolation mountings.	Vibration isolation mountings	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr/(m^2)	**9** Instrumentation and control components for local air conditioning systems.	Instrumentation and controls	Instrumentation and controls	Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable local air conditioning systems. Proactive: visual inspection of local air conditioning systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated.
				10 Thermal insulation.	Thermal insulation	Thermal insulation	
				11 Air curtains (i.e. air movement systems for circulating a 'curtain' of tempered air across the dividing space between two areas of differing temperatures).	Air curtains	Air curtains	
			item	**12** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	
		3 Testing of installations.	%	**13** Testing and commissioning; reset to work.	(Included in item)	(Included in item)	
		4 Commissioning of installations.					
			note	**14** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA. **M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M4** Contractor-designed work is to be described and identified separately.

Element 5.7: Ventilation systems

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.7.1	Central ventilation systems. **Definition:** air movement systems removing vitiated air from spaces and/or supplying fresh outside air to spaces. There is no environmental control or air treatment, except filtration when required.	**1** Central ventilation systems: details to be stated.	m^2/(nr)	**1** Air extraction systems.	Air extraction systems	Fans	**Component specifications:** to be described for each item 1–11, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. Note: state types of pumps, fans and valves in the supplementary listing at the end of group element 5. (nr): unit of measurement for maintain. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Air supply and extraction systems.	Air supply and extraction systems	Fans	
				3 Extraction units/terminal units.	Extraction units/terminal units	Terminal units	
				4 Fan units.	Fan units	Fans	
				5 Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Ductwork systems	Ductwork systems	
			nr	**6** Grilles, fans, filters and other ancillary components of central ventilation systems.	Grilles, diffusers, fans and filters	Grilles and diffusers Fans	
			m^2/(nr)	**7** Distribution pipelines and pipeline fittings.	Pipeline system	Pipeline system	
			nr	**8** Valves: type to be stated.	Valves	Valves	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**9** Pumps: type to be stated.	Pumps	Pumps	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable ventilation systems. Proactive: visual inspection of ventilation system types. Reactive: respond and carry out unscheduled minor repairs. Note: state types of pumps, valves and controls in the supplementary listing at the end of group element 5. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA.
			10 Vibration isolation mountings.	Vibration isolation mountings	N/A	
			11 Instrumentation and control components for central ventilation systems.	Instrumentation and controls	Instrumentation and controls	
		item	**12** Sundry items: planned procedures for ventilation systems.	Actions arising from servicing and planned inspections	Planned procedures	
	2 Testing of installations.	%	**13** Testing and commissioning; set to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
			14 Work undertaken by subcontractors: on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Where more than one system is employed, the area served by each system is to be measured separately. **M3** Where components are to be enumerated, the number of components is to be stated. **M4** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, should be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing/setting to work are to be applied to the total cost of the items comprising the sub-elements. A single combined percentage addition can be applied to cover the costs of testing, ommissioning and setting to work. **M7** Planned procedures are to be itemised.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.7.2	Local and special ventilation systems. **Definition:** local and special air movement systems removing vitiated air from spaces and/or supplying fresh outside air to spaces. There is no environmental control or air treatment, except filtration when required.	**1** Toilet/bathroom ventilation units: details to be stated.	nr	**1** Toilet/bathroom ventilation (air movement systems for removing smells, odours and other unwanted contaminants from, or supplying fresh air to, toilet areas, e.g. packaged toilet extractor fans).	Toilet/ bathroom ventilation extractor fans	Fans	**Component specifications:** to be described for each item 1–15, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state the types of pumps, fans and valves, etc. in the supplementary listing at the end of group element 5. (m^2): unit of measure for maintaining systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
		2 Kitchen ventilation units: details to be stated.		**2** Kitchen ventilation (air movement systems for collecting, containing and removing smells, fumes and other unwanted contaminants from, or supplying fresh air to, kitchen areas), including hoods, canopies and grease filters.	Kitchen ventilation	Kitchen ventilation (ductwork cleaning)	
		3 Safety cabinet and fume cupboard extracts: details to be stated.		**3** Safety cabinet and fume cupboard extractors (air movement systems for collecting, containing, cleaning and removing smells, fumes and other unwanted contaminants), including safety cabinets and fume cupboard extractors with integral extraction.	Safety cabinet and fume cupboard extractors	Safety cabinet and fume cupboard extractors	
		4 Fume extractors: details to be stated.		**4** Fume extractors (air movement systems for collecting, containing, cleaning and removing smells, fumes and other unwanted contaminants), including hoods, canopies and valances.	Fume extractors	Fume extractors	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Dust collection units: details to be stated.	nr	**5** Dust collection, including dust and particle extraction or separation equipment, discharge stacks, hoods and collection equipment.	Dust collection unit	Dust collection unit	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable ventilation systems. Proactive: visual inspection of ventilation system types. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building).
		6 Anaesthetic gas extractors: details to be stated.		**6** Anaesthetic gas extractors (i.e. scavenging systems for the removal of anaesthetic gases).	Anaesthetic gas extractors	Anaesthetic gas extractors	
		7 Cyclone systems: details to be stated.		**7** Cyclone systems.	Cyclone system	Cyclone systems	
		8 Unit extract fans: details to be stated.		**8** Unit extract fans.	Unit extract fans	Fans	
		9 Rotating ventilators: details to be stated.		**9** Rotating ventilators.	Rotating ventilators	Fans	
		10 Roof-mounted ventilation: details to be stated.		**10** Roof-mounted ventilation units.	Roof-mounted ventilation units	Fans	
		11 Car parking ventilation: details to be stated.		**11** Car parking ventilation (i.e. air movement systems for removing fumes, smells and other contaminants of the air from car parks to the outside), including systems involving no air treatment and systems supplying fresh air to the car parking spaces.	Car parking ventilation	Car park ventilation (see fans)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		12 Other local and special ventilation units: details to be stated.	(nr)/m^2	**12** Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Ductwork systems	Ductwork systems	**M3** Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work. N/A: not applicable to renewal and/or maintain work. The area serviced is measured using the rules of measurement for ascertaining the gross internal floor area (GIFA).
			nr	**13** Grilles, fans, filters and other ancillary components of central air conditioning systems.	Grilles, fans, filters and diffusers, etc.	Grilles and diffusers Fans	
				14 Vibration isolation mountings.	Vibration isolation mountings	N/A	
				15 Instrumentation and control components to local and special ventilation systems.	Instrumentation and controls	Instrumentation and controls	
			item	**16** Sundry items: planned procedures for ventilation systems.	Actions arising from servicing and planned inspections	Planned procedures	
		13 Testing of installations.	%	**17** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		14 Commissioning of installations.					
			note	**18** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.7.3	Smoke extraction/ control. **Definition:** air movement and pressurisation systems for removing and controlling the build-up of smoke arising from a fire, and to assist in procuring the safety of personnel and in maintaining safe escape routes.	**1** Smoke extract/ control systems: details to be stated.	m^2/(nr)	**1** Automatic smoke extract systems.	Automatic smoke extraction systems	Smoke extraction/ controls	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life and to assign the applicable planned maintenance task schedules. Note: state types of fans, grilles and controls, etc. in the supplementary listing at the end of group element 5. (nr): unit of measure for maintain. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Automatic smoke compartmentalisation systems.	Automatic smoke compartment-alisation systems	Automatic smoke compartment-alisation systems	
				3 Fan units: type to be stated.	Fan units	Fans	
				4 Distribution ductwork and ductwork fittings and ancillaries, e.g. supports, hangers, access openings and dampers (control, fire and smoke).	Ductwork systems	Ductwork systems	
			nr	**5** Grilles, fans, filters and other ancillary components of smoke ventilation systems.	Grilles, diffusers, fans and filters	Grilles and diffusers Fans	
				6 Vibration isolation mountings.	Vibration isolation mountings	N/A	
				7 Instrumentation and control components for smoke ventilation systems.	Instrumentation and controls	Instrumentation and controls	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**8** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable smoke extraction systems. Proactive: visual inspection of ventilation system types. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA. **M2** Where more than one system is employed, the area served by each system is to be measured separately.
		2 Testing of installations.	%	**9** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**10** Work undertaken by subcontractors: on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Where components are to be enumerated, the number of components is to be stated. **M4** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, should be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing/setting to work are to be applied to the total cost of the items comprising the sub-elements. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. **M7** Planned procedures are to be itemised.

Element 5.8: Electrical systems

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.8.1	Electrical mains and sub-mains distribution. **Definition:** the distribution of LV electricity from (and including) the building's main switchgear panel to (and including) the area distribution boards.	**1** Electrical mains and sub-mains LV distribution: details to be stated.	m^2/(nr)	**1** Distribution of LV electricity from (and including) the building's main switchgear panel to (and including) the area distribution boards.	LV distribution	LV distribution	**Component specifications:** to be described for each item 1–9, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state the types of ancillary electrical components in the supplementary listing at the end of group element 5. (nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 HV switchgear.	HV switch gear	HV switch gear	
				3 LV switchgear and distribution boards.	LV switch gear and distribution boards	LV switch gear and distribution boards	
				4 HV and LV cables and wiring, including support components, cable trays, etc.	HV and LV cables and wiring	HV and LV cables and wiring	
				5 Conduits and cable trunking, including all fittings and support components.	Conduits and cable trunking	Conduits and cable trunking	
				6 Busbar trunking.	Busbar trunking	Busbar trunking	
				7 Earthing and bonding components.	(Covered in 5.8.6)	(Covered in 5.8.6)	
			nr	**8** Transformers.	Transformers	Transformers	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**9** Fuse pillars, base units, etc.	Fuse pillars, base units, etc.	Fuse pillars, base units, etc.	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable electrical mains and sub-mains systems. Proactive: visual inspection of electrical mains and sub-mains system types. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area served is measured using the rules of measurement for ascertaining the GIFA.
			item	**10** Sundry items: planned procedures for electrical system.	Actions arising from servicing and planned inspections	Planned procedures	
				10a Other sundry items.	Surge protection	Surge protection	
		2 Testing of installations.	%	**11** Testing and commissioning: set to work.	Electricity monitoring system	Electricity monitoring system	
		3 Commissioning of installations.					
			note	**12** Work undertaken by subcontractors: on costs.	(Included in item)	(Included in item)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M3** Where components are to be enumerated, the number of components is to be stated. **M4** Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.8.2	Power installations. **Definition:** sub-circuit power installations from sub-distribution boards terminating at socket outlets, fuse connection units and other accessories, including final connections to permanent mechanical and electrical equipment.	**1** Power installations: details to be stated.	m^2/(nr)	**1** General LV power installations.	General LV power installations	General LV power installations	(nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable power installations. Proactive: visual inspection of power installation types. Reactive: respond and carry out unscheduled minor repairs.
				2 Extra LV supply installations.	Extra LV supply installations	Extra LV supply installations	
				3 Direct current (DC) installations.	DC installations	DC installations	
				4 LV switchgear and distribution boards, where not included as part of the sub-mains distribution.	LV switchgear Distribution board	LV switchgear Distribution board	
			nr	**5** Uninterruptible power supply (UPS) installations, etc. (kW capacity to be stated).	UPS system	UPS system	
			m^2/(nr)	**6** Cables and wiring, including support components from sub-distribution boards to socket outlets, fuse connection units, etc.	Cables and wiring	Cables and wiring	
				7 Conduits and cable trunking, including all fittings and support components.	Conduits and cable trunking, etc.	Wiring and components	
				8 Earthing and bonding components.	(Covered in 5.8.6)	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2/(nr)	**9** Socket outlets, fuse connection units and other outlet accessories.	Socket outlets and fuse connection units	Socket outlets	**Component specifications:** to be described for each item 1–12 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: for specific types of electrical ancillaries, see the supplementary listing at the end of group element 5. (nr): unit of measurement for maintain system. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area serviced is measured using the rules of measurement for ascertaining the GIFA. **M2** Where more than one system is employed, the area served by each system is to be measured separately.
		N/A	**10** Final connections to equipment (e.g. boilers, kitchen and catering equipment, instantaneous water heaters, cookers and extraction terminals).	N/A	N/A	
		m^2	**11** Separate power installations for specialist mechanical and electrical equipment (e.g. for transportation systems).	Specialist power installations	Specialist power installations	
		N/A	**12** Final connections to specialist mechanical and electrical equipment where not carried out by the equipment installer.	N/A	N/A	
		item	**13** Sundry items: planned procedures for electrical system.	Actions arising from servicing and planned inspections	Actions arising from servicing and planned inspections	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	2 Testing of installations.	%(nr)	**14** Testing and commissioning reset to work: • portable appliances testing (PAT) • fixed electrical wiring testing.	PAT testing Fixed electrical wiring testing	PAT testing Fixed electrical wiring testing	**M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M4** Where components are to be enumerated, the number of components is to be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing and commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs. Socket outlets testing to be included as part of PAT testing and electrical fixing wiring tests. Note: include reset to work with respective item.
	3 Commissioning of installations.	(m^2/nr)				
		note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.8.3	Lighting installations. **Definition:** sub-circuit installations from sub-distribution boards to provide lighting.	**1** Lighting installations: details to be stated.	m^2/(nr)	**1** General internal lighting, including lighting fixed to the exterior of the building (e.g. bulkhead fittings and down lighters to soffits/external suspended ceilings).	Light fittings – general	Light fittings – general	**Component specifications:** to be described for each item 1–11, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state types of electrical ancillary components in the supplementary listing at the end of this group element. (nr): unit of measurement for maintain system. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Emergency lighting.	Emergency lighting	Emergency lighting	
				3 Lighting fixed to the exterior of the building supplied as part of the interior system.	External lighting	External lighting	
				4 LV switchgear and distribution boards, where not included as part of the sub-mains distribution.	LV switchgear and distribution boards	LV switchgear and distribution boards	
				5 Cables and wiring, including support components from sub-distribution boards to lighting points, switches, etc.	Cables and wiring	Cables and wiring	
				6 Conduits and cable trunking, including fittings and support components.	Conduits and cable trunking	Conduits and cable trunking	
			nr	**7** Earthing and bonding.	(Covered in 5.8.6)	(Covered in 5.8.6)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr	**8** Fittings to lighting points, including roses, pendants, etc.	Fittings to lighting points	Fittings to lighting points	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable lighting installations, including re-lamping of light fittings (according to lamp life hours). Proactive: visual inspection of lighting installation types. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the GIFA of the building, measured using the rules of measurement for ascertaining the GIFA.
			9 Switches, including pull cords.	Lighting switches	Lighting switches	
		m^2/nr	**10** Luminaires and lamps.	Luminaires/ lamps	Luminaires/ lamps	
		nr	**11** Lighting control equipment.	Lighting control equipment	Lighting control equipment	
		item	**12** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	
	2 Testing of installations.	%	**13** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**14** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Where more than one system is employed, the area served by each system is to be measured separately. Areas are to be measured by using the rules of measurement for ascertaining the GIFA. **M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M4** Where components are to be enumerated, the number of components is to be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.8.4	Specialist lighting installations. **Definition:** specialist or special effect internal illumination systems.	**1** Specialist lighting installations: details to be stated.	nr	**1** Illuminated display signs, lettering, emblems and symbols for information purposes, advertising, etc.	Illuminated display signs	Illuminated display signs	**Component specifications:** to be described for each item 1–14 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: for types of electrical ancillaries, see the supplementary service listing at the end of group element 5. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
			nr/m^2	**2** Studio lighting.	Studio lighting	Studio lighting	
				3 Auditorium lighting, theatre lighting, stage lighting, etc.	Auditorium lighting	Auditorium lighting	
				4 Arena lighting.	Arena lighting	Arena lighting	
				5 Operating theatres and other specialist lighting installations.	Operating theatre and other specialist lighting	Operating theatre and other specialist lighting	
				6 LV switchgear and distribution boards, where not included as part of the sub-mains distribution.	LV switchgear and distribution boards	LV switchgear and distribution boards	
				7 Cables and wiring, including support components from sub-distribution boards to lighting points, switches, etc.	Cables, wiring and supports	Cables and wiring	
				8 Conduits and cable trunking, including all fittings and support components.	Conduits and cable trunking	Conduits and cable trunking	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		nr/m²	**9** Earthing and bonding.	Covered in 5.8.6)	Covered in 5.8.6)	Planned: PPM on applicable specialist lighting, including re-lamping of lighting (according to lamp life hours). Proactive: visual inspection of specialist lighting system types. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining GIFA. **M3** Where more than one system is employed, the area measured for each system.
		nr	**10** Fittings to lighting points.	Fittings to lighting points	Fittings to lighting points	
			11 Switches, including pull cords.	Switches	Switches	
		nr/m²	**12** Luminaires and lamps.	Luminaires/ lamps	Luminaires/ lamps	
		nr	**13** Lighting gantries, etc.	Lighting gantries	Lighting gantries	
			14 Lighting control equipment.	Lighting control equipment	Lighting control equipment	
		item	**15** Sundry items: planned procedures for specialist lighting system.	Actions arising from servicing and planned inspections	Planned procedures	
	2 Testing of installations.	%	**16** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**17** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.8.5	Local electricity generation systems. **Definition:** local generation equipment for the production of electrical energy, including emergency and/or standby generator plant.	**1** Electricity generation systems: details to be stated.	nr	**1** Emergency/standby generator plant (gas, oil and dual-fuel).	Standby generator	Standby generator	**Component specifications:** to be described for items 1 and 2, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Ancillary cables and wiring, conduits and cable trunking, and controls required to connect local electricity generation systems to other systems.	Ancillary cables and wiring	Ancillary components	
			item	**3** Sundry items: planned procedures for local electricity generation system.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**4** Testing (including full-load and off-load testing) and commissioning.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**5** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable local generation systems. Proactive: visual inspection of local generation systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		Transformation devices:			Wind turbines	Wind turbines	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
		4 Wind turbines: details, including output (kW), to be stated.	nr	**1** Wind turbines, including rooftop wind energy systems.	Photovoltaic devices	Photovoltaic devices	
		5 Photovoltaic devices: details, including surface area of units (m^2) and output (kW), to be stated.	nr	**2** Photovoltaic devices, including cells, panels, modules, etc.	Solar collection devices, etc.	Solar collection devices, etc.	
				3 Solar collectors, including supporting framework (including fish plate collectors, evacuated tube collectors, etc.).	Other transformation devices	Other transformation devices	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		6 Other transformation devices: details, including output (kW), to be stated.	nr	**4** Other transformation devices.	Generators	Generators	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable transformation devices. Proactive: visual inspection of transformation device types. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work. **M4** Planned procedures are to be itemised.
				5 Generators in connection with transformation devices.	Ancillary equipment	Ancillary equipment	
				6 Ancillary cables and wiring, conduits and cable trunking, and controls required to connect transformation devices to other systems.	Actions arising from servicing and planned inspections	Planned procedures	
			item	**7** Sundry items: planned procedures for system.			
		7 Testing of installations.	%	**8** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		8 Commissioning of installations.					
			note	**9** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.8.6	Earthing and bonding systems. **Definition:** systems for the transfer of electrical current to the earth to protect personnel, buildings, structure, plant and equipment in the case of electrical fault within the electrical supply system, and also to protect against interference from electromagnetic fields and electromagnetic forces.	**1** Earthing and bonding systems: details to be stated.	m^2/(nr)	**1** Earthing and bonding cables.	Earthing and bonding cables	Earthing and bonding cables	**Component specifications:** to be described for each item 1–2, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. (nr): unit of measurement for maintain system. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Earthing and bonding components, including protective conductors, earth clamps, earth tapes, clean-earth bars, earth electrodes, earthing busbars, earth rod covers and boxing, equipotential bonding and all other ancillary components.	Earthing and bonding components	Protective conductor and earthing	
			item	**3** Sundry items: planned procedures for local electricity generation system.	Actions arising from servicing and planned inspections	Planned procedures	
			m^2/(nr)	**3a** Other sundry items, i.e. hazardous area (electrics) earthing.	Hazardous area (electrics) earthing	Hazardous area (electrics) earthing	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**4** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	Planned: PPM on applicable earthing and bonding systems. Proactive: visual inspection of earthing and bonding system types. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the GIFA of the building, measured using the rules of measurement for ascertaining the GIFA. **M2** Where more than one system is employed, the area served by each system is to be measured separately. **M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, is to be stated.
		3 Commissioning of installations.					
			note	**5** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Where components are to be enumerated, the number of components is to be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing and commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Element 5.9: Fuel installations

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.9.1	Fuel storage. **Definition:** storage tanks and vessels for storage of oil, petrol, diesel or LPG.	**1** Fuel storage: details to be stated..	nr	**1** Oil, petrol, diesel, LPG, biomass and other fuel systems.	Fuel systems (type)	Fuel systems (type)	**Component specifications:** to be described for each item 1–5, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Storage tanks and vessels not supplied in connection with heat source installations.	Fuel storage tanks and vessels	Fuel storage tanks and vessels	
				3 Proprietary supports forming an integral part of the storage tank/vessel unit.	Proprietary supports	N/A	
				4 Off-site painting/anti-corrosion treatments.	Anti-corrosion paint	N/A	
				5 Thermal insulation.	Thermal insulation	Thermal insulation	
			item	**6** Sundry items: planned procedures for fuel storage system.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations. **3** Commissioning of installation.	%	**7** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	Planned: PPM on applicable fuel storage systems. Proactive: monitor and inspect fuel storage systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA. **M3** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated.
			note	**8** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work. N/A: not applicable to renewal and/or maintain work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.9.2	Fuel distribution systems. **Definition:** piped supply systems distributing gas from point of mains supply within buildings and oil, petrol, diesel or LPG from storage tanks or vessels to user points.	**1** Piped distribution systems: details to be stated.	m^2/(nr)	**1** Gas, oil, petrol, diesel, LPG and other fuel systems.	Fuel systems (type)	Fuel systems (type)	**Component specifications:** to be described for each item 1–9, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. (nr): unit of measurement for maintain systems. Note: state types of pumps and valves as the supplementary listing at the end of group element 5. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Distribution pipelines from point of mains connection within building to user points, including pipeline ancillaries and fittings.	Pipework systems	Pipework systems	
				3 Pipeline components/ancillaries (e.g. valves and pumps – see the supplementary listing).	Pipeline components and ancillaries	Pumps and valves (see the supplementary listing).	
			item/ nr	**4** Bracketry.	Bracketry	N/A	
			nr	**5** Manifolds, local meters, gas governors, gas boosters and gas connection outlets.	Manifolds, local meters, etc.	Gas distribution components	
			m^2/(nr)	**6** Terminal control equipment.	Terminal control equipment	Terminal control equipment	
				7 Thermal insulation.	Thermal insulation	Thermal insulation	
				8 Off-site painting/anti-corrosion treatments.	Anti-corrosion paint	N/A	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2/(nr)	**9** Monitoring equipment.	Monitoring equipment	Monitoring equipment	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable fuel distribution systems. Proactive: monitor and inspect fuel distribution systems. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the total GIFA of the building, measured using the rules of measurement for ascertaining the GIFA. **M2** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated.
		item	**10** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	
	2 Testing of installations.	%	**11** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
	3 Commissioning of installations.					
		note	**12** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage additioncan be applied to cover the costs of testing, commissioning and setting to work. N/A: not applicable to renewal and/or maintain work.

Element 5.10: Lifts and conveyor installations

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.1	Lifts and enclosed hoists. **Definition:** electro-mechanical or electro-hydraulic installations for the conveyance of people, goods or equipment from one level to another in a vertical plane.	Lifts: **1** Passenger lifts: details, including capacity (i.e. number of people), speed (in m/sec), number of doors (nr), door heights (mm) and number of levels serviced (nr), to be stated.	nr	**1** Complete lift installation, including lift cars, doors and equipment, guides and counterbalances, hydraulic and lifting equipment, emergency lighting, lift alarms and telephones.	Lifts (state type)	Lifts (state type)	**Component specifications:** to be described for each item 1 and 5, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Firefighting lifts.	Firefighting lifts	Firefighting lifts	
		2 Wall-climbing lifts: details, including capacity (in kg), number of people (nr), speed (in m/sec) and number of levels serviced (nr), to be stated.		**3** Wall-climbing lifts.	Wall-climbing lifts	Wall-climbing lifts	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		3 Goods lifts: details, including the capacity (in kg), number of doors (nr), door heights (mm) and number of levels served (nr), to be stated.	nr	**4** Gantries, trolleys, blocks, hooks and ropes, down-shop leads, pendants, etc.	Gantries, trolleys, blocks, etc.	Gantries, trolleys, blocks, etc.	Planned: PPM on applicable lifts and enclosed hoists. Proactive: monitor and inspect lifts and hoists. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work. **M4** Planned procedures are to be itemised.
				5 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical works	Controls and electrical works	
			item	**6** Sundry items: planned procedures for lifts and enclosed hoists.	Actions arising from servicing and planned inspections	Planned procedures	
		4 Testing of installations.	%	**7** Testing and commissioning: reset to work.	(Include in item)	(Include in item)	
		5 Commissioning of lift installations.					
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		Enclosed hoists: **6** Enclosed hoists: details, including capacity (in kg) and number of levels (nr) serviced, to be stated.	nr	**1** Hoists, kitchen service hoists, dumb waiters, etc.	Hoists, kitchen service hoists and dumb waiters	Hoists (H)	All as per lifts above.
				2 Complete hoist installations, including cages, doors and equipment, guides and counterbalances, hydraulic and lifting equipment.	(H)	(H)	
				3 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**4** Sundry items: planned procedures for hoists.	Actions arising from servicing and planned inspections	Planned procedures	
		7 Testing of installations.	%	**5** Testing and commissioning: reset to work.	(Include in item)	(Includedin item)	
		8 Commissioning of enclosed hoist installation.					
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.2	Escalators. **Definition:** permanently fixed lifting equipment, either electro-mechanical or hydraulically operated, for the raising or lowering of people, goods or equipment.	**1** Escalators: details, including number of flights served (nr), angle of rise (in degrees), rise (m) and step width (mm), to be stated.	nr	**1** Escalators.	Escalator	Escalator	**Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Ancillary components, including under-step lighting, under-handrail lighting, balustrades, cladding to sides and soffits, and chairs.	Ancillary components	Ancillary components	
				3 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**4** Sundry items: planned procedures for escalators.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**5** Testing and commissioning: reset to work.	Included in item	Included in item	
		3 Commissioning of installations.					
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable escalators. Proactive: monitor and inspect escalators. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The rise is the distance (m) between the finished floor level at the bottom of the escalator and the finished floor level at the top of the escalator. **M3** Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.3	Moving pavements. **Definition:** electro-mechanical systems for the conveyance of people from one level to another by means of a continually moving stairway.	**1** Moving pavements: details, including length (m) and width (mm), to be stated.	nr	**1** Moving pavements.	Moving pavements	Moving pavements	**Component specifications:** to be described for each item 1–4, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The linear length measured is the extreme length.
				2 Travelators.	Travelators	Travelators	
				3 Stairlifts.	Stairlifts	Stairlifts	
				4 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls/ electrical work	
			item	**5** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**6** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable moving pavements. Proactive: monitor and inspect moving pavements. Reactive: respond and carry out unscheduled minor repairs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.4	Powered stairlifts. **Definition:** electro-mechanical systems for the conveyance of people from one place to another by means of a moving flat strip of pavement, either level or inclined to elevate from one level to another.	**1** Powered stairlifts: details to be stated.	nr	**1** Complete stairlift installations, including rails, folding rails, carriages, hinged bridging platforms, guards, drive units and signage.	Powered stairlifts	Powered stairlifts	**Component specifications:** to be described for items 1 and 2, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**3** Sundry items: planned procedures for stair lifts.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**4** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**5** Works undertaken by subcontractors (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Proactive: monitor and inspect powered stairlifts. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.5	Conveyors. **Definition:** systems for the mechanical conveyance of goods between two or more points.	**1** People conveyors: details, including length (m) and width (mm), to be stated.	nr	**1** Complete conveyor systems.	Conveyor systems	Conveyor systems	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable conveyors. Proactive: monitor and inspect conveyors. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The linear length measured is the extreme length. **M3** Contractor-designed work is to be described and identified separately.
		2 Goods conveyors: details, including length (m) and width (mm), to be stated.		**2** Specialist systems, e.g. baggage handling systems, etc.	Specialist systems (e.g. baggage handling system)	Specialist systems (e.g. baggage handling system)	
				3 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**4** Sundry items: planned procedures for conveyors.	Actions arising from servicing and planned inspections	Planned procedures	
		3 Setting to work.	%	**5** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
			note	**6** Work undertaken by subcontractors (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work. **Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.6	Dock levellers and scissor lifts. **Definition:** localised lifting systems for goods and people.	**1** Dock levellers: details, including total rise (m), to be stated.	nr	**1** Dock levellers, including canopy.	Dock levellers	Dock levellers	**Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
		2 Scissor lifts: details, including total rise (m), to be stated.		**2** Scissor lifts.	Scissor lifts	Scissor lifts	
				3 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**4** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
		3 Testing of installations.	%	**5** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		4 Commissioning of installations.					
			note	**6** Work undertaken by subcontractors (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable dock levellers and scissor lifts. Proactive: monitor and inspect dock levellers and scissor lifts. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.7	Cranes and unenclosed hoists. **Definition:** cranes and unenclosed hoists for the lifting and movement of heavy goods and equipment.	**1** Cranes: details, including design load (kN) and total rise (m), to be stated.	nr	**1** Cranes.	Cranes	Cranes	**Component specifications:** to be described for each item 1–4 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
		2 Travelling cranes: details, including design load (kN) and total rise (m), to be stated.		**2** Travelling cranes.	Travelling cranes	Travelling cranes	
		3 Unenclosed hoists: details, including total rise (m), to be stated.		**3** Unenclosed hoists and other lifting systems for materials and goods.	Unenclosed hoists and other lifting systems	Unenclosed hoists and cradles	
				4 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**5** Sundry items: planned procedures for cranes.	Actions arising from servicing and planned inspections	Planned procedures	
		4 Testing of installations.	%	**6** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		5 Commissioning of installations.					
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable cranes and hoists items. Proactive: monitor and inspect cranes and hoists. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing and setting to work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.8	Car lifts, car stacking systems, turntables, etc. **Definition:** vehicle lifting, storage and moving systems.	**1** Car lifts: details, including number of floors served (nr), to be stated.	nr	**1** Car lifts, car stacking systems, etc.	Car lifts and car stacking systems	Car lifts and car stacking systems	**Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
		2 Car stacking systems: details, including capacity (i.e. number of cars), to be stated.					
		3 Vehicle turntables.		**2** Vehicle turntables.	Vehicle turntables	Vehicle turntables	
				3 Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**4** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
		4 Testing of installations.	%	**5** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		5 Commissioning of installations.					
			note	**6** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable car lifts and car stacking systems. Proactive: monitor and inspect car lifts and stacking systems. Reactive: respond and carry out unscheduled minor repairs. **M1–M3** measurement rules are the same as sub-element 5.10.7.
5.10.9	Document handling systems. **Definition:** specialist document handling/ delivery systems, warehouse picking systems, etc.	**1** Document handling/delivery systems: details to be stated.	nr	**1a** Document handling/delivery systems.	Document handling systems	Document handling systems	**Component specifications:** to be described for each item 1 and 2, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position.
		2 Warehouse picking systems: details to be stated.		**1b** Warehouse picking systems, etc.	Warehouse picking systems	Warehouse picking systems	
		3 Other systems: details to be stated.		**2** Controls and electrical work from, and including, the isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**3** Sundry items: planned procedures.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Testing of installations.	%	**4** Testing and commissioning; reset to work.	(Included in item)	(Included in item)	Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable document handling system. Proactive: monitor and inspect document handling systems. Reactive: respond and carry out unscheduled minor repairs. **M1–M3** measurement rules are the same as sub-element 5.10.7.
		5 Commissioning of installations.					
			note	**5** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.10.10	Other transport systems. **Definition:** transport systems not covered by sub-elements 5.10.1–5.10.9.	**1** Other lift and conveyor installations: details to be stated.	nr	**1** Paternoster lifts.	Paternoster lifts	Paternoster lifts	**Component specifications:** to be described for items 1–4, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Hoists for moving people with disabilities.	Hoists for moving people with disabilities	Hoists for moving people with disabilities	
				3 Other transport systems.	Other transport systems	Other transport systems	
				4 Controls and electrical work from, and including, isolator where supplied with installation.	Controls and electrical work	Controls and electrical work	
			item	**5** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**6** Testing and commissioning; reset to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**7** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable other lift and conveyor systems, as per items 1–4. Proactive: monitor and inspect lift and conveyor systems. Reactive: respond and carry out unscheduled minor repairs. **M1–M3** measurement rules are the same as sub-element 5.10.7.

Element 5.11: Fire and lightning protection

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.11.1	Firefighting systems. **Definition:** piped distribution systems within the confines of the building for firefighting purposes.	**1** Fire hose reels: details of each type of system to be stated.	nr	**1** Fire hose reels, including hose reels and pressure booster sets.	Fire hose reel systems	Fire hose reel systems	**Component specifications:** to be described for each item 1–7 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. (nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
		2 Dry risers: details to be stated.		**2** Dry risers, including inlet breechings, inlet boxes, landing valves, outlet boxes and drain valves.	Dry risers	Dry risers	
		3 Wet risers: details to be stated.		**3** Wet risers, including landing valves, outlet boxes, pressure vessel within diaphragm, and control panels.	Wet risers	Wet risers	
		4 Fire and oxide protection curtains: details of each type of system to be stated.		**7** Fire and smoke protection curtains (e.g. drop-down curtains), including control panels.	Fire and smoke protection curtains	Fire and smoke protection curtains	
		5 Other firefighting systems: details of each type of system to be stated.	nr/m^2	**4** Distribution pipelines, pipeline ancillaries and fittings.	Pipework systems	Pipework systems	
				5 Thermal insulation.	Thermal insulation	Thermal insulation	
			nr	**6** Control components.	Control components	Control components	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**8** Sundry items: planned procedures for systems.	Action arising	Planned procedures	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable firefighting systems. Proactive: visual inspection of firefighting systems. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured using the rules of measurement for ascertaining the GIFA.
		6 Testing of installations.	%	**9** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		7 Commissioning.					
			note	**10** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Where more than one system is employed, the area served by each system is to be measured separately. **M4** Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.
5.11.2	Fire suppression systems. **Definition:** piped distribution systems within the confines of the building for fire suppression purposes.	**1** Sprinklers: details of each type of system to be stated.	m^2/(nr)	**1** Sprinklers, including reaction and control devices, and sprinkler heads.	Sprinkler system	Sprinkler system	**Component specifications:** to be described for each item 1–8 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. Note: state types of pumps, tanks, controls etc. in the supplementary listing at the end of group element 5.
		2 Deluge systems: details of each type of system to be stated.		**2** Deluge systems, including water storage, reaction and control devices, and deluge discharge nozzles.	Deluge system	Deluge system	
		3 Gas firefighting systems: details of each type of system to be stated.		**3** Gas firefighting systems, including gas storage cylinders and vessels, gas manifolds and equipment, discharge nozzles, detectors and activators.	Gas firefighting system	Gas firefighting system	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Foam firefighting systems: details of each type of system to be stated.	m^2/(nr)	**4** Foam firefighting systems, including foam generation equipment, storage vessels, detectors and activators, foam discharge nozzles, etc.	Foam firefighting system	Foam firefighting system	(nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable fire suppression systems. Proactive: visual inspection of fire suppression systems. Reactive: respond and carry out unscheduled minor repairs.
		5 Other fire suppression systems: details of each type of system to be stated.		**5** Distribution pipelines, pipeline ancillaries and fittings.	Pipework systems	Pipework systems	
			nr	**6** Water tanks and cisterns for firefighting installations.	Tanks and cisterns	Tanks and cisterns	
			m^2/(nr)	**7** Thermal insulation.	Thermal insulation	Thermal insulation	
			nr	**8** Control components.	Control components	Control components	
			item	**9** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
		6 Testing of installations.	%	**10** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		7 Commissioning of installations.					
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA. **M3** Where more than one system is employed, the area served by each system is to be measured separately. **M4** Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.11.3	Lightning protection. **Definition:** lightning protection installations.	**1** Lightning protection installations: details of each type of system to be stated.	m^2/(nr)	**1** Bonded steel frame and tape-based systems.	Lightning protection (LP)	Lightning protection (LP)	**Component specifications:** to be described for each item 1–4 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. LP: included in lightning protection. (nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable lightning protection installations.
			(nr)	**2** Finials.	Finials	(LP)	
				3 Conductor tapes.	Conductor tapes	(LP)	
				4 Grounding/earthing, e.g. tape-based systems, including lightning conductor and earth lightning protector.	Grounding/ earthing	(LP)	
			item	**5** Sundry items: planned procedures for system.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Setting to work.	%	**6** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**7** Work undertaken by subcontractors: on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Proactive: visual inspection of lightning protection installations. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA. **M2** Where more than one system is employed, the area served by each system is to be measured separately. **M3** Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Element 5.12: Communication, security and control systems

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.12.1	Communication systems. **Definition:** systems for communicating, including visual, audio and data installations.	Details of each type of system to be stated: **1** Telecommunication systems.	m^2/(nr)	**1** Telecommunication systems, including wiring, handsets and equipment, telex equipment, facsimile equipment, combined systems (e.g. PAX, PAXB and PMBX systems), etc.	Telecommunication systems	Telecommunication systems	Note: television systems include TV monitors. **Component specifications:** to be described for each item 1–16 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. (nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
		2 Data transmission systems.		**2** Data transmission systems, including wiring, computer networking, modems, multiplexers, data terminals and data-bus systems.	Data transmission systems	Data transmission systems	
		3 Paging and emergency systems.		**3** Paging and emergency call systems, including emergency call buttons, pull cords, etc.	Paging and emergency call systems	Paging and emergency call systems	
		4 Public address and conference audio systems.		**4** Public address and conference audio facilities, including public address systems, hospital radio, conference audio facilities, audio frequency induction loop systems and background noise systems (including microphones, amplifiers and speakers.	Public address and conference audio systems	Public address and conference audio systems	
		5 Radio systems.		**5** Radio, cable and satellite systems (including receivers).	Radio systems	Radio systems	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		6 Projection systems.	nr	**6** Projection systems (e.g. cinematographic equipment, fixed or portable projection equipment, screens, back-projection equipment and sound equipment).	Projection systems	Projection systems	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable communication systems. Proactive: monitor and inspect communication systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA.
		7 Fire detection and alarm systems.	m^2/(nr)	**7** Fire detection and alarm systems, including manual call points, automatic detection equipment, sounders, controls and indicator panels.	Fire detection and alarm systems	Fire detection and alarm systems	
		8 Smoke detection and alarm systems.		**8** Smoke detection and alarm systems.	Smoke detection and alarm systems	Smoke detection and alarm systems	
		9 Liquid detection systems.		**9** Liquid detection alarms (i.e. systems giving early warning of water/liquid leakage to prevent damage).	Liquid detection alarms	Liquid detection alarms	
		10 Clocks, card clocks and flexitime installations.	nr	**10** Clocks, card clocks and flexitime installations.	Clocks, card clocks, flexitime installations	Clocks	
		11 Door entry systems.	m^2/(nr)	**19** Door entry systems.	Door entry systems	Door entry systems	
		12 Radio and television systems.		**11** Radio and television systems, including cable and satellite systems.	Radios	Radios	
		13 Television systems. **14** TV monitors.	nr	**12** Television systems, including cable and satellite systems. **13** TV monitors.	Television systems TV monitors	Television systems N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		15 Pneumatic message systems.	m^2/(nr)	**14** Pneumatic message systems.	Pneumatic message systems	Pneumatic message systems	**M3** Where more than one system is employed, the area served by each system is to be measured separately. **M4** Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.
		16 Other communication systems.	m^2/(nr)	**15** Other communication systems.	Other communication systems	Other communication systems	
			item	**16** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
		17 Testing of installations.	%	**17** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		18 Commissioning of installations.					
			note	**18** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.12.2	Security systems. **Definition:** observation and access control installations, etc.	Details of each type of system to be stated: **1** Surveillance equipment.	nr/m²	**1** Surveillance equipment.	Surveillance equipment	Surveillance equipment	**Component specifications:** to be described for each item 1–8 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
		2 Security detection equipment.		**2** Security detection equipment.	Security detection equipment	Security detection equipment	
		3 Security alarm equipment.		**3** Security alarm equipment.	Security alarm equipment	Security alarm equipment	
		4 Access control systems.		**4** Access control systems.	Access control systems	Access control systems	
		5 Burglar and security alarms.		**5** Burglar and security alarms.	Burglar and security alarms	Burglar and security alarms	
		6 Door entry systems.	nr	**6** Door entry systems (audio and visual).	Door entry systems	Door entry systems	
		7 Security lights and lighting systems.	nr/m²	**7** Security lights and lighting systems.	Security lights and lighting systems	Security lights and lighting systems	
		8 Other security systems.	nr/m²	**8** Other security systems.	Other security systems	Other security systems	
			item	**9** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		9 Testing of installations. **10** Commissioning of installations.	%	**10** Testing and commissioning: set to work.	(Included in item)	(Included in item)	Planned: PPM on applicable security systems. Proactive: visual inspection of security systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA. **M3** Where more than one system is employed, the area served by each system is to be measured separately.
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Installations for residential units, hotel rooms, student accommodation units, etc. may be enumerated (nr). The type of residential unit or room, and size (by number of bedrooms) of unit, are to be stated. **M5** Contractor-designed work is to be described and identified separately. **M6** State whether external security systems are included with building security systems (cross-reference to sub-element 8.7.8). **M7** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.12.3	Central control/ building management systems. **Definition:** control systems that, from a central remote location, provide a means for controlling and reporting on the performance of the operational systems of a building.	**1** Central control/ building management systems: details of each type to be stated.	m^2/(nr)	**1** Control panels for mechanical and electrical equipment.	Control panels	Control panels	**Component specifications:** to be described for each item 1–6 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. (nr): unit of measurement for maintain systems. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
				2 Building management systems (BMS), including central and satellite computer terminal software.	BMS and central operating station systems	BMS and central operating station systems	
				4 Controlling terminal units and switches.	Controlling terminal units and switches	Controlling terminal units and switches	
				5 Control cabling and containment.	Control cabling and containment	Control cabling and containment	
				6 Compressed air and vacuum operated control systems.	Compressed air and vacuum operating controls	Compressed air and vacuum operating controls	
		2 Computer-aided facilities management systems: details of each type of system to be stated.	item/ (nr)	**3** Computer-aided facilities management systems (CAFM).	Computer-aided facilities management systems (CAFM)	Computer-aided facilities management systems (CAFM)	
				7 Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		3 Testing of installations.	%	**8** Testing and commissioning: set to work.	(Included in item)	(Included in item)	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable central control/BMS. Proactive: visual inspection of central control/BMS installations. Reactive: respond and carry out unscheduled minor repairs. **M1** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA.
		4 Commissioning of installations.					
			note	**9** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M2 Where more than one system is employed, the area served by each system is to be measured separately. **M3** Contractor-designed work is to be described and identified separately. **M4** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.

Element 5.13: Specialist installations

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.13.1	Specialist piped supply systems. **Definition:** • piped gas supply systems of high purity (e.g. oxygen or nitrous oxide) from storage source to distribution points in medical treatment, medical research or similar establishments	Details of each type of system to be stated: **1** Medical and laboratory gas supply systems.	nr/m^2	**1** Medical and laboratory gas supply systems, including gas bottles and bulk storage vessels, manifold headers, gas governors, monitoring equipment, terminal control equipment, gas detection and alarm equipment, gas connection outlets, etc.	Medical and laboratory gas supply systems	Medical and laboratory gas supply systems	**Component specifications:** to be described for each item 1–12 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the components included in scope. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials.
		2 Centralised vacuum cleaning systems.		**2** Centralised vacuum cleaning systems, including vacuum pumps, blowers and vacuum connection units.	Centralised vacuum cleaning systems	Centralised vacuum cleaning systems	
		3 Treated water systems.		**3** Treated water systems, including de-alkalisation, de-ionisation, de-aeration, raw sewage storage tanks and vessels, chemical storage tanks and vessels, purified water tanks and vessels, distillation equipment, electrolytic chlorine ion generation equipment, demineralisation plant, reverse osmosis plant, etc.	Treated water systems	Treated water systems	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
• piped distribution systems providing suction for vacuum cleaning and collection facilities • piped water supply systems where the water is treated to obtain a high degree of purity for special use and application • systems for the treatment and circulation of water for swimming pools.	**4** Swimming pool water treatment systems.	nr/m²	**4** Swimming pool water treatment, including filter vessels, chemical storage vessels, chemical dosing equipment, ozone generation and injection equipment, de-ozoning vessels, electrolytic chlorine ion generation equipment, pool inlet jets, scum channels, perimeter draw-off grilles, etc.	Swimming pool water treatment	Swimming pool water treatment	**Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable specialist piped systems. Proactive: visual inspection of specialist piped systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the area served by the system (i.e. the area of the rooms and circulation spaces that is served by the system, which is not necessarily the total GIFA of the building). The area serviced is measured by using the rules of measurement for ascertaining the GIFA.
	5 Compressed air systems.		**5** Compressed air systems, including compressors (including motors and starters), inter-coolers, after-coolers, air storage vessels and receivers, air separators, cooling water systems, lubrication systems, local water coolers, compressed air ancillaries, compressed air connection outlets, instrument air pipeline ancillaries (including manifolds), instrument air connection outlets, etc.	Compressed air systems	Compressed air systems	
	6 Vacuum installations.		**6** Vacuum systems, including vacuum pumps, intercoolers and driers, vacuum connection points, etc.	Vacuum systems	Vacuum systems	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	7 Other specialist piped supply systems.	nr/m²	**7** Other specialist piped supply systems.	Other specialist piped supply systems	Other specialist piped supply systems	**M3** Where more than one system is employed, the area served by each system is to be measured separately. **M4** Contractor-designed work is to be described and identified separately. **M5** The percentage additions for testing, commissioning and setting to work are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs.
		m	**8** Pipelines, pipeline ancillaries and fittings. **9** Air duct lines, duct line ancillaries and fittings.	Pipework system Air duct lines, duct line ancillaries and fittings	Pipework system Air duct lines, duct line ancillaries and fittings	
		m²/(nr)	**10** Thermal insulation.	Thermal insulation	Thermal insulation	
		item	**11** Silencers and acoustic treatment.	Silencers and acoustic treatment	Silencers and acoustic treatment	
		nr	**12** Control components.	Control components	Control components	
		item	**13** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	
	8 Testing of installations.	%	**14** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	9 Commissioning of installations.					
		note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.13.2	Specialist refrigeration systems. **Definition:** specialist refrigeration systems, including cold rooms, ice pads and other specialist systems.	**1** Cold rooms: details of each type of system to be stated.	nr/m²	**1** Cold rooms, including packaged cold rooms, packaged walk-in freezers, wall panels and linings, ceiling panels and linings, flooring systems, doors and door mechanisms, jointing material, thermal cladding, refrigeration plant and equipment, evaporators, lighting, etc.	Cold rooms	Cold rooms	**Component specifications:** to be described for each item 1–3 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
		2 Ice pads: details to be stated.		**2** Ice pads, including waterproof layer, insulation layer, working screed, slip-plane layer, bonded refrigeration pads (incorporating pipelines, reinforcement, etc.), floor drains and sealing plates, cooling towers, evaporative condensers, heat recovery systems, etc.	Ice pads	Ice pads	
		3 Other specialist refrigeration systems: details of each type of system to be stated.	nr/m²	**3** Other specialist refrigeration systems.	Other specialist refrigeration systems	Other specialist refrigeration systems	
			item	**4** Sundry items: planned procedures for specialist refrigeration systems.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Testing of installations.	%	**5** Testing and commissioning: set to work.	(Included in item)	(Included in item)	Planned: PPM on applicable refrigeration systems. Proactive: monitor and inspect refrigeration systems. Reactive: respond and carry out unscheduled minor repairs. **M1–M5** measurement rules are the same as sub-element 5.13.1.
		5 Commissioning of installations.					
			note	**6** Work undertaken by subcontractors.	Subcontractor on costs	Subcontractor on costs	
5.13.3	Specialist mechanical installations. **Definition:** specialist installations not covered by elements 5.1–5.12 or sub-elements 5.13.1 and 5.13.2.	**1** Other specialist installations: details of each type of system to be stated.	nr/m²	**1** Wave machines.	Wave machines	Wave machines	**Component specifications:** to be described for each item 1–5 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position.
				2 Saunas.	Saunas	Saunas	
				3 Jacuzzis.	Jacuzzis	Jacuzzis	
				4 Swimming pools.	Swimming pools	Swimming pools	
				5 Other specialist installations (to be stated).	Other specialist installations	Other specialist installations	
			item	**6** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**7** Testing and commissioning: set to work.	(Included in item)	(Included in item)	Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures. Planned: PPM on applicable specialist mechanical systems. Proactive: monitor and inspect specialist mechanical systems. Reactive: respond and carry out unscheduled minor repairs. **M1–M5** measurement rules are the same as sub-element 5.13.1.
		3 Commissioning of installations.					
			note	**8** Work undertaken by subcontractors.	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.13.4	Specialist electrical/ electronic installations. **Definition:** radio and television studios, etc.	**1** Specialist electrical and electronic installations and/or systems: details to be stated.	nr	**1** Radio and television studio equipment and installations.	Radio and television studio equipment	Radio and television studio equipment	**Component specifications:** to be described for each item 1–7 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Recording studio equipment and installations.	Recording studio equipment	Recording studio equipment	
				3 Discrete and communal television aerial and satellite systems.	Television aerial and satellite systems	Television aerial and satellite systems	
				4 Home cinemas.	Home cinemas	Home cinemas	
				5 Multi-room audio and video systems.	Multi-room audio and video	Multi-room audio and video	
				6 Automated curtains and blinds.	Automated curtains and blinds	Automated curtains and blinds	
				7 Other specialist electrical and electronic installations and systems.	Other specialist electrical and electronic systems	Other specialist electrical and electronic systems	
			item	**8** Sundry items: planned procedures for systems.	Actions arising from servicing and planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations.	%	**9** Testing and commissioning: set to work.	(Included in item)	(Included in item)	Planned: PPM on applicable special electrical systems. Proactive: monitor and inspect special electrical systems. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing and commissioning are to be applied to the total cost of items comprising the sub-element A single combined percentage addition can be applied to cover the costs of the testing, commissioning and setting to work.
		3 Commissioning of installations.					
			note	**10** Work undertaken by subcontractors (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.13.5	Water features. **Definition:** water systems for display or decorative purposes involving the movement of water.	**1** Water features: details to be stated.	nr	**1** Water features, including ornamental fountains and waterfalls.	Water features	Water features	**Component specifications:** to be described for each item 1–5 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules to the component. **Renewal actions** Replacement: remove installation, including all ancillary fittings and connections, and replace with new modern equivalent in position. Major repairs: carry out repairs on the appropriate component or subcomponent parts, stating size, type and materials. **Maintain actions** Note: include for undertaking introductory site risk assessments, obtaining permits to work and complying with written procedures.
				2 Water filtration equipment.	Water filtration equipment	Water filtration equipment	
				3 Nutrient treatment and equipment.	Nutrient treatment and equipment	Nutrient treatment and equipment	
			N/A	**4** Final electrical connections.	N/A	N/A	
			nr	**5** Control components.	Control components	Control components	
			item	**6** Sundry items: planned procedures for water feature.	Actions arising from servicing and planned inspections	Planned procedures	
		2 Testing of installations.	%	**7** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		3 Commissioning of installations.					
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Planned: PPM on applicable water features. Proactive: monitor and inspect water features. Reactive: respond and carry out unscheduled minor repairs. **M1** Where components are to be enumerated, the number of water feature components is to be stated. **M2** Contractor-designed work is to be described and identified separately. **M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of testing, commissioning and setting to work.

Element 5.14: Builder's work in connection with services

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
5.14.1	Builder's work in connection with services. **Definition:** sundry builder's work associated with the installation of water, gas, electricity heating, ventilation, aboveground drainage, telecommunications and other services, as well as to swimming pools.	**1** Builder's work in general areas: details to be stated.	m^2/nr/m/%	**1** General builder's work associated with the installation of water, gas, electrical, heating, ventilation aboveground drainage, telecommunications and other services.	General builder's works	BWIC with services	**Renewal and maintain** BWIC with services to be measured as M1–M8 above. **M1** Where quantifiable, cost-significant builder's work in connection with services should be separately identified and measured by area (m^2), linear measurement (m) or enumerated (nr). **M2** Where components are to be enumerated, the number of components is to be stated. **M3** Where the length of a component is to be measured, the length of linear components measured is their extreme length over all obstructions.
		2 Builder's work to landlord areas: details to be stated.		**2** Builder's work to landlord areas.	Builder's work to landlord areas	(included above)	
		3 Builder's work to plant rooms: details to be stated.	m^2/nr	**3** Builder's work to plant rooms.	Builder's work to plant rooms	(included above)	
		4 Large plant and equipment bases: details, including overall size (m), to be stated.	nr	**4** Large plant and equipment bases.	Large plant and equipment bases	(included above)	
		5 Fuel bunds: details, including construction and overall size (m), to be stated.	nr/m^2/m	**5** Builder's work to fuel bunds.	Builder's work to fuel bunds	(included above)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Where not quantifiable, or not cost-significant, builder's work items in connection with services should be identified and quantified by a percentage allowance or by applying the GIFA. **M5** The area measured is the floor area relating to each builder's work classification. The area is measured using the rules of measurement for ascertaining the GIFA. **M6** Percentage additions for builder's work in connection with services should be applied to the total cost of all elements comprising group element 5 (i.e. elements 5.1–5.13 inclusive). **M7** Other cost-significant items are to be measured by area (m^2), linear measurement (m) or enumerated (nr) and identified separately. **M8** Contractor-designed work is to be described and identified separately.

Supplementary listing of building service subcomponents/ancillaries (applicable to various systems)

Below is a list of subcomponents that have a Building Engineering Services Association (BESA) SFG20 maintenance task schedule.

Applicable components are to be included with the relevant systems or components (e.g. pumps, valves, fuse, filters, controls (referred to in elements 5.1–5.3 in Part 6 of these rules)).

ID	Included components – supplementary list of ancillary components	Unit
	Actuators	
1	Thermal actuators	nr
2	Pneumatic actuators	nr
3	Hydraulic actuators	nr
4	Motor-driven actuators	nr
5	Power fail – motor-return actuators	nr
6	Power fail – spring-return actuators	nr
	Compressors	
7	Compressors – refrigeration (reciprocal)	nr
8	Compressors – screw	nr
9	Compressor refrigeration – centrifugal	nr
10	Compressors – scroll	nr
11	Air compressors and receivers	nr
12	Air compressors – compressed-air dryers	nr
13	Compressors – air network distribution	nr
	Controllers and sensors	
14	Switches and sensors	nr
15	Pressure measurement sensors	nr

ID	Included components – supplementary list of ancillary components	Unit
16	Multiple boilers – sequence control	nr
17	Boiler controls – single boiler on/off	nr
18	Boiler protection controls	nr
19	Boilers – space temperature controls	nr
20	Boilers – fire and safety circuits	nr
21	Control panels – electrical services	nr
22	Control panels – lamps, meters, alarms	nr
23	Control optimiser	nr
24	Heating control – compensator type	nr
25	Controller single input type	nr
26	Controller unit and sensor type	nr
27	Controller – timer type	nr
28	Controller – flow meter	nr
29	Step controllers	nr
30	Time switches	nr
31	Time switches	nr
32	Multi input controllers	nr
33	Indicator and displays	nr
34	Alarm modules	nr
35	Level controllers	nr
36	Speed controllers	nr
37	Transducers	nr

ID	Included components – supplementary list of ancillary components	Unit
38	Control dampers	nr
39	Ducting - Fire Dampers - Fusible Link Type	nr
40	Ducting - Combined Fire/Smoke Dampers used in Smoke Control Systems for Means of Escape	nr
41	Ducting - Combined Fire/Smoke Dampers used in Ventilation Systems	nr
42	Pneumatic controls	nr
43	Pneumatic relays	nr
44	Temperature measurement sensors	nr
45	Relative humidity sensor	nr
46	Absolute humidity sensor	nr
47	Air quality sensor	nr
48	Carbon dioxide sensor	nr
49	Velocity sensor	nr
50	Occupancy and light sensors	nr
51	Control valves	nr
52	Emergency stop button	nr
53	On/off switching devices	nr
54	Magnahelic Gauge Panel and Manometers	nr
55	Direct Current (DC) Drives	nr
56	Access Control	nr
57	Emergency Assistance Alarm	nr
58	Instrument Control Panel	nr
59	Local Control Panel/Local Control Station	nr

ID	Included components – supplementary list of ancillary components	Unit
60	Motor Control Centre	nr
61	Water Leak Detection Systems	nr
62	Smoke Detectors	nr
63	Gas Detector Sensors/Carbon Monoxide Sensors	nr
64	Control Relays	nr
65	Automatic Transfer Switch	nr
66	Reduced Pressure Zone (RPZ) Valves	nr
67	Automatic (Sensor) Taps	nr
68	Ammonia Leak Detection System	nr
	Ductwork	
69	Ductwork system – general	nr
70	Galvanised (rectangular and circular)	nr
71	Plastic	nr
72	Flexible (circular)	nr
73	Ductwork ancillaries – various	nr
74	Coils (aluminium fins) –cooling	nr
75	Coils (aluminium fins) – heating	nr
76	Coils (copper fins) – cooling	nr
77	Coils (copper fins) – heating	nr
78	Coils (electric)	nr
79	Coils (galvanised) - heating	nr
80	Eliminators (galvanised)	nr

RETURN TO GROUP ELEMENT CONTENTS

ID	Included components – supplementary list of ancillary components	Unit
81	Eliminators (plastic)	nr
82	Eliminators (stainless steel)	nr
83	External louvers (anodised aluminium)	nr
84	External louvers (steel painted)	nr
85	Grilles /diffusers (anodised aluminium)	nr
86	Grilles /diffusers (painted metal)	nr
87	Hoods (stainless steel)	nr
88	Plate recuperator	nr
89	Spray cooler coils (copper electro tinned) and washers	nr
90	Thermal wheels	nr
91	Run around heat recovery coil	nr
92	Plate heat exchangers	nr
93	Heat Exchangers - Indirect Gas Fired to Air	nr
94	Heat Exchangers - Steam to Air	nr
95	Heat Exchangers - Water to Water	nr
96	Ducting - volume control dampers and fire/ smoke dampers	nr
97	Ducting – Combined Fire/Smoke Dampers used in Smoke Control Systems for Means of Escape	nr
98	Ducting – Combined Fire/Smoke Dampers used in Ventilation Systems	nr
99	Ducting – attenuators and acoustics	nr
100	Ductwork – cleaning hygiene, inspections and monitoring	nr
	Electrical ancillaries	
101	Control relays	nr

ID	Included components – supplementary list of ancillary components	Unit
102	Isolators/starters and fuse switches	nr
103	Motors – drive elements	nr
	Fans	
104	Fans	nr
105	Fans – general ventilating	nr
106	Fans – centrifugal	nr
107	Fans – axial	nr
108	Fans – propeller	nr
109	Fans – mixed flow	nr
110	Fans – bifurcated	nr
111	Fans – extraction (domestic purposes)	nr
112	Fans – extraction (including fire/smoke units)	nr
113	Fans – high temperature (boiler combustion)	nr
114	Fans – roof mounted units	nr
115	Ammonia extract fan	nr
116	Hazardous area extract fan	nr
117	Extract fans – twin toilet	nr
118	Fans – window or wall mounted	nr
	Filters	
119	Air handling unit – filters	nr

ID	Included components – supplementary list of ancillary components	Unit
120	Kitchen extraction canopy – grease filters	nr
121	Electrostatic filters	nr
122	Ductwork ancillaries – filters	nr
	Humidifiers/dehumidifiers	
123	Humidifiers – cold water evaporator drum type	nr
124	Humidifiers – direct stream injection type	nr
125	Humidifiers – electrode boiler	nr
126	Humidifiers – compressed air type	nr
127	Humidifiers – ultrasonic	nr
128	Humidifiers – resistance heater type	nr
129	Humidifiers – spray	nr
130	Humidifiers – Spirax Sarco Direct Steam Injection Type	nr
131	Humidifiers – steam humidifier (VAPAC Type)	nr
132	Dehumidifiers – chemical dehumidifiers	nr
	Pumps	
133	Pumps – general	nr
134	Circulating pumps	nr
135	Centrifugal pumps	nr
136	Pressurisation pumps	nr
137	Rotary hand pumps	nr
138	Steam driven pumps	nr
139	Secondary hot water circulation pumps	nr

ID	Included components – supplementary list of ancillary components	Unit
140	Sewage or drainage pumps – submersible	nr
141	Sewage and drainage pumps – drywell	nr
142	Sewage pumps – compressed air	nr
143	Sump pumps – extended shaft	nr
144	Domestic water accelerators	nr
145	Shower booster pumps	nr
146	Water booster pumps	nr
147	Condensate pumps	nr
148	Fuel oil transfer pumps	nr
149	Twin set pumps	nr
	Starters	
150	Drive element – starters	nr
151	Starters – star delta	nr
152	Starters – two-speed (dual wound)	nr
153	Starters – two-speed (pole change)	nr
154	Starters – reversing	nr
155	Starters – auto transformer	nr
156	Starters – quick transition (electric heater)	nr
157	Starters – electrolyte type	nr
158	Starters – air break and contactors	nr

ID	Included components – supplementary list of ancillary components	Unit
159	Motors – drive elements	nr
160	Speed controllers	nr
161	Direct current drives	nr
	Taps and outlet fittings	
162	Taps and outlet fittings	nr
163	Taps and outlet fittings – sluice valves	nr
164	Taps and outlet fittings – stop cocks and stop taps	nr
165	Combination tap assemblies – non-thermostatic mixing valves (type 1)	nr
166	Combination tap assemblies – thermostatic mixing valves (type 2)	nr
167	Combination tap assemblies – thermostatic mixing valves (type 3)	nr
168	Automatic (sensor) taps	nr
	Valves	
169	Valves – gate	nr
170	Valves – boiler valves	nr
171	Valves – diaphragm valves	nr
172	Valves – globe valves	nr
173	Valves – lubricated plug valves	nr
174	Valves – multiport valves	nr
175	Valves – parallel slide valves	nr
176	Valves – sluice valves	nr
177	Valves – steam pressure reducing valves	nr

ID	Included components – supplementary list of ancillary components	Unit
178	Valves – steam safety valves	nr
179	Valves – thermostatic radiator valves (TRVs)	nr
180	Valves – float operated valve	nr
181	Valves – automatic control	nr
182	Rotary valves – shoe or slipper	nr
183	Butterfly and ball valves	nr
184	Self-acting and thermal valves	nr
185	Solenoid valves	nr
186	Pressure-control valves	nr
187	Seat valves	nr
188	Shower valves	nr
189	Free fall fire valves – gas and oil	nr
190	Solenoid gas/oil shut-off (safety) valves	nr
191	Air admittance valves	nr
192	Steam boiler water level control valves (Mobrey)	nr
193	Reduced Pressure Zone (RPZ) valves	nr
194	Combination tap assemblies, mixing valves/taps	nr
	Water treatment	
195	Ultraviolet disinfection unit	nr
196	Ozonation plant	nr
197	Chemical dosing	nr

Note: refer to Building Engineering Services Association (BESA) SFG20 for details of maintenance schedules for each supplementary item.

Group element 6: Prefabricated buildings and building units

Note: not covered by NRM 3 rules (as after construction, the assets are dealt with elsewhere in other elements). Refer to NRM 1 for measurement rules for the acquisition of prefabricated buildings and building units.

Group element 7: Work to existing buildings

Group element 7 comprises the following elements:

7.1 Minor demolition and alteration works

7.2 Repairs to existing services

7.3 Damp-proof courses/fungus and beetle eradication

7.4 Facade retention

7.5 Cleaning existing surfaces

7.6 Renovation works

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Not applicable: On the following pages, 'N/A' means not applicable to renewal and/or maintain works.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals, plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned procedures: For safety and performance reasons, planned procedures (permits to work) for each system and asset type should be included with the measurement of specific work items.

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Element 7.1: Minor demolition and alteration works

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.1.1	Minor demolition and alteration works. **Definition:** individual items of work to existing buildings, such items involving one or more trades. Items involve altering, adapting or repairing existing buildings. Includes cutting away and removing existing work and inserting new and minor demolition works and soft strip.	**1** Spot items: details to be stated.	item	**15** Repairs to external wall cladding and covering systems.	Repairs to external wall coverings	Minor demolition works and alteration works	**Component specifications:** to be described for each item 1–43, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Major repairs: to include preparation, repair and making good, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing, as appropriate. **Maintain actions** Planned procedures for undertaking inspections and for safely performing the works. **M1** Where components are to be enumerated, the number of components is to be stated.
				16 Repairs to roof coverings (e.g. tiles, slates, sheet coverings, flexible sheet coverings and asphalt).	Repairs to roof coverings	N/A	
				17 Repairs to existing rainwater installations.	Repairs to rainwater installations	N/A	
				22 Repairs to sheet linings (e.g. plasterboard and timber sheeting to walls, floors and ceilings).	Repairs to sheet linings	N/A	
				26 Re-glazing.	Re-glazing	N/A	
				27 Repairs to screeds.	Repairs to screeds	N/A	
				28 Repairs to toppings (e.g. granolithic).	Repairs to toppings	N/A	
				29 Repairs to latex screeds (i.e. to existing floors).	Repairs to latex screeds	N/A	
				30 Repairs to plastered, rendered and roughcast coatings (including lathing and baseboards).	Repairs to coatings	N/A	
				31 Repairs to tiled finishes – walls and floors (e.g. quarry tiles, ceramic tiles, etc.).	Repairs to tiled finishes	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
				32 Repairs to wood block flooring.	Repairs to wood block flooring	N/A	**M2** Where the length of a component is to be measured, the length of linear components is their extreme length, over all obstructions. **M3** Where the area of a component is to be measured, the area measured for items is the surface area of the item, with no deduction for voids. **M4** Work arising out of party wall awards/agreements is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately.
				33 Repairs to floor coverings.	Repairs to floor coverings	N/A	
				34 Degreasing old painted surfaces.	Degreasing	N/A	
				35 Stripping previously decorated surfaces.	Stripping	N/A	
				36 Removing paint from timber, metal and other similar surfaces (e.g. burning off paint and chemically stripping paint).	Removing paint	N/A	
				37 Repainting existing timber, metal and other similar surfaces (e.g. windows, doors, rooflights, etc.).	Repairs to windows, doors, etc.	N/A	
				38 Scraping paint from plastered surfaces, etc.	Scraping paint from plastered surfaces	N/A	
				39 Minor painting and redecoration (e.g. touch-up painting).	Minor redecorations	N/A	
				40 Overhauling ironmongery for windows, doors, etc.	Overhauling ironmongery	N/A	
				41 Applying sealants to existing window and door frames, rooflights, etc.	Applying sealants	N/A	
				42 Other alteration works (spot items).	Other spot items	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**44** Sundry items: planned procedures for assets.	Actions arising from planned inspections	Planned procedures	
			note	**45** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Minor demolition works.	nr/m/m^2	**1** Stripping out existing service installations, including pipe casings, etc.	Stripping out services	Minor demolition works and alteration works	
				2 Stripping out fixtures and fittings.	Stripping out fixtures and fittings	N/A	
				3 Stripping out skirtings, dado rails, picture rails, architraves, etc.	Stripping out skirtings, dado rails, picture rails, architraves, etc.	N/A	
				5 Removing shelves, work benches, etc.	Removing shelves, work benches, etc.	N/A	
				6 Removing sanitary appliances and fittings.	Removing sanitary appliances and fittings	N/A	
				7 Removing parts of existing buildings.	Removing parts of existing buildings	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr/m/m^2	**11** Removing wall, floor and ceiling finishes.	Removing wall, floor and ceiling finishes	N/A	
				12 Removing internal walls and partitions, including making good.	Removing internal walls and partitions	N/A	
				13 Removing floor construction.	Removing floor construction	N/A	
				14 Removing existing roof coverings.	Removing roof coverings	N/A	
		3 Removals.	item/ nr/m/ m^2	**4** Removing kitchen fittings and appliances.	Removals	Minor demolition and alteration works	
		4 Alteration works.		**8** Cutting openings in existing work.	Cutting openings in existing work	Minor demolition and alteration works	
				9 Strutting and supports for openings in walls or after removal of walls.	Strutting and supports	N/A	
				10 Inserting tie beams, tie rods, etc.	Inserting tie beams/tie rods	N/A	
				18 Rebuilding chimney stacks.	Chimney stacks	N/A	
				19 Cutting back chimney breasts.	Chimney breasts	N/A	
				20 Rebuilding piers and columns.	Piers and columns	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
				21 Rebuilding walls and partitions (where not included in element 2.7).	Walls and partitions	N/A	
				23 Removing windows, doors, frames, linings, screens, etc. in preparation for filling openings and/or taking down wall or partition.	Windows, doors, frames, linings, screens, etc.	N/A	
				24 Filling in or covering over existing openings.	Filling in or covering over existing openings	N/A	
				25 Inserting new windows, doors, stairs, rooflights, etc. into the existing building fabric.	Inserting new windows, doors, stairs, rooflights	N/A	
				43 Temporary screens required for alteration works.	Temporary screens	N/A	

Element 7.2: Repairs to existing services

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.2.1	Repairs to existing services. **Definition:** refurbishment of existing services installations, systems, equipment and plant.	**1** Equipment/plant repairs.	nr	**2** Repairs to overhaul the existing mechanical and electrical plant and equipment (e.g. boilers, water heaters, storage tanks and vessels, and extractor fans), including the replacement of components.	Equipment/ plant repairs	Repairs to existing services	Component specifications: to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Refurbishment: to include removal, preparation and refurbishment of existing services, as appropriate. **Maintain actions** Reactive: minor repairs to existing services. Proactive: visual inspection of existing services. **M1** Where components are to be enumerated, the number of components is to be stated.
				3 Fault finding (not part of consultant/specialist fees).	Fault finding	Include with repairs	
				6 Renewing flue pipes.	Renewing flues	N/A	
			item	**7** Sundry items: planned procedures for repairs to existing services.	Actions arising from planned inspections	Planned procedures	
			note	**9** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Overhauling service installations/ systems.	m^2	**1** Repairs to existing sanitary appliances (including clearing blockages).	Repairs to sanitary appliances	Repairs to existing services	
				4 Overhauling existing mechanical and electrical installations and systems (e.g. heating installations, ventilation systems, electrical systems, etc.), including the replacement of components.	Overhauling mechanical and electrical installations and systems	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**5** Repairs and upgrades to existing specialist services (e.g. lifts).	Repairs and upgrades to specialist services	N/A	**M2** The area measured is the area serviced by the installation/system, measured using the rules of measurement for ascertaining the GIFA. **M3** Where more than one installation/system is employed, the area served by each system is to be measured separately. The area measured for each system is the area serviced by the installation/system. **M4** Where components are to be itemised, the number of key subcomponents comprising the component are to be identified, described and enumerated within the description of the component. **M5** Other cost-significant items are to be measured by area (m^2), linear measurement (m) or enumerated (nr) and identified separately.
		3 Testing of equipment/plant and/or installations.	%	**8** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		4 Commissioning of equipment/plant and/or installations.					

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M6 Work arising out of party wall awards/agreements is to be described and identified separately. **M7** Contractor-designed work is to be described and identified separately. **M8** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.

Element 7.3: Damp-proof courses/fungus and beetle eradication

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.3.1	Damp-proof courses. **Definition:** preventing rising damp in existing masonry walls.	**1** Damp-proof courses.	m^2/ (item)	**1** Chemical damp-proof courses, including drilling holes, injecting chemicals and making good holes.	Damp-proof courses (DPC)	Damp-proof courses	**Component specifications:** to be described for each item 1–4, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. (item): unit of measurement for maintain. **Renewal actions** Damp-proof courses (DPC): state type and specification. **Maintain actions** Reactive: minor repairs to damp-proof courses. Proactive: visual inspection of damp-proof courses. **M1** The area measured is the surface area of the treatment, with no deduction for voids. **M2** Work arising out of party wall awards/agreements is to be described and identified separately.
				2 Injection of mortar damp-proof courses.	DPC	N/A	
				3 Inserting mechanical damp-proof courses.	DPC	N/A	
				4 Local making good to finishes.	N/A	N/A	
			item	**5** Sundry items: planned procedures for damp-proof courses.	Actions arising from planned inspections	Planned procedures	
			note	**6** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Contractor-designed work is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
7.3.2	Fungus/beetle eradication. **Definition:** treating existing timbers to eradicate fungus attacks (such as dry and wet rot) and various types of wood-boring infestation.	**1** Eradication treatment.	m^2/ (item)	**1** Opening up existing work (e.g. lifting and replacing floorboards).	Fungus/beetle eradication (FBE)	Fungus/beetle detection	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. (item): unit of measurement for maintain. **Renewal actions** Treatment to eradicate fungus/beetle. **Maintain actions** Reactive: minor repairs to timber. Proactive: visual inspection of timber.
				2 Cutting out fungus- or beetle-infested timber, plaster, etc. and disposing of cut-out material.	(FBE – treatment)	N/A	
				3 Applying preservative treatment (e.g. irrigation of walls by pressure injection, application of fungicide solution and treating with insecticide).	FBE – treatment)	N/A	
				4 Solid-rod preservative inserts.	FBE – treatment)	N/A	
				5 Preservative treatments.	FBE – treatment)	N/A	
				6 Paste preservative treatment.	FBE – treatment)	N/A	
				7 Insecticidal smoke treatment.	FBE – treatment)	N/A	
			item	**8** Sundry items: planned procedures.	Actions arising from planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			note	**9** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	**M1** The length of linear components measured is their extreme length, over all obstructions. **M2** Work arising out of party wall awards/agreements is to be described and identified separately. **M3** Contractor-designed work is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.

Element 7.4: Facade retention

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.4.1	Facade retention. **Definition:** temporary or semi-permanent support for unstable structures or facades (i.e. structures not to be demolished).	**1** Support structures.	nr	**1** Facade retention works where existing facade is to be integrated into new building.	Facade retention (FR)	Facade inspection	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. (FR): included as part of facade retention works. **Renewal actions** As identified by inspection. **Maintain actions** Reactive: minor repairs to facades. Proactive: visual inspection of facades. **M1** Where components are to be enumerated, the number of components is to be stated.
				2 Location surveys.	(group element 11)	N/A	
				3 Commencement and completion condition surveys.	(group element 11)	N/A	
				4 Dead, raking, flying or box shores; strutting (including bracing; sole plates and wall plates; needles, including holes; brackets, blockings and wedges; dog irons and similar metalwork).	(FR)	N/A	
				5 Foundations for shores.	(FR)	N/A	
				6 Cutting holes in existing structures for needles, etc.	(FR)	N/A	
				7 Design, erection, maintenance, reposition and removal of support structures.	(FR)	N/A	
			item	**9** Sundry items: planned procedures for the facade retention works.	Actions arising from planned inspections	Planned procedures	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			note	**10** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	**M2** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
		2 Periodic technical inspections of support structures.	nr	**8** Periodic technical inspections.	N/A	Facade inspection	
		3 Removing support structures.	nr	Included in item 7 above.	(FR)	N/A	

Element 7.5: Cleaning existing surfaces

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.5.1	Cleaning. **Definition:** cleaning and removing stains and deposits from existing surfaces.	**1** Cleaning existing surfaces.	m^2	**1** Removing efflorescence, stains, soot, graffiti, vegetation, algae, bird droppings, etc.	N/A	Cleaning surfaces (CS)	**Component specifications:** to be described for each item 1–3 to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** None. **Maintain actions** Reactive: minor repairs to damp-proof courses. Proactive: visual inspection of existing surfaces. **M1** The area measured is the surface area of the surface to be cleaned, with no deduction for voids. **M2** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
				2 Cleaning by washing, abrasive blasting, chemical treatment or other methods.	N/A	(CS)	
				3 Artificial weathering.	N/A	(CS)	
			item	**4** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**5** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.5.2	Protective coatings. **Definition:** coatings to protect existing surfaces, including bird/ vermin repellent coatings.	**1** Protective coatings to existing surfaces.	m^2	**1** Internal and external surfaces.	N/A	Protective coatings (PC)	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Actions arising from inspection. **Maintain actions** Reactive: minor repairs to protective coatings. Proactive: visual inspection of protective coatings. **M1** The area measured is the surface area of the surface to be coated, with no deduction for voids. **M2** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: items not applicable to renewal and/or maintain work.
				2 Specialist painting/coating systems (i.e. designed for use on concrete, masonry, steelwork, etc.).	N/A	(PC)	
				3 Lime washing, colourless waterproofers, anti-graffiti colourless coatings, etc.	N/A	(PC)	
				4 Bird repellent coatings, etc.: details to be stated.	Bird repellent coatings	Bird repellent coatings	
			item	**5** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**6** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Element 7.6: Renovation works

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.6.1	Masonry repairs. **Definition:** local cutting out and reinstatement of existing brick, block or stonework, and re-pointing defective joints.	**1** Masonry repairs.	nr/m/m^2	**1** Cutting out decayed, defective and cracked bricks, blocks or stones, and inserting new (including isolated repairs, stitching, etc.).	Masonry repairs (MR)	Masonry inspections (MI)	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Actions arising from inspection. **Maintain actions** Reactive: minor repairs to masonry. Proactive: visual inspection of masonry. M1 Where components are to be enumerated, the number of components is to be stated. **M2** Where the length of a repair is to be measured, the length of linear components measured is their extreme length, over all obstructions. **M3** Where the area of a repair is to be measured, the area measured is the surface area of the repair. **M4** Work arising out of party wall awards/agreements is to be described and identified separately.
				2 Plastic stone repairs.	(MR)	(MI)	
				3 Re-dressing stonework to new profiles.	(MR)	(MI)	
				4 Inserting new wall ties (without demolition).	(MR)	(MI)	
				5 Grouting.	(MR)	(MI)	
				6 Rejointing/repointing existing masonry.	(MR)	(MI)	
			item	**7** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**8** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.6.2	Concrete repairs. **Definition:** cutting out, repairing, partially replacing, resurfacing and rehabilitating eroded and defective concrete.	**1** Concrete repairs.	nr/m/m^2	**1** Cutting out defective concrete and replacing with new.	Concrete repairs (CR)	Concrete inspections (CI)	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Actions arising from inspection. **Maintain actions** Reactive: minor repairs to concrete. Proactive: visual inspection of concrete. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured is the surface area of the repair. **M4** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
				2 Cutting out defective reinforcement and replacing with new.	(CR)	(CI)	
				3 Cleaning and rust-proofing existing rusted reinforcement.	(CR)	(CI)	
				4 Concrete and resin/cement mixes in repairs and resurfacing, including spray-applied concrete.	(CR)	(CI)	
				5 Anchored mesh reinforcement.	(CR)	(CI)	
				6 Resin or cement impregnation/ injection.	(CR)	(CI)	
			item	**7** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**8** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.6.3	Metal repairs. **Definition:** repairing, renovating and conserving existing architectural metalwork, metal components and finishes.	**1** Metal repairs.	nr/m/m^2	**1** Taking down metalwork.	Metal repairs (MRE)	Metal inspections (MIN)	**Component specifications:** to be described for each item 1–10, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Actions arising from inspection. **Maintain actions** Reactive: minor repairs to metalwork. Proactive: visual inspection of metalwork. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured is the surface area of the repair. **M4** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
				2 Cleaning and restoring surface finishes.	(MRE)	(MIN)	
				3 Straightening.	(MRE)	(MIN)	
				4 Rust-proofing.	(MRE)	(MIN)	
				5 Metalwork repairs (e.g. welding, riveting and bolting), rejointing, reassembling and refixing.	(MRE)	(MIN)	
				6 Renewing surface finishes off-site.	(MRE)	(MIN)	
				7 Repairs to structural members (e.g. roof members and structural beams).	(MRE)	(MIN)	
				8 Repairs to existing windows, doors, hatches, rooflights, frames, linings, etc. including overhauling/ renewing ironmongery (e.g. sash cords, opening gear, etc.).	(MRE)	(MIN)	
				9 Repairs to staircases, including handrails and balustrades.	(MRE)	(MIN)	
			item	**10** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**11** Subcontractor on costs (where applicable).	N/A	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.6.4	Timber repairs. **Definition**: repairing, renovating and conserving existing timber structures, components and finishes.	**1** Timber repairs.	nr/m/m^2	**1** Taking down existing work, cleaning and resurfacing, cutting out defective or decayed timber, piecing in new timber, rejointing and refixing work.	Timber repairs (TR)	Timber inspections (TI)	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Actions arising from inspection. **Maintain actions** Reactive: minor repairs to timber structures. Proactive: visual inspection of timber structures. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured is the surface area of the repair. **M4** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
				2 Resin repairs to timbers.	(TR)	(TI)	
				3 Preservative/fire-retardant treatments.	(TR)	(TI)	
				4 Repairs to structural members (e.g. roof members and structural beams).	(TR)	(TI)	
				5 Repairs to existing windows, doors, hatches, rooflights, frames, linings, etc. (including overhauling/ renewing ironmongery, sash cords, opening gear, etc.).	(TR)	(TI)	
				6 Repairs to staircases, including handrails and balustrades.	(TR)	(TI)	
			item	**7** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
7.6.5	Plastic repairs. **Definition:** repairs to plastic windows, roof lights, doors, cladding, etc	**1** Plastic repairs.	nr/m/m^2	**1** Renewing domed rooflights.	Plastic repairs (PR)	Plastic inspections (PI)	**Component specifications:** to be described for each item 1–3, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Actions arising from inspection. **Maintain actions** Reactive: minor repairs to plastic windows, rooflights, doors and cladding. Proactive: visual inspection of plastic windows, rooflights, doors and cladding. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured is the surface area of the repair. **M4** Work arising out of party wall awards/agreements is to be described and identified separately. N/A: not applicable to renewal and/or maintain work.
				2 Overhauling of windows, rooflights, doors, etc.	(PR)	(PI)	
				3 Repairs to rooflights, doors, etc.	(PR)	(PI)	
			item	**4** Sundry items: planned procedures for the works.	Actions arising from planned inspections	Planned procedures	
			note	**5** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Group element 8: External works

Group element 8 comprises the following elements:

8.1 Site preparation works

8.2 Roads, paths, pavings and surfacings

8.3 Soft landscaping, planting and irrigation systems

8.4 Fencing, railings and walls

8.5 External fixtures

8.6 External drainage

8.7 External services

8.8 Minor building works and ancillary buildings

Note 1: works associated with minor demolition works are included in group element 7. Works associated with general site preparation and groundworks, and permanent roads, paths and pavings are included in group element 8. The provision of temporary roads and services is included in group element 9.

Note 2: works associated with toxic/hazardous/contaminated material treatment, major demolition works, temporary support for adjacent structures, specialist groundworks, temporary diversion works and extraordinary site investigation works are included in group element 0.

Note 3: works requiring site accommodation, temporary services, security, safety and environmental control and protection (e.g. temporary roofing, external or internal scaffolding, etc.), mechanical plant, temporary works, site services, etc. to facilitate the measured work item are included in group element 9.

Subcontractor on costs: Where works are to be carried out by a subcontractor, an allowance is to be made within the unit rate applied to elements or components for subcontractor's preliminaries, design fees, risk, overheads and profit.

Testing and commissioning: Where testing and commissioning is required to be measured under sub-element 8.3.3, the terms should include the following works:

1 Testing includes:

(1) water tests

(2) water required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements

(3) fuels required for commissioning.

3 Setting all mechanical and electrical services and installations to work after completion of testing and commissioning (following repairs, replacement and fitting new works).

Where testing and commissioning is required to be measured under element 8.6, the terms should include the following works:

1 Testing includes:

(1) air tests

(2) water tests

(3) dyes required for testing.

2 Commissioning includes:

(1) commissioning, including preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements.

3 Setting all drainage installations to workafter completion of commissioning.

Where testing and commissioning is required to be measured under element 8.7, the terms should include the following works:

1 Testing includes:

(1) testing equipment and consumables

(2) calibration

(3) site installation tests

(4) static testing, including testing records

(5) performance testing, including performance test records

(6) fuels required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements

(3) fuels required for commissioning

(4) setting all mechanical and electrical services and installations to work after completion of commissioning (following repairs, replacement and fitting new works).

Not applicable: On the following pages, 'N/A' means not applicable to renewal and/or maintain works.

Works (action required): The work items, or actions required, within each section of the building element have been categorised into the following:

- Renewal (R): replacement, major repairs, refurbishment, upgrade work and removals, plus redecoration works (if measured separately).
- Maintain (M): planned, proactive and reactive/ minor repair works.

Note: the required work actions included in the measurement rules are not an exhaustive list and are for guidance only.

Planned inspections: Non-invasive planned inspections are included in the external works section, which is normally undertaken as part of the maintain (M) regime. Actions arising from the planned inspections are normally dealt with as renewal (R) works when they are not covered by the minor repairs provision in the planned preventative maintenance regime.

Note: this group element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Element 8.1: Site preparation works

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.1.1	Site clearance. **Definition:** preparatory work required to clear existing site vegetation, trees, etc. including the application of herbicides over the site before commencement of excavations works.	**1** Clearing vegetation: details to be stated.	m^2	**1** Clearing existing site vegetation (e.g. shrubs and undergrowth), including disposing of arisings.	N/A	N/A	N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Where components are to be itemised, the number of key elements comprising the component are to be identified, described and enumerated within the description of the component. **M3** The area measured is the surface area to which the work applies.
			item	**6** Sundry items: details to be stated.	N/A	N/A	
			note	**7** Subcontractor on costs (where applicable).	N/A	N/A	
		2 Taking down trees: details to be stated.	nr	**2** Taking down trees, including grubbing up tree stumps and roots, and disposing of arisings.	N/A	N/A	
		3 Removing tree stumps and roots: details to be stated.		See item 2 above.	N/A	N/A	
		4 Tree protection: details to be stated.	item	**3** Protection of trees.	N/A	N/A	
		5 Minor demolition works: details to be stated.	item/ nr	**4** Minor demolition works (e.g. to outbuildings, etc.).	N/A	N/A	
		6 Applying herbicides: details to be stated.	m^2	**5** Applying herbicides before commencement of excavation works.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), inear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.1.2	Preparatory groundworks. **Definition:** preparatory earthworks to form new contours.	**1** Forming new site contours and adjusting existing site levels: details to be stated.	m^2	**1** Excavation and earthworks to form new site contours and adjust existing site levels.	N/A	N/A	N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the surface area to which the work applies. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately.
				3 Extracting old piles, including disposal.	N/A	N/A	
		2 Breaking out existing substructures: details to be stated.		**2** Breaking out (or grubbing up) existing substructures, ground slabs, strip foundations, basement retaining walls, etc., including disposal.	N/A	N/A	
		3 Breaking out existing hard pavings: details to be stated.		**4** Breaking out existing hard pavings, including concrete, bituminous bound material, brick, block and other hard materials, including disposal.	N/A	N/A	
		4 Grubbing up old drainage pipelines: details to be stated.	m	**6** Grubbing up redundant foul and surface water drainage, including manholes, soakaways, catch pits, interceptors, etc., including disposal.	N/A	N/A	
		5 Grubbing up old manholes, etc.: details to be stated.	nr	See item 6 above.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		6 Filling disused manholes, etc.: details to be stated.	nr	**7** Filling disused manholes, shafts, etc.	N/A	N/A	**M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).
		7 Removing existing underground storage tanks, including disposal: details to be stated.		**5** Removing existing underground storage tanks, including disposal and decontamination where not undertaken as part of facilitating works.	N/A	N/A	
			item	**8** Sundry items: details to be stated.	N/A	N/A	
			note	**9** Subcontractor on costs (where applicable).	N/A	N/A	

Element 8.2: Roads, paths, pavings and surfacings

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.2.1	Roads, paths and pavings. **Definition:** roads, paths and pavements, vehicular and pedestrian, including car parks and protection of grassed areas, and non-specialist surfacings and pavings used for sports and general amenities.	**1** Roads: details, including width (m), to be stated.	m	**1** Excavation and earthworks associated with the construction of roads, paths and pavings.	Roads, paths and pavings (RPP)	Roads, paths and pavings (RPP) – condition inspections	**Component specifications:** to be described for each item 1–29, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. RPP: included in roads, paths and pavings. PPS: included in paths – paving slabs. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of roads, paths and pavings, as appropriate. Major repairs: to include preparation, repair and making good of roads, paths and pavings, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of roads, paths and pavings, as appropriate.
				2 Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous materials where not to be carried out as part of facilitating works). Note: where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	(RPP)	N/A	
				3 Disposal of surface water and groundwater.	(RPP)	N/A	
				4 Preparation of subgrades, including applying herbicides, levelling, grading, rolling, subgrade improvement layers and geotextile membranes.	(RPP)	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**5** Sub-bases to roads, paths and pavings (e.g. granular and soil cement), including laying, levelling, grading and compacting.	(RPP)	N/A	**Maintain actions** Planned: normally covered by site tours and checks, and remedial works to surfacings. Proactive: visual inspection of roads, paths and pavings, design joints, etc. Reactive: minor repairs to roads, paths and pavings. Note: snow clearance is excluded from NRM 3 (part of operation costs). **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured for paved areas, hardstandings, etc. is the surface area of the paving. No deduction is made for voids caused by tree grilles, etc.
				6 Blinding (e.g. sand, cement-bound sand and lean mix concrete).	(RPP)	N/A	
				7 In situ concrete to roads, paths and pavings, including formwork, reinforcements, joints, worked finishes, etc.	(RPP)	(RPP)	
				8 Coated macadam and asphalt to roads, paths and pavings, including road bases, base courses and wearing courses, application of binders, forming channels, etc.	Coated macadam and asphalt	(RPP)	
				9 Interlocking bricks and blocks for roads, paths and pavings, including sand beds, geotextile membranes, paving units, integral kerbs and edgings, and vibrating pavings.	Interlocking bricks and blocks	(RPP)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**14** Sett and cobbled pavings for roads, paths and pavings, including sand and mortar beds, separating layers, geotextile membranes, brick paving, shallow channels and low edgings formed with standard paving units, movement joints and dividing strips (e.g. stone setts, concrete setts and cobbles).	Sett/cobbled pavings	(RPP)	**M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M6** Curved work is to be described and identified separately. **M7** Work outside the curtilage of the site is to be described and identified separately.
				15 Gravel surfacings to roads, paths and pavings (sealed and unsealed), including treating base with weedkiller, geotextile membranes, sealing surface with bituminous emulsion, etc.	Gravel surfacings	(RPP)	
				16 Uncoated stone chipping surfacings for roads, paths and pavings, including treating base with weedkiller, binders, etc.	Uncoated stone chipping surfacings	(RPP)	
				17 Hoggin and woodchip surfacings for roads, paths and pavings, including treating base with weedkiller, binders, etc.	Hoggin and woodchip surfacings	(RPP)	
				18 Perforated units as protection for grassed areas (e.g. to form roads, paths and car parking areas).	Perforated units as protection for grassed areas	(RPP)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**19** Kerbs, kerb channels, etc., including concrete foundations, haunchings, kerbs and kerb accessories (standard and purpose-made kerbs).	Kerbs, kerb channels	(RPP)	**M8** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/ or maintain work. Note: snow clearance is excluded from NRM 3 (part of operation costs).
				25 Paving accessories, including cat's eyes, tree grilles, traffic calming accessories, etc.	Pavings accessories	(RPP)	
			item	**30** Sundry items: details to be stated.	Actions arising from planned inspections	Planned inspections	
			note	**31** Subcontractor on costs (where applicable).	Subcontractor on cost	Subcontractor on costs	
		2 Paths: details, including width (m), to be stated.	m	**10** Paving slabs to paths and pavings, including sand and mortar beds, separating layers, geotextile membranes, paving slabs, shallow channels and low edgings formed with standard paving units, movement joints and dividing strips (e.g. precast concrete, natural and artificial stone slab paving).	Paths – paving slabs (PPS)	Paths – paving slabs (PPS)	
				11 Frangible smoke outlet paving panels to basements.	Frangible smoke outlets	(PPS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**13** Brick paving to paths and pavings, including sand and mortar beds, separating layers, geotextile membranes, brick paving, shouldow channels and low edgings formed with standard paving units, movement joints and dividing strips.	Path – brick paving	(PPS)	
				20 Edgings, including concrete foundations and haunchings (standard and purpose-made edgings).	Edgings	(PPS)	
				21 Timber edgings and pegs.	Timber edgings	(PPS)	
		3 Paved areas, hardstandings, etc.: details to be stated.	m^2	**12** Paving slab cycle stands (see items 1–9 and 14–21 above).	Paved areas – slab cycle stands	Paved areas	
		4 Roundabouts: details to be stated.	nr	Roundabouts (see items 1–9 and 14–21 above).	Roundabouts	Roundabouts	
		5 Road crossings: details to be stated.		**22** Road crossings, zebra crossings and pelican crossings, including road markings, beacons, lights, signs, advance danger signs, etc., and final connections to services (also see items 1–9 and 14–21 above).	Road crossings	Road crossings	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		6 Steps: details to be stated.	nr	**27** Steps, including structure, finishings, balustrades and handrails.	Steps	Steps	
		7 Ramps: details to be stated.	nr/m	**28** Ramps, including structure, finishings, balustrades and handrails.	Ramps	Ramps	
				30 Portable ramps	Portable ramps	Portable ramps	
		8 Traffic calming accessories: details to be stated.	nr	**25** Paving accessories, including cat's eyes, tree grilles, traffic calming accessories, etc.	Traffic calming accessories	N/A	
		9 Tree grilles: details to be stated.			Tree grilles	N/A	
		10 Vehicle protection barriers: details to be stated.	m	**23** Vehicle protection barriers.	Vehicle protection barriers	N/A	
		11 Vehicle bumper rails: details to be stated.		**24** Vehicle bump rails, etc.	Vehicle bumper rails	N/A	
		12 Pavement markings: details to be stated.	nr/m	**26** Pavement markings, including paint, thermoplastic and hot-applied markings.	Pavement markings	Pavement markings	
		13 Repairs to existing roads, paths and pavings: details to be stated.	nr/m/m^2	**29** Repairs to existing roads, paths and pavings.	Taken elsewhere with roads, paths and pavings	Taken elsewhere with roads, paths and pavings	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.2.2	Special surfacings and pavings. **Definition:** surfacings and pavings specifically for outdoor sporting activities and general amenities.	**1** Surfacings and pavings: details to be stated.	m^2	**1** Surfacings and pavings designed specifically for sports and general amenities, such as: • sheet and liquid-applied surfacings (e.g. synthetic rubber, granulated rubber, plastics and fibre) • synthetic tufted surfacings for ski slopes • proprietary coloured no-fines concrete and clay/shale surfacings and pavings.	Special surfacings and pavings (SSP)	Special surfacings and pavings (SSP)	**Component specifications:** to be described for each item 1–8, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. SSP: included in special surfacings and pavings. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of special surfacings and pavings, as appropriate. Major repairs: to include preparation, repair and making good special surfacings and pavings, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of special surfacings and pavings, as appropriate.
				2 Excavation and earthworks associated with the construction of surfacings and pavings for sporting activities and general amenities.	(SSP)	N/A	
				3 Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous materials where not to be carried out as part of facilitating works). Note: Where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	(SSP)	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**4** Disposal of surface water and groundwater.	(SSP)	N/A	**Maintain actions** Planned: normally covered by site tours/surveys. Proactive: visual inspection of special surfacings and pavings. Reactive: minor repairs to special surfacings and pavings. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured for surfacings and pavings is the surface area of the surfacing or paving.
				5 Preparation of subgrades, including applying herbicides, levelling, grading, rolling, subgrade improvement layers and geotextile membranes, etc.	(SSP)	N/A	
				6 Sub-bases to surfacings and pavings, including laying, levelling, grading and compacting.	(SSP)	N/A	
				7 Accessories for surfacings and pavings.	(SSP)	N/A	
				8 Markings for surfacings and pavings.	Markings	Markings	
			item	**9** Sundry items: details to be stated.	Actions arising from planned inspections	Planned inspections	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M6** Curved work is to be described and identified separately. **M7** Work outside the curtilage of the site is to be described and identified separately. **M8** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).

Element 8.3: Soft landscaping, planting and irrigation systems

Note: Where testing and commissioning is required to be measured under sub-element 8.3.3, the terms should include the following works:

1 Testing includes:

(1) water tests

(2) water required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements

(3) fuels required for testing and commissioning.

3 Setting all installations to work after completion of commissioning.

Note: this element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.3.1	Seeding and turfing. **Definition:** preparing soil and seeding or turfing to form lawns, parklands and other general grassed areas.	**1** Grassed areas: details to be stated.	m^2	**1** Applying herbicides.	N/A	Seeding and turfing (ST) as part of ground maintenance, if in scope	**Component specifications:** to be described for each item 1–16, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. ST: included in seeding and turfing. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of seeding and turfing, as appropriate. Major repairs: to include preparation, repair and making good of seeding and turfing, as appropriate. **Maintain actions** Planned: PPM on applicable seeding and turfing, as applicable if part of a ground maintenance regime. Reactive: minor repairs to seeding/turfing, as appropriate.
				2 Topsoil, including transporting from stockpiles or importing topsoil and spreading.	Topsoil	(ST)	
				3 Cultivating topsoil, including removing stones and weeds.	N/A	(ST)	
				4 Fine grading of topsoil.	N/A	(ST)	
				5 Providing, spreading and working in manure, compost, mulch, fertiliser, soil ameliorants, etc.	N/A	N/A	
				6 Light mesh reinforcement.	N/A	(ST)	
				7 Seeding, including hydraulic seeding.	N/A	(ST)	
				8 Turfing.	N/A	(ST)	
				10 Seeding and turfing for retaining structures.	N/A	(ST)	
				11 Initial grass cutting.	N/A	(ST)	
				13 Watering, before end of defects liability period, period for rectifying defects or maintenance period.	N/A	(ST)	
				14 Replacement seeding and turfing.	N/A	(ST)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Reinforced grass proprietary systems: details to be stated.	m^2	**9** Reinforced grass proprietary systems, including sub-base, topsoil, reinforced root zone, seeding or turfing.	N/A	Seeding and turfing	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured for grassed areas is the surface area of the area to be grassed, measured over all obstructions. Areas of roads, paths, pavings, ponds, etc. to be deducted. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
		3 Marking out of grass sports pitches: details to be stated.	nr	**12** Initial marking out of grass sports pitches (e.g. football, rugby and cricket).	N/A	Seeding and turfing	
		4 Works to existing grassed areas: details to be stated.	m^2	**16** Work to existing grassed areas, including scarifying, forking, fertilising, applying weedkillers, local reseeding or re-turfing, etc.	N/A	N/A	
		5 Maintenance of grassed areas: details, including time period (weeks), to be stated.	m^2	**15** Maintenance work specified to be executed during the defects liability period, period for rectifying defects or maintenance period (i.e. as distinct from making good defects), including mowing and fertilising.	Grounds maintenance	Grounds maintenance	
			item	**17** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**18** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M6** Work outside the curtilage of the site is to be described and identified separately. **M7** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work.
8.3.2	External planting. **Definition:** preparing soil and planting bulbs, corms, tubers, herbaceous plants, trees, hedges, shrubs and reed beds.	**1** Planting: details to be stated.	m^2	**1** Applying herbicides.	N/A	External planting (EP) as part of ground maintenance, if in scope	**Component specifications:** to be described for each item 1–24, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules.
				2 Topsoil, including transporting from stockpiles or importing topsoil and spreading.	N/A	(EP)	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m^2	**3** Cultivating topsoil, including removing stones and weeds.	N/A	(EP)	EP: included in external planting. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external planting, as appropriate. Major repairs: to include preparation, repair and making good of external planting, as appropriate. Replace trees: arising from storm/vandal damage. **Maintain actions** Planned: PPM on applicable external planting. Proactive: visual inspection of external planting. Reactive: minor repairs to external planting. **M1** Where components are to be enumerated, the number of components is to be stated.
			4 Fine grading of topsoil.	N/A	N/A	
			5 Forming raised and sunken beds, borders, etc.	N/A	(EP)	
			6 Providing, spreading and working in manure, compost, mulch, fertiliser, soil ameliorants, etc.	N/A	(EP)	
			7 Overlays, including mulch matting, gravel, bark or other materials.	N/A	(EP)	
			8 Planting bulbs, corms, tubers, etc.	N/A	(EP)	
			9 Planting container-grown plants.	N/A	(EP)	
			10 Planting to retaining structures.	N/A	(EP)	
			11 Planting shrubs and hedges.	N/A	Shrubs and hedges	
			15 External prefabricated plant/ tree containers.	N/A	N/A	
			16 Support wires for climbers; tree stakes; tree guards; wrapping; labelling; and other protection for trees, shrubs and plants.	N/A	(EP)	
			20 Applying anti-desiccants.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m^2	**21** Watering before end of defects liability period, period for rectifying defects or maintenance period.	N/A	N/A	**M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured is the surface area of the external planting, measured over all obstructions. Areas of roads, paths, pavings, ponds, etc. are to be deducted. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M6** Work outside the curtilage of the site is to be described and identified separately.
				22 Protecting newly planted areas with temporary fencing, boards, tarpaulins, etc.	N/A	(EP)	
				24 Replacement planting.	N/A	(EP)	
		2 Planting reed beds: details to be stated.	m^2	**17** Planting reed beds, etc.	Reed beds	(EP)	
		3 Hedges: details to be stated.	m	**12** Fence support for hedges. See item 11 above.	Fence support for hedges	(EP)	
		4 Trees: details to be stated.	nr	**13** Planting trees, including nursery stock and semi-mature trees.	Trees	(EP)	
				14 Excavating and backfilling tree pits.	Trees pits	N/A	
		5 Woodland planting: details to be stated.	m^2	**18** Planting woodland.	Excluded from NRM 3	(EP)	
		6 Tree surgery, thinning and pruning: details to be stated.	nr	**19** Tree surgery, thinning and pruning.	N/A	(EP)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		7 Maintenance work to plants, shrubs and planting beds: details, including time period (weeks), to be stated.	m^2	**23** Maintenance work specified to be executed during the defects liability period, period for rectifying defects or maintenance period (i.e. as distinct from making good defects), including weeding and pruning.	N/A	(EP)	**M7** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work. Excluded: Trees and woodland are not in the scope of NRM 3. Refer to NRM 2 for rules of measurement for these items.
		8 Maintenance work to trees: details, including time period (weeks), to be stated.	nr	**27** Maintenance work to trees.	Trees	Tree maintenance	
		9 Maintenance work to hedges: details, including time period (weeks), to be stated.	m	**28** Maintenance works to hedges.	Hedges	Hedge maintenance	
			item	**25** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**26** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.3.3	Irrigation systems. **Definition:** piped water supply systems to landscape-planted areas or crop-planted areas providing a water supply for growing purposes.	**1** Irrigation systems: details to be stated.	m^2	**1** Pipelines, including pipeline fittings and ancillaries.	Pipelines	Irrigation system (IS)	**Component specifications:** to be described for each item 1–8, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of irrigation systems, as appropriate. Major repairs: to include preparation, repair and making good of irrigation systems, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of irrigation systems, as appropriate. **Maintain actions** Planned: PPM on applicable irrigation systems. Proactive: visual inspection of irrigation systems. Reactive: minor repairs to irrigation systems. **M1** The area measured for irrigation systems is the surface area of land serviced by the system.
				2 Storage tanks and vessels.	Storage tanks	(IS)	
				3 Chemical storage vessels.	Chemical storage vessels	(IS)	
				4 Chemical dosing equipment.	Chemical dosing equipment	(IS)	
				5 Nutrient treatment and equipment.	Nutrient treatment	(IS)	
				6 Outlet pipes and nozzles.	Outlet pipes	(IS)	
				7 Painting, anti-corrosion treatments and coating systems for storage tanks and vessels, pipelines, etc.	Painting and preservative treatments	(IS)	
				8 Builder's work in connection with land drainage.	N/A	N/A	
			item	**9** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		2 Testing of installations. **3** Commissioning of installations.	%	**10** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	**M2** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M3** Work outside the curtilage of the site is to be described and identified separately. **M4** Contractor-designed work is to be described and identified separately. Note: applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M5** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. N/A: not applicable to renewal and/or maintain work.

RETURN TO GROUP ELEMENT CONTENTS

Element 8.4: Fencing, railings and walls

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.4.1	Fencing and railings. **Definition:** fencing and railings, etc. to prevent access to or from an area, or to provide light or noise screening, with associated gates.	**1** Fencing: details, including height (m), to be stated.	m	**1** Timber, metal and concrete fencing systems, including all system components.	Fencing system	Fencing (F)	**Component specifications:** to be described for each item 1–10, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. F: included in fencing. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of fencing and railings, as appropriate. Major repairs: to include preparation, repair and making good of fencing and railings, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of fencing and railings, as appropriate. **Maintain actions** Planned: PPM regime applied to fencing and railings.
				3 Noise/light screening, including systems applied to fencing.	Noise/light screening	(F)	
				7 Fencing to provide light or noise screening, including systems attached to fencing (as item 3).	Noise/light screening	(F)	
				8 Excavating, concreting and backfilling holes for posts, etc.	Excavating, concreting and backfilling	(F)	
				9 Fixing railings to concrete and masonry.	Fixing railings	(F)	
				10 Painting, coating and preservative treatments.	Painting, coating and preservative treatments	(F)	
		2 Railings: details, including height (m), to be stated.		**2** Railings.	Railings	Railings	
		3 Gates: details to be stated.	nr	**4** Gates and gate posts associated with fencing and railings.	Gates	Gates	
				5 Security gates and gate posts associated with fencing and railings, including mechanical and electrical operating equipment, guide rails, etc.	Security gates	Security gates	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**6** Ironmongery for gates.	Ironmongery	Ironmongery	Proactive: visual inspection of fencing and railings. Reactive: minor repairs to fencing and railings. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Descriptions should include the amount of any PC sum included in the unit rates applied to the item.
			item	**11** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**12** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Curved work is to be described and identified separately. **M6** Work outside the curtilage of the site is to be described and identified separately. **M7** Contractor-designed work is to be described and identified separately. This only applies when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).
8.4.2	Walls and screens. **Definition:** non-retaining walls and screens, etc. to prevent access to or from an area, or to provide light or noise screening, with associated gates.	**1** Walls: details, including height (m), to be stated.	m	**1** Masonry walls and screens (e.g. brickwork, blockwork and stonework), including foundations, reinforcement and design joints.	Walls (state type)	Walls (state type)	**Component specifications:** to be described for each item 1–13, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. W: included in walls and screens.
				3 Trench and pit excavations.	N/A	N/A	
				4 Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous materials where not to be carried out as part of facilitating works).	N/A	N/A	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		m	**Note:** where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.			**Renewal actions** Replacement: to include removal of existing, preparation and replacement of walls and screens, as appropriate. Major repairs: to include preparation, repair and making good of walls and screens, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of walls and screens, as appropriate. Redecoration: for external walls and screens is to be described and identified with the renewal work items, as appropriate, and/or measured separately if part of a decoration programme of works. **Maintain actions** Planned: PPM on applicable walls and screens. Proactive: visual inspection of walls and screens.
			5 Disposal of surface water and groundwater.	N/A	N/A	
			6 Consolidating and compacting formation level to receive foundations.	N/A	N/A	
			7 Blinding.	N/A	N/A	
			8 Piers, including reinforcement.	(W)	N/A	
			9 Pier caps.	Pier caps	Pier caps	
			10 Copings, etc.	Copings	Copings	
	2 Screens: details, including height (m), to be stated.	m	**2** Masonry walls and screens with timber infill panels, including foundations.	Screens	Screens	
	3 Gates: details to be stated.	nr	**11** Gates and gate posts associated with walls and screens.	Gates	Gates	
			12 Security gates and gate posts associated with walls and screens, including mechanical and electrical operating equipment, guide rails, etc.	Security gates	Security gates	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
				13 Ironmongery for gates.	Ironmongery	Gates and security gates	Reactive: minor repairs to walls and screens. Re-pointing and re-bedding pier caps and copings as necessary. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Descriptions should include the amount of any PC sum included in the unit rates applied to the item.
			item	**14** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work.
8.4.3	Retaining walls. **Definition:** retaining walls that are not an integral part of the building.	**1** Retaining walls: details, including height above ground (m), to be stated.	m	**1** Concrete retaining walls, including reinforcement, formwork and design joints.	Retaining walls – concrete (RWC)	Retaining walls (RW)	**Component specifications:** to be described for each item 1–18, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of retaining walls, as appropriate.
				2 Fixings cast into or fixed to concrete retaining walls to retain masonry facing wall (e.g. brickwork, blockwork and stonework).	(RWC)	(RW)	
				3 Masonry facing walls to concrete retaining walls (e.g. brickwork, blockwork and stonework), including reinforcement and design joints.	Masonry facing walls	(RW)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**4** Masonry retaining walls (e.g. brickwork, blockwork and stonework), including reinforcement and design joints.	Retaining walls – masonry	(RW)	Refurbish: to include removal of existing, preparation and refurbishing of retaining walls, as appropriate. Redecoration: for retaining walls is to be described and identified with the renewal work items, as appropriate, and/or measured separately if part of decoration programme of works. **Maintain actions** Planned: PPM on applicable retaining walls. Proactive: visual inspection of retaining walls. Reactive: minor repairs to retaining walls. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions.
				5 Crib walls, including timber (and preservative treatment) and precast concrete headers and stretchers, combined units, and sand and gravel filling.	Crib walls	(RW)	
				6 Gabions, including steel mesh cages/mattresses and wiring together, graded stone filling and filter membranes.	Gabions	(RW)	
				7 Reinforced earth, including reinforcement layers (e.g. steel, polymeric and geotextile), selected fill material, anchors and soil nails, mesh to support soft landscape facing, concrete, timber facing, etc.	(RW)	(RW)	
				8 Other types of retaining structure.	Other types of retaining structure	(RW)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**9** Piles associated with external retaining walls (individual, continuous and steel sheet), including piling mats and platforms (installing and removing), piling rigs, cutting off excess lengths of piles or steel sheet piles, cutting out concrete to tops of piles, preparing pile heads and reinforcements, and pile tests.	Piles associated with external retaining walls	N/A	**M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M5** Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work.
				10 Trench and pit excavations, including earthwork support (including insertion and extraction of steel sheet piling, if used).	(RW)	N/A	
				11 Excavating below groundwater level.	(RW)	N/A	
				12 Disposal of excavated material, including tipping charges and landfill tax (including inert, non-hazardous and hazardous materials where not to be carried out as part of facilitating works). Note: where no contamination/ remediation strategy report exists, an allowance is to be made within the construction risk allowance for the extra cost of disposing of contaminated material.	(RW)	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**13** Disposal of surface water and groundwater.	(RW)	N/A	
				14 Consolidating and compacting formation level to receive foundations.	(RW)	N/A	
				15 Blinding.	(RW)	N/A	
				16 Weep holes.	(RW)	N/A	
				17 Land drainage forming an integral part of the retaining wall.	Land drainage	(RW)	
				18 Copings, etc.	Copings	N/A	
			item	**19** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**20** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
8.4.4	Barriers and guardrails. **Definition:** external vehicle and pedestrian barriers and guardrail systems, with associated gates.	**1** Vehicle restraint systems: details to be stated.	m	**1** Vehicle restraint systems, including parapets.	Vehicle restraint systems (VRS)	Barriers and guardrails (BG)	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. VRS: included in vehicle restraint systems.
				4 Excavating, disposal of excavated material, concreting and backfilling holes for posts, etc.	(VRS)	(BG)	
				5 Fixing barriers and guardrails to concrete and masonry.	(VRS)	(BG)	
				6 Painting, coating, etc.	Redecoration works	(BG)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	2 Pedestrian restraint systems: details to be stated.	m	**2** Pedestrian restraint systems, including parapets.	Pedestrian restraint systems	Barriers and guardrails	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of barriers and guardrails, as appropriate. Major repairs: to include preparation, repair and making good of barriers and guardrails, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of barriers and guardrails, as appropriate. Redecoration: for barriers and guardrails is to be described and identified with the renewal work items, as appropriate, and/or measured separately if part of a decoration programme of works. **Maintain actions** Planned: PPM on applicable barriers and guardrails. Proactive: visual inspection of barriers and guardrails. Reactive: minor repairs to barriers and guardrails.
	3 Vehicle and pedestrian control barriers and gates: details to be stated.	nr	**3** Vehicle and pedestrian control barriers and gates not associated with fencing.	Control barriers and gates	Barriers and guardrails	
		item	**7** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
		note	**8** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M1 Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).

Element 8.5: External fixtures

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.5.1	Site/street furniture and equipment (SSFE). **Definition:** furniture and equipment designed for use externally, but excluding items provided by a statutory undertaker.	**1** Site/street furniture and equipment: details to be stated.	nr	**1** Gates, where not part of fencing, railings, walls, screens, barriers or guardrails.	Gates	Gates	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of site/street furniture and equipment, as appropriate. Major repairs: to include preparation, repair and making good of site/street furniture and equipment, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of site/street furniture and equipment, as appropriate. Redecoration: for site/street lighting furniture and equipment is to be described and identified with the renewal work items, as appropriate, and/or measured separately if part of a decoration programme of works.
				2 Turnstiles.	Turnstiles	Turnstiles	
				3 Bollards, including removable and collapsible.	Bollards	Bollards	
				4 Seats, benches and tables.	Seats and benches	N/A	
				5 Litter bins, grit bins and dustbins (including continental bins).	Litter bins	N/A	
				6 Poster display units and notice boards.	Poster display units Notice boards	Poster display units Notice boards	
				7 Cycle stands.	Cycle stands	N/A	
				8 Directional signs, including reflective traffic signs.	Directional signage	Directional signage	
				9 Flagpoles.	Flagpoles	Flagpoles	
				10 Sports and playground equipment to be used externally.	Sports/ playground equipment	Sports/ playground equipment	
				11 Other furniture and equipment to be used externally.	Other furniture	Other furniture	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**12** Minor footbridges.	Minor footbridges	Minor footbridges	**Component specifications:** to be described for each item 1–19, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. SSFE: included in site/street furniture and equipment. **Maintain actions** Planned: PPM on applicable site/street furniture and equipment. Proactive: visual inspection of site/street furniture and equipment. Reactive: minor repairs to site/street furniture and equipment. **M1** Where components are to be enumerated, the number of components is to be stated.
				13 Clothes drying fittings.	Clothes drying fittings	N/A	
				14 Bus stops, bus shelters, telephone boxes/booths, post boxes and road signs where not the responsibility of a statutory undertaker.	Bus stops/ shelters	Bus stops/ shelters	
				15 Sculptures and other works of art external to the building envelope.	Sculptures and other external works of art	Sculptures	
				16 Site/street furniture and equipment that act as transformation devices (i.e. generate energy).	Site/street furniture and equipment	(SSFE)	
				17 Other site and street furniture and equipment.	Taken elsewhere as item 11	Taken elsewhere as item 11	
				18 All builder's work in connection with site/street furniture and equipment.	N/A	N/A	
				19 Painting, coating and preservation treatments.	Painting, coating and preservation treatments	Planned inspections	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			item	**20** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	**M2** Work outside the curtilage of the site is to be described and identified separately. **M3** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work.
			note	**21** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
8.5.2	Ornamental features. **Definition:** ornamental water features, etc.	**1** Water features: details to be stated.	nr	**1** Water features, etc. **2** Builder's work in connection with installing water features, etc.	Water features N/A	Water features N/A	**Component specifications:** to be described for each item, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of ornamental features, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of ornamental features, as appropriate.
			item	**3** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**4** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Other features: details to be stated.	nr	**5** Ornamental features.	Ornamental features	Ornamental features	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							Redecoration: for ornamental features is to be described and identified with the renewal work items, as appropriate, and/or measured separately if part of a decoration programme of works. **Maintain actions** Planned: PPM on applicable ornamental features. Proactive: visual inspection of ornamental features. Reactive: minor repairs to ornamental features. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Work outside the curtilage of the site is to be described and identified separately. **M3** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).

Element 8.6: External drainage

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.6.1	Surface water and foul water drainage. **Definition:** foul water and surface water drainage systems, below and above ground, from the first manhole beyond the enclosing walls of the building, the sewer connection or other outfall (e.g. on-site sewage treatment facility).	**1** Connections to statutory undertaker's sewers: details to be stated.	nr	**1** Connection to statutory undertaker's sewer or sewers.	N/A	N/A	**Component specifications:** to be described for each item 1–28, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. GG: included in gullies and gratings. SWFWD: included in surface water and foul water drainage. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of surface water and foul water drainage, as appropriate. Major repairs: to include preparation, repair and making good of surface water and foul water drainage, as appropriate.
		2 Drainage runs below ground: details, including depth of trench (m) and nominal pipe size (mm), to be stated.	m	**2** Trenches for pipework, including excavation, earthwork support, backfilling and disposal of surplus material.	(Taken with pipeline)	N/A	
				3 Pipeline and pipeline fittings.	Pipeline and pipeline fittings	Surface water and foul water drainage (SWFWD)	
				4 Granular beds and surrounds, concrete beds, cradles, haunchings and surrounds, and foamed concrete backfill.	Pipeline bedding, haunchings and surrounds	(SWFWD)	
				6 Connections to manholes, etc.	N/A	N/A	
				7 Connections to aboveground soil stacks, sanitary appliances and wastes.	N/A	N/A	
				8 Connections to ancillary equipment and systems (e.g. pumping stations and sewage treatment vessels).	N/A	N/A	
				9 Gullies and gratings, including road gullies and gratings.	Gullies and gratings (GG)	Gullies and gratings (GG)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**10** Rodding and access points.	Rodding and access points	(GG)	Refurbish: to include removal of existing, preparation and refurbishing of surface water and foul water drainage, as appropriate. **Maintain actions** Planned: PPM on applicable surface water and foul water drainage. Proactive: visual inspection of surface water and foul water drainage. Reactive: minor repairs to surface water and foul water drainage. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all branches, fittings, etc.
				20 Connections to sewers, where not statutory undertaker's sewers.	N/A	N/A	
				21 Connections to ancillary drainage systems.	N/A	N/A	
		3 Drainage runs above ground: details, including height above ground (m) and nominal size of pipe (mm), to be stated.	m	**5** Supports for aboveground drainage, including earth embankments.	Supports for aboveground drainage	N/A	
				18 Packaged pumping stations.	Packaged pumping stations	N/A	
				19 Outfalls/outlet headwalls.	Packaged pumping stations	Packaged pumping stations	
				22 Painting, anti-corrosion treatments and coating systems to drainage above ground.	Painting, anti-corrosion treatments and coating systems	(SWFWD)	
				23 Builder's work in connection with external surface water and foul water drainage.	N/A	N/A	
		4 Prefabricated channels: details, including nominal size (mm), to be stated.	m	**11** Prefabricated channels (i.e. in roads, paths and pavements).	Prefabricated channels	(SWFWD)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Manholes, etc.: details, including depth (m), to be stated.	nr	**12** Interceptor traps and fresh air inlets, and air release and wash out valves for pressure pipelines.	Interceptor traps and fresh air inlets	(SWFWD)	**M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).
				13 Inspection chambers, manholes and catch pits, including channels, benchings, step irons, access covers and other accessories.	Inspection chambers, manholes and catch pits	(SWFWD)	
				14 Soakaways.	Soakaways	(SWFWD)	
				15 Retention/storage tanks and vessels.	Retention/ storage tanks and vessels	N/A	
				16 Cesspools and septic tanks.	Cesspools and septic tanks	Septic tanks	
				17 Petrol interceptor units.	Petrol interceptor units	Petrol interceptor units	
		6 Alterations to existing external drainage systems: details to be stated.		**24** Alterations to existing external drainage systems.	N/A	N/A	
		7 Work to existing manholes, etc.: details to be stated.		**25** Work to existing manholes, etc.	N/A	N/A	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		8 Clearing existing drains: details to be stated.	nr/m	**26** Clearing existing drains.	N/A	Cleaning drains	**M6** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. N/A: not applicable to renewal and/or maintain work.
		9 Sealing redundant drains: details to be stated.		**27** Sealing redundant drains, including filling entire length of drain with foam concrete, etc.	N/A	N/A	
		10 Filling disused manholes, etc.: details to be stated.	nr	**28** Filling disused manholes.	N/A	N/A	
		11 Testing of installations.	%	**29** Testing and commissioning of external surface water and foul water drainage.	(Included in item)	CCTV surveys of drains	
		12 Commissioning of installations.		**31** Testing and commissioning.			
			item	**30** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**32** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.6.2	Ancillary drainage systems. **Definition:** systems with a storage tank or vessel for the reception of foul water and sewage at one level, for transfer by pump to drains or sewers at a higher level; sewage treatment systems to meet local special needs where it is necessary to treat human or animal sewage to render it safe for discharge into the statutory undertaker's drainage system; and sustainable urban drainage schemes	**1** Pumping stations: details to be stated.	nr	**1** Pumping stations.	Pumping stations	Ancillary drainage systems (ADS)	**Component specifications:** to be described for each item 1–10, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. ADS: included in ancillary drainage systems. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of ancillary drainage systems, as appropriate. Major repairs: to include preparation, repair and making good of ancillary drainage systems, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of ancillary drainage systems, as appropriate.
				7 Control components located externally.	Control components	(ADS)	
				8 Monitoring equipment located externally.	Monitoring equipment	(ADS)	
				9 Painting, anti-corrosion treatments and coating systems for ancillary drainage systems.	Painting, anti-corrosion treatments and coating systems	(ADS)	
				10 Builder's work in connection with the provision of ancillary drainage equipment and systems.	N/A	N/A	
			item	**11** Sundry items associated with the provision of ancillary drainage equipment: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**13** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Ejector stations: details to be stated.	nr	**2** Ejector stations.	Ejector station	(ADS)	
		3 Storage/retention tanks and vessels: details to be stated.		**3** Storage/retention tanks and vessels (e.g. concrete and proprietary), including supports, forming protective bunds, etc.	Storage/ retention tanks/ vessels	(ADS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Sewage treatment systems: details to be stated.	nr	**4** Sewage treatment systems, including receivers or storage vessels and treatment vessels (e.g. concrete and proprietary), control components and monitoring equipment.	Sewage treatment system	(ADS)	**Maintain actions** Planned: PPM on applicable ancillary drainage systems. Proactive: visual inspection of ancillary drainage systems. Reactive: minor repairs to ancillary drainage systems. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** The area measured for sustainable urban drainage schemes is the surface area of land served by the scheme. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
		5 Enzyme systems: details to be stated.		**5** Enzyme systems.	Enzyme systems	(ADS)	
		6 Sustainable urban drainage schemes: details to be stated.	m^2	**6** Sustainable urban drainage schemes (SUDS).	Sustainable urban drainage schemes	(ADS)	
		7 Testing of installations.	%	**12** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		8 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M7** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.6.3	External chemical, toxic and industrial liquid waste drainage. **Definition:** laboratory/ industrial waste drainage, from the external face of the external wall to the point of disposal.	**1** Drainage runs below ground: details, including depth of trench (m) and nominal size of pipe (mm), to be stated.	m	**1** Trenches for pipework, including excavation, earthwork support, backfilling and disposal of surplus material.	N/A	External chemical, toxic and industrial liquid waste drainage (ECTILWD)	**Component specifications:** to be described for each item 1–15, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. ECTILWD: included in external chemical, toxic and industrial liquid waste drainage. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external laboratory and industrial liquid waste drainage, as appropriate. Major repairs: to include preparation, repair and making good of external laboratory and industrial liquid waste drainage, as appropriate. Refurbish: to include removal of existing, preparation and refurbishing of external laboratory and industrial liquid waste drainage, as appropriate.
				2 Pipework and pipework fittings.	Pipework and pipework fittings	(ECTILWD)	
				3 Granular beds and surrounds, concrete beds, cradles, haunchings and surrounds, and foamed concrete backfill.	Drainage bedding, haunchings and surrounds	(ECTILWD)	
				5 Connections, tanks, etc.	N/A	(ECTILWD)	
				11 Connections to equipment.	N/A	N/A	
				14 Painting, anti-corrosion treatment and coating systems for drainage pipelines.	Painting, anti-corrosion treatment and coating systems	(ECTILWD)	
				15 Builder's work in connection with external laboratory and industrial liquid waste drainage.	N/A	N/A	
			item	**16** Sundry items.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**18** Subcontractor on costs.	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	2 Drainage runs above ground: details, including height above ground (m) and nominal size of pipe (mm), to be stated.	m	**4** Supports for aboveground drainage, including earth embankments. See items 2, 5, 11 and 14 above.	N/A Drainage runs above ground	N/A (ECTILWD)	**Maintain actions** Planned: PPM on applicable external laboratory and industrial liquid waste drainage. Proactive: visual inspection of external laboratory and industrial liquid waste drainage. Reactive: minor repairs to external laboratory and industrial liquid waste drainage. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all branches, fittings, etc. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
	3 Equipment and plant: details to be stated.	nr	**6** Storage tanks and vessels.	Storage tanks	Storage tanks	
			7 Settlement tanks.	Settlement tanks	Storage tanks	
			8 Effluent treatment plant.	Effluent treatment	Effluent treatment	
			9 Dosing equipment.	Dosing equipment	Dosing equipment	
			10 Sterilisation equipment.	Sterilisation equipment	Sterilisation equipment	
			12 Control components located externally.	Control components	Control components	
			13 Monitoring equipment located externally.	Monitoring equipment	Monitoring equipment	
	4 Testing of installations.	%	**17** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	5 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
						M4 Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M5** Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M7** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. N/A: not applicable to renewal and/or maintain works.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.6.4	Land drainage. **Definition:** disposal systems for drainage of waterlogged ground.	**1** Drainage runs below ground: details, including depth of trench (m) and nominal size of pipe (mm), to be stated.	m	**1** Filter drains, with or without pipes.	Filter drains	Land drainage (LD)	**Component specifications:** to be described for each item 1–16, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. LD: included in land drainage. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of land drainage, as appropriate. Major repairs: to include preparation, repair and making good of land drainage, as appropriate. **Maintain actions** Planned: PPM on applicable land drainage. Proactive: visual inspection of land drainage. Reactive: minor repairs to land drainage.
				2 Fin drains, with or without pipes.	Fin drains	(LD)	
				3 Mole drains.	Mole drains	(LD)	
				4 Trenchless drains.	Trenchless drains	(LD)	
				5 Pipe drains, including fittings.	Pipe drains	(LD)	
				7 Trenches for pipework, including excavation, earthwork support, backfilling and disposal of surplus material.	Trenches for pipework	(LD)	
				8 Pipework and pipework fittings (to point of disposal).	Pipework and pipework fittings	(LD)	
				9 Granular fill and surrounds.	Granular fill and surrounds	(LD)	
				10 Geotextile filters and trench linings.	Geotextile filters and trench linings	(LD)	
				11 Silt traps, silt trap manholes, etc.	Silt traps/silt trap manholes	(LD)	
				14 Outfalls/outlet headwalls.	Outfalls	(LD)	
				15 Builder's work in connection with land drainage.	N/A	N/A	
				16 Clearing existing ditches, channels, etc.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		item	**17** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all branches, fittings, etc. **M3** The area measured for drainage blankets is the surface area of land serviced by the blanket. **M4** The area measured for land drainage to parklands is the surface area of the parkland. **M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
		note	**19** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
	2 Manholes, etc.: details, including depth (m), to be stated.	nr	**12** Soakaways. **13** Storage tanks and vessels.	Soakaways Storage tanks and vessels	(LD) (LD)	
	3 Drainage blankets: details to be stated.	m^2	**6** Drainage blankets (e.g. comprising layer of aggregate, porous pipes and upper/lower geotextile pipes).	Drainage blanket	N/A	
	4 Land drainage for parkland: details, including centres of main runs (m) and laterals (m), to be stated.	ha	See items 1–16 above.	(LD)	(LD)	
	5 Testing of installations.	%	**18** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	6 Commissioning of installations.					

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M6 Descriptions should include the amount of any PC sum included in the unit rates applied to the item. **M7** Work outside the curtilage of the site is to be described and identified separately. **M8** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M9** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. N/A: not applicable to renewal and/or maintain work.

Element 8.7: External services

Note: Where testing and commissioning is required to be measured under element 8.7, the terms should include the following works:

1 Testing includes:

(1) testing equipment and consumables

(2) calibration

(3) site installation tests

(4) static testing, including testing records

(5) performance testing, including performance test records

(6) fuels required for testing.

2 Commissioning includes:

(1) preliminary checks, setting systems and installations to work, regulation of such systems and installations, and commissioning records

(2) temporary operation of equipment to client's requirements

(3) fuels required for commissioning.

3 Setting all mechanical and electrical services and installations to work after completion of commissioning (initial operation).

Note: This element of tabulated rules of measurement has been aligned with NRM 1 to create a standardised costs structure that links all construction (C) sub-elements, components and inclusions with the applicable renewal (R) and maintain (M) work items. Specific construction works that are not applicable (N/A) to maintenance works have been identified throughout.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.1	Water mains supply. **Definition:** piped water supply systems bringing water from the statutory undertaker's mains to the point of entry into the building, including distribution to external user points (e.g. external plant and equipment) and fire hydrants.	**1** Connections to statutory undertaker's water main: details to be stated.	nr	**1** Connections to statutory undertaker's water main.	Connections to water mains	Water mains supply (WMS)	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of water mains supply, as appropriate. Major repairs: to include preparation, repair and making good of water mains supply, as appropriate. **Maintain actions** Planned: PPM on applicable water mains supply. Proactive: visual inspection of water mains supply. Reactive: minor repairs to water mains supply. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** For connections to external plant and equipment, the number of draw-off points is to be stated.
				5 Water meters, where not provided by the statutory undertaker, including chambers and enclosures.	Meters	(WMS)	
				6 Fire hydrants.	Hydrants	Hydrants	
				7 Trace heating – pipework.	Trace heating	Trace heating	
				8 Thermal insulation.	Thermal insulation	Thermal insulation	
				9 Constructing stop valve surface boxes.	Stop valve boxes	(WMS)	
		2 Connections to external plant and equipment: details to be stated.		**3** Connections to external plant and equipment.	Connection to plant and equipment	(WMS)	
		3 Service runs: details to be stated.	m	**2** Water main from statutory undertaker's mains to water meter, including pipelines and pipeline fittings, excavation and backfilling trenches, ground anchor blocks, etc.	Water main from statutory undertaker's mains	(WMS)	
				4 Mains water supply and distribution of water supply to external plant and equipment, including pipelines and pipeline fittings, excavation and backfilling trenches, ground anchor blocks, etc.	Mains water supply and distribution	(WMS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		4 Rainwater harvesting systems: details, including the number of collection points (nr), to be stated.	nr	**10** Rainwater harvesting systems external to the building, including collection pipelines.	Rainwater harvesting systems	Rainwater harvesting systems	**Component specifications:** to be described for each item 1–11, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. WMS: included in water mains supply. **M3** The length of linear components measured is their extreme length, over all branches, fittings, etc. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Work outside the curtilage of the site is to be described and identified separately.
		5 Grey water systems: details, including the number of collection points (nr), to be stated.		**11** Grey water systems external to the building, including collection pipelines.	Grey water systems	Grey water systems	
		6 Testing of installations.	%	**13** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		7 Commissioning of installations.					
			item	**12** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**14** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M6 Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M7** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
8.7.2	Electricity mains supply.	**1** Connections to statutory undertaker's electricity main: details to be stated.	nr	**1** Connections to statutory undertaker's electricity main.	N/A	Electricity mains supply	**Component specifications:** to be described for each item 1–7, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. EMS: included in electricity mains supply.
		2 Service runs: details to be stated.	m	**2** Distribution of HV electricity to on-site transformer, including cables, excavating and backfilling trenches, etc.	HV and LV cables and wiring	Electricity mains supply (EMS)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			m	**4** Distribution of LV electricity to main switchgear panel within the building, including excavating and backfilling trenches, etc.	Distribution of LV electricity	(EMS)	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of electricity mains supply, as appropriate. Major repairs: to include preparation, repair and making good of electricity mains supply, as appropriate. **Maintain actions** Planned: PPM on applicable electricity mains supply. Proactive: visual inspection of electricity mains supply. Reactive: minor repairs to electricity mains supply. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions.
				5 Constructing draw pits, including access covers.	Draw pits	(EMS)	
				6 Marker tape, cover tiles and other special protection for electrical cables.	Marker tape, cover tiles etc.	(EMS)	
			item	**8** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
		3 Transformer substations: details to be stated.	nr	**3** Transformer substations, including packaged substations.	Transformer stations	Transformer stations	
		4 External electricity generation installation/plant: details to be stated.		**7** External electricity generation plant, including emergency or standby generation plant.	Generator plant	Generator plant	
			%	**9** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M6** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.3	External transformation devices. **Definition:** systems using the natural elements (i.e. wind turbines and sun) to generate energy.	**1** Wind turbines: details to be stated.	nr	**1** Wind turbines where external to the building.	Wind turbines	External transformation devices (ETD)	**Component specifications:** to be described for each item 1–8, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. ETD: included in external transformation devices. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of external transformation devices, as appropriate. Major repairs: to include preparation, repair and making good of external transformation devices, as appropriate. **Maintain actions** Planned: PPM on applicable external transformation devices. Proactive: visual inspection of external transformation devices.
				6 Distribution of LV electricity to main switchgear panel within building, excavating and backfilling trenches, etc.	LV distribution	(ETD)	
				7 Constructing draw pits, including access covers.	Draw pits	(ETD)	
				8 Marker tape, cover tiles and other special protection for electrical cables.	Marker tape	(ETD)	
				9 Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Photovoltaic devices: details, including surface area of units (m^2), to be stated.	nr	**2** Photovoltaic devices where external to the building.	Photovoltaic devices	(ETD)	
				3 Solar collectors where external to the building. See item 6 above.	Solar collectors	(ETD)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		3 Other transformation devices: details to be stated.	nr	**4** Other transformation devices.	Other transformation devices	(ETD)	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M3** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
				5 Generators in connection with transformation devices. See item 6 above.	Generator plant	Generator plant	
		4 Testing of installations.	%	**11** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		5 Commissioning of installations.					

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.4	Electricity distribution to external plant and equipment. **Definition:** subcircuit power installations from the subdistribution boards to external equipment terminating at socket outlets, fuse connection units and other accessories, including final connections to permanent mechanical and electrical plant and equipment, external features (e.g. water features), etc.	**1** Connections to external plant or equipment: details to be stated.	nr	**1** General LV power installations to external plant and equipment, including cables, excavating and backfilling trenches, etc.	LV power installations	Electrical distribution external plant and equipment (EDEPE)	**Component specifications:** to be described for each item 1–12, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. EDEPE: included in electrical distribution external plant and equipment. UPS: uninterruptible power supply. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of electricity distribution to external plant and equipment, as appropriate. Major repairs: to include preparation, repair and making good of electricity distribution to external plant and equipment, as appropriate.
				2 LV switchgear and distribution boards, where not included as part of the submains distribution.	LV switchgear and distribution board	(EDEPE)	
				3 Uninterruptible power supply (UPS) installations, etc. specific to external plant and equipment.	UPS	(EDEPE)	
				4 Cables and wiring, including support components from subdistribution boards to fuse connection units, etc.	LV cables and wiring	UPS	
				5 Conduits and cable trunking, including all fittings and support components.	Conduits, cable trunking and supports	(EDEPE)	
				6 Earthing and bonding components.	Earthing and bonding	(EDEPE)	
				7 Constructing draw pits, including access covers.	Draw pits	Earthing and bonding	
				8 Marker tape, cover tiles and other special protection for electrical cables.	Marker tape	(EDEPE)	
				9 Fuse connection units and other outlet accessories.	Fuse connection unit	(EDEPE)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**10** Final connections to equipment (e.g. to pumping stations and ejector stations).	N/A	(EDEPE)	**Maintain actions** Planned: PPM on applicable electricity distribution to external plant and equipment. Proactive: visual inspection of electricity distribution to external plant and equipment. Reactive: minor repairs to electricity distribution to external plant and equipment. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions.
				11 Separate power installations to specialist mechanical and electrical equipment (e.g. to sewage treatment plant).	Specialist power installations	N/A	
				12 Final connections to specialist mechanical and electrical equipment where not carried out by the equipment installer.	N/A	(EDEPE)	
			item	**13** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Service runs: details to be stated.	m	See items included in component 1 to external plant or equipment, as appropriate.	N/A	(EDEPE)	
		3 Testing of installations. **4** Commissioning of installations.	%	**14** Testing and commissioning: set to work.	(Included in item)	(Included in item)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M4 Work outside the curtilage of the site is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M6** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning. N/A: not applicable to renewal and/or maintain work.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.5	Gas mains supply. **Definition:** piped natural gas supply systems taking gas from the statutory undertaker's mains to the gas meter and taking LPG from external storage vessels to the distribution point, including mains gas supply and distribution of gas supply to external user points (e.g. to external plant and equipment).	**1** Connections to statutory undertaker's gas main: details to be stated.	nr	**1** Connections to statutory undertaker's gas main.	N/A	Gas mains supply	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of gas mains supply, as appropriate. Major repairs: to include preparation, repair and making good of gas mains supply, as appropriate. **Maintain actions** Planned: PPM on applicable gas mains supply. Proactive: visual inspection of gas mains supply. Reactive: minor repairs to gas mains supply. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions.
			item	**7** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**9** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Service runs: details to be stated.	m	**2** Gas main from statutory undertaker's mains to point of mains connection within the building, including pipelines and fittings, excavating and backfilling trenches, etc.	Gas mains	Gas mains supply	
				3 Connections to external plant and equipment.	N/A		
				4 Mains gas supply and distribution of gas supply to external plant and equipment, including pipelines and fittings, excavation and backfilling trenches.	Distribution pipelines		
		3 Governing stations: details to be stated.	nr	**5** Governing stations.	Governing stations	Gas mains supply	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**6** LPG installations, including storage bottles and containers, pipelines and fittings to gas distribution points in the building.	LPG installations		**M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M6** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
		4 Testing of installations.	%	**8** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		5 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.6	Telecommunications and other communication system connections. **Definition:** connection of telecommunications systems, cable television and other communication systems from statutory undertaker's or other service provider's supply to the main distribution point within the building.	**1** Telecommunications system connections: details to be stated.	nr	**1** Connections to statutory undertaker's or service provider's supply.	N/A	Telecommuni-cations and other communication system connections (TOCSC)	**Component specifications:** to be described for each item 1–4, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. TOCSC: telecommunication and other communication system connections. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of TOCSC, as appropriate. Major repairs: to include preparation, repair and making good of TOCSC, as appropriate. **Maintain actions** Planned: PPM on applicable TOCSC. Proactive: visual inspection of TOCSC. Reactive: minor repairs to TOCSC. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The length of linear components measured is their extreme length, over all obstructions.
				2 Distribution of telecommunication, cable television, and other communication systems, including wiring to main distribution point within building, cables, excavating and backfilling trenches, etc.	Tele-communications distribution systems	(Included in item)	
				3 Constructing draw pits, including access covers.	Draw pits	(Included in item)	
				4 Marker tape, cover tiles and other special protection for electrical cables.	Marker tape	(Included in item)	
			item	**5** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**7** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Cable television connections: details to be stated.	nr	**8** Cable television connections.	N/A	(TOCSC)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		3 Other communication system connections: details to be stated.	nr	**9** Other communication systems.	N/A	(TOCSC)	**M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M6** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
		4 Service runs: details to be stated.	m	**10** Service runs.	Service runs	(TOCSC)	
		5 Testing of installations.	%	**6** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		6 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.7	External fuel storage and piped distribution systems. **Definition:** storage tanks and vessels external to the building, and piped supply systems distributing oil, petrol or diesel from storage tanks or vessels to the entry point within the building or to external plant and equipment.	**1** Fuel storage and piped distribution systems: details to be stated.	nr	**1** Oil, petrol and diesel.	Oil, petrol and diesel	Fuel storage and piped distribution systems (FSPD)	**Component specifications:** to be described for each item 1–11, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. FSPD: included in fuel storage and piped distribution systems. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of fuel storage and piped distribution systems, as appropriate. Major repairs: to include preparation, repair and making good of fuel storage and piped distribution systems, as appropriate. **Maintain actions** Planned: PPM on applicable fuel storage and piped distribution systems.
				2 Storage tanks and vessels not supplied in connection with heat source installations.	Storage tanks and vessels	(FSPD)	
			N/A	**3** Proprietary supports forming an integral part of the storage tank/vessel unit.	Proprietary supports	(FSPD)	
				4 Off-site painting/anti-corrosion treatments.	Off-site painting/ anti-corrosion treatments	(FSPD)	
				5 Connections to external plant and equipment.	N/A	N/A	
			m	**6** Distribution pipelines and pipeline fittings, from storage tank or vessel to plant or equipment being served, above and below ground, including excavating and backfilling trenches, etc.	Pipelines and fittings	(FSPD)	
			nr	**7** Pipeline components/ancillaries (e.g. valves and pumps).	Pipeline components/ ancillaries	(FSPD)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr/(m^2)	**8** Thermal insulation.	Thermal insulation	Thermal insulation	Reactive: minor repairs to fuel storage and piped distribution systems. **M1** Where components are to be enumerated, the number of components is to be stated **M2** The length of linear components measured is their extreme length, over all obstructions. **M3** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately.
				9 Off-site painting/anti-corrosion treatments.	(Taken in item 4)	(FSPD)	
			N/A	**10** Meters.	Meters	N/A	
			nr	**11** Monitoring equipment.	Monitoring equipment	Monitoring equipment	
			item	**12** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
			note	**14** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Service runs: details to be stated.	m	See item 5–11 above.	Service runs	(FSPD)	
		3 Testing of installations.	%	**13** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		4 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M6** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
8.7.8	External security systems. **Definition:** external observation and access control installations, etc.	**1** Surveillance equipment: details of each type of system to be stated.	item/ nr	**1** Surveillance equipment (e.g. CCTV).	Surveillance equipment	External security systems (ESS)	**Component specifications:** to be described for each item 1–12, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. ESS: included in external security systems.
				9 Camera poles, etc., including excavating, concreting and backfilling holes for poles, etc.	Camera poles	(ESS)	
				10 General-purpose power installations for external security systems, including cables, excavating and backfilling trenches, etc.	General power installations	(ESS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
		item/ nr	**11** Constructing draw pits, including access covers.	Draw pits	(ESS)	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of external security systems, as appropriate. Major repairs: to include preparation, repair and making good of external security systems, as appropriate. **Maintain actions** Planned: PPM on applicable external security systems. Proactive: visual inspection of external security systems. Reactive: minor repairs to external security systems. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Where components are to be itemised, the number of key elements comprising the component are to be identified, described and enumerated within the description of the component.
			12 Marker tape, cover tiles and other special protection for electrical cables.	Marker tape	(ESS)	
		item	**13** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	
		note	**15** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
	2 Security detection equipment: details of each type of system to be stated.	item/ nr	**2** Security detection equipment.	Security detection	(ESS)	
	3 Security alarm equipment: details of each type of system to be stated.	nr	**3** Security alarm equipment.	Security alarms	(ESS)	
	4 Gate access control systems: details of each type of system to be stated.		**4** Gate access control systems.	Gate access control	(ESS)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Gate entry systems: details of each type of system to be stated.	nr	**5** Gate entry systems (audio and visual).	Gate entry systems	(ESS)	**M3** The length of linear components measured is their extreme length, over all obstructions. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).
		6 Security lights and lighting systems: details of each type of system to be stated.	item/ nr	**6** Security lights and lighting systems.	Security lighting	(ESS)	
		7 Other security systems: details of each type of system to be stated.		**7** Other security systems.	Other security systems	(ESS)	
		8 Service runs: details to be stated.	m	**8** Cables/wiring and interlinking components of external security systems, including excavating and backfilling trenches, protection, etc.	Cables/wiring	(ESS)	
		9 Testing of installations.	%	**14** Testing and commissioning: reset to work.	(Included in item)	(Included in item)	
		10 Commissioning of installations.					

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M7 State whether external security systems are included with building security systems (cross-reference to sub-element 5.12.2). **M8** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
8.7.9	External street lighting systems. **Definition:** external illumination systems, including lighting for pedestrian areas, paths and roads, and illuminated traffic signs.	**1** External lighting to pedestrian areas: details to be stated.	nr	**1** External lighting, columns, poles, bollards, masts, luminaires and lamps, cables and lighting for external surfaces/areas.	External lighting	Site/street lighting systems (SSLS)	**Component specifications:** to be described for each item 1–9, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. SSLS: included in site/street lighting systems.
				2 Fixing luminaires and lamps to building fabric.	Luminaires and lamps	(SSLS)	
				4 General-purpose power installations for external illumination systems, including cables, excavating and backfilling trenches, etc.	General power installations	(SSLS)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**5** Constructing draw pits, including access covers.	Draw pits	(SSLS)	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of site/street lighting systems, as appropriate. Major repairs: to include preparation, repair and making good of site/street lighting systems, as appropriate. **Maintain actions** Planned: PPM on applicable site/street lighting systems. Proactive: visual inspection of site/street lighting systems. Reactive: minor repairs to site/street lighting systems. **M1** Where components are to be enumerated, the number of components is to be stated.
				6 Marker tape, cover tiles and other special protection for electrical cables.	Marker tape	(SSLS)	
				7 Lighting control points.	Lighting control points	(SSLS)	
				8 Painting and anti-corrosion treatments for poles, bollards, masts, etc.	Painting and preservative treatment	(SSLS)	
		2 External lighting for paths: details to be stated.	nr	See items in component 1 as appropriate.		(SSLS)	
		3 External lighting for roads: details to be stated.		See items in component 1 as appropriate.		(SSLS)	
		4 Illuminated traffic signs: details to be stated.		**3** Illuminated traffic signs.	Illuminated traffic signs	(SSLS)	
		5 Testing of installations.	%	**10** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
		6 Commissioning of installations.	item	**9** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			note	**11** Subcontractor on costs (where applicable).			**M2** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M3** Work outside the curtilage of the site is to be described and identified separately. **M4** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M5** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.7.10	Local/district heating installations. **Definition:** local/district heating installations, including heat source.	**1** Heat source associated plant and equipment: details to be stated.	item/nr	**1** Externally located heat source (e.g. boiler plant), including ancillary plant and equipment.	Heat source, associated plant and equipment	Local/district heating installations (LDHI)	**Component specifications:** to be described for each item 1–6, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. LDHI: included in local district heating installations. **Renewal actions** Replacement: to include removal of existing, preparation and replacement of local/district heating systems, as appropriate. Major repairs: to include preparation, repair and making good of local/district heating systems, as appropriate. **Maintain actions** Planned: PPM on applicable local/district heating systems. Proactive: visual inspection of local/district heating systems. Reactive: minor repairs to local/district heating systems.
				2 Instrumentation and control components for heat source.	Instrumentation and control components	(LDHI)	
				5 Instrumentation and control components for heating systems.	Instrumentation and control components	(LDHI)	
				6 Thermal insulation.	Thermal insulation	(LDHI)	
		2 Service runs: details to be stated.	m	**3** Heat distribution pipelines from heat source to point of entry into building, including pipelines, pipeline fittings and ancillaries (e.g. valves and pumps).	Heat distribution pipelines	(LDHI)	
		3 External heating ducts and duct access covers: details to be stated.		**4** Heating ducts and access covers for local/district heating pipelines.	Heating ducts and access covers	(LDHI)	
		4 Testing of installations.	%	**8** Testing and commissioning: set to work.	(Included in item)	(Included in item)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
		5 Commissioning of installations.	item	**7** Sundry items: details to be stated.	Actions arising from maintenance and planned inspections	Planned inspections	**M1** Where components are to be enumerated, the number of components is to be stated. **M2** Where components are to be itemised, the number of key elements comprising the component are to be identified, described and enumerated within the description of the component. **M3** The length of linear components measured is their extreme length, over all obstructions. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M5** Work outside the curtilage of the site is to be described and identified separately.
			note	**9** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M6 Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). **M7** The percentage additions for testing and commissioning are to be applied to the total cost of the items comprising the sub-element. A single combined percentage addition can be applied to cover the costs of both testing and commissioning.
8.7.11	Builder's work in connection with external services.	**1** Ducts, etc.: details to be stated.	nr/m	**1** Ducts, etc. for external mains services.	Ducts	Builder's work in connection with external services (BWIC)	**Component specifications:** to be described for each item 1–13, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules.
				7 On-site painting or anti-corrosion treatments for mechanical service equipment, including fuel storage tanks and vessels, pipelines, etc.	On-site painting or anti-corrosion treatments	(BWIC)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr/m	**8** Forming/cutting holes, mortices, sinkings, chases, etc., including making good.	N/A	N/A	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of builder's work in connection with external services, as appropriate. Major repairs: to include preparation, repair and making good of builder's work in connection with external services, as appropriate. **Maintain actions** Planned: PPM on applicable builder's work in connection with external services. Proactive: visual inspection of builder's work in connection with external services. Reactive: minor repairs to builder's work in connection with external services. **M1** Where components are to be enumerated, the number of components is to be stated.
				9 Pipe ducts, sleeves, etc.	Pipe ducts and sleeves	(BWIC)	
				10 Trench covers, duct covers and frames.	Trench covers, duct covers and frames	(BWIC)	
				11 Stopping up and sealing holes.	N/A	(BWIC)	
				12 Fire-resistant stopping, including fire sleeves.	Fire-resistant stopping	(BWIC)	
				13 Identification labelling and colour coding of service installations and systems.	Identification labelling and colour coding	(BWIC)	
			item	**15** Sundry items: details to be stated.	Actions arising from planned inspections	Planned inspections	
			note	**17** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	
		2 Supports for external storage tanks, vessels, etc.: details to be stated.	item/ nr	**2** Supports for external storage tanks, vessels, etc.	Supports for external storage tanks	(BWIC)	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
				Renewal (R)	Maintain (M)	
	3 Fuel bunds, etc. for storage/retention tanks and vessels: details to be stated.	item/ nr	**3** Fuel bunds, etc. for storage/ retention tanks and vessels.	Fuel bunds	(BWIC)	**M2** Where components are to be itemised, the key elements comprising the component are to be identified, described and enumerated within the description of the component. **M3** Where the linear length of a component is to be measured, the length measured is its extreme length, over all fittings, etc. **M4** Where a percentage addition is to be applied, the percentage addition is to be applied to the cost targets for sub-elements 8.7.1–8.7.11 inclusive, as appropriate. Each system is to be identified separately. **M5** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
	4 Protective compounds, fencing and storage racks associated with LPG installations, etc.: details to be stated.		**4** Protective compounds, fencing and storage racks associated with LPG installations, etc.	Compounds and fencing for LPG	(BWIC)	
	5 Protective compounds connected with transformer substations, etc.: details to be stated.		**5** Protective compounds connected with transformer substations, etc.	Compounds connected with transformer substations	(BWIC)	
	6 Bases for service equipment: details, including size, to be stated.	nr	**6** Bases for service equipment, including for transformation devices (i.e. wind turbines, photovoltaic devices, etc.).	Bases for service equipment	(BWIC)	
	7 Other builder's work in connection with external services: details to be stated.		**14** Other builder's work items in connection with external services.	Other BWIC	(BWIC)	
	8 Testing of installations.	%	**16** Testing and commissioning: set to work.	(Included in item)	(Included in item)	
	9 Commissioning of installations.					

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M6 Work to existing buildings is to be described and identified separately. **M7** Work outside the curtilage of the site is to be described and identified separately. **M8** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work.

Element 8.8: Minor building works and ancillary buildings

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.8.1	Minor building works. **Definition:** refurbishment of, and alterations to, existing separate and external small ancillary buildings, including overhauling existing mechanical and electrical plant and equipment.	**1** Refurbishment of existing ancillary buildings: details, including GIFA (m^2), to be stated.	item/ nr	**1** Refurbishment (including alterations) of existing separate and external small ancillary buildings (e.g. boiler houses). **4** Works arising out of party wall awards/agreements. **5** Other minor building works to ancillary buildings.	N/A	N/A	N/A: not applicable to renewal and/or maintain work. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** Where components are to be itemised, the number of key elements comprising the component are to be identified, described and enumerated within the description of the component. **M3** The area measured is the GIFA, measured using the rules of measurement for ascertaining the GIFA. **M4** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
		2 Overhauling existing mechanical and electrical plant and equipment: details to be stated.		**2** Overhauling existing mechanical and electrical plant and equipment (externally located).	N/A	N/A	
		3 Repairs to existing fences, railings, walls and screen walls: details to be stated.	nr/m	**3** Repairs to existing fences, railings, walls, screen walls and retaining walls.	N/A	N/A	
			item	**6** Sundry items.	N/A	N/A	
			note	**7** Subcontractor on costs.	N/A	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M5 Work outside the curtilage of the site is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).
8.8.2	Ancillary buildings and structures. **Definition:** separate and external small ancillary buildings and structures, including specialist structures.	**1** Minor ancillary buildings – built on site: details including GIFA (m^2), to be stated.	nr	**1** Boiler houses.	Boiler houses	Ancillary buildings and structures (ABS)	**Renewal actions** Replacement: to include removal of existing, preparation and replacement of ancillary buildings and structures, as appropriate. Major repairs: to include preparation, repair and making good of ancillary buildings and structures, as appropriate.
				2 Substation buildings or housings, where not supplied and installed by the statutory undertaker.	Substation buildings or housings	(ABS)	
				3 Fuel storage buildings, etc.	Fuel storage buildings	(ABS)	
				4 Specialist structures (e.g. external cooling towers).	Specialist structures	(ABS)	
				5 Bicycle stores.	Bicycle stores	(ABS)	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
			nr	**6** Prefabricated/timber workshops, sheds, stores, etc.	Prefabricated/ timber workshops, sheds and stores	(ABS)	**Component specifications:** to be described for each item 1–9, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. ABS: included in ancillary buildings and structures. **Maintain actions** Planned: PPM on applicable ancillary buildings and structures. Proactive: visual inspection of ancillary buildings and structures. Reactive: minor repairs to ancillary buildings and structures. **M1** Where components are to be enumerated, the number of components is to be stated. **M2** The area measured is the GIFA, measured using the rules of measurement for ascertaining the GIFA.
				7 Guard huts, etc.	Guard huts	(ABS)	
				8 Canopies for external areas.	Canopies for external areas	(ABS)	
				9 Other ancillary buildings.	Other ancillary buildings	(ABS)	
		2 Minor ancillary buildings – prefabricated.	nr	See items included in component 1 as appropriate.		(ABS)	
			item	**10** Sundry items: details to be stated.	Sundry items	Sundry items	
			note	**11** Subcontractor on costs (where applicable).	Subcontractor on costs	Subcontractor on costs	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element. **M4** Work outside the curtilage of the site is to be described and identified separately. **M5** Work arising out of party wall awards/agreements is to be described and identified separately. **M6** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project).

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
8.8.3	Underpinning for external site boundary walls. **Definition:** inserting additional foundation support under and around existing foundations, including boundary walls.	**1** Underpinning to external site boundary walls, etc.	m	**1** Underpinning to external site boundary walls.	Underpinning	N/A	**Component specifications:** to be described for each item 1–8, to determine the appropriate reference service life (RSL) and to assign the applicable planned maintenance task schedules. **Renewal actions** Underpinning works: as per rules M1–M5 below. **Maintain actions** Covered by structural surveys included in group element 11. **M1** The length of underpinning measured is the extreme length. **M2** Other cost-significant components are to be described and identified separately. Such components are to be measured by area (m^2), linear measurement (m) or enumerated (nr) separately in accordance with the rules of measurement for this sub-element.
				2 Preliminary trenches and underpinning pits, excavation and earthwork support.	(Included in item)	N/A	
				3 Temporary supports.	(Included in item)	N/A	
				4 Disposal of excavated material.	(Included in item)	N/A	
				5 Cutting away existing projecting foundations, etc.	(Included in item)	N/A	
				6 Preparing existing work to receive pinning up of new work.	(Included in item)	N/A	
				7 Concrete, including reinforcement and formwork.	(Included in item)	N/A	
				8 Masonry (brickwork, blockwork, etc.).	(Included in item)	N/A	
			item	**9** Sundry items: details to be stated.	Sundry items	N/A	
			note	**10** Subcontractor on costs (where applicable).	Subcontractor on costs	N/A	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Maintenance descriptor		Measurement rules for maintenance works
					Renewal (R)	Maintain (M)	
							M3 Curved work is to be described and identified separately. **M4** Work arising out of party wall awards/agreements is to be described and identified separately. **M5** Contractor-designed work is to be described and identified separately. This applies only when the contractor is responsible for designing specific elements and/or components of the building project (i.e. not the entire building project). N/A: not applicable to renewal and/or maintain work.

Group element 9: Maintenance contractor's management and administration costs

Group element 9 comprises the following elements:

9.1 Client's requirements:

- 9.1.1 Site accommodation
- 9.1.2 Site records
- 9.1.3 Completion and post-completion requirements
- 9.1.4 Management tasks

9.2 Main contractor's cost items:

- 9.2.1 Management and staff
- 9.2.2 Site establishment
- 9.2.3 Temporary services
- 9.2.4 Security
- 9.2.5 Safety and environmental protection
- 9.2.6 Control and protection
- 9.2.7 Mechanical plant
- 9.2.8 Temporary works
- 9.2.9 Site records
- 9.2.10 Completion and post-completion requirements
- 9.2.11 Cleaning
- 9.2.12 Fees and charges
- 9.2.13 Site services
- 9.2.14 Insurance, bonds, guarantees and warranties.
- 9.2.15 Operational tasks
- 9.2.16 Periodic tasks

Note 1: where the unit of measurement for a component or a sub-component has been given as 'per week', a week should mean a period of 7 calendar days irrespective of public holidays.

Note 2: works associated with minor demolition works are included in group element 7. Works associated with general site preparation and groundworks, and permanent roads, paths and pavings are included in group element 8. The provision of temporary roads and services is included in group element 9.

RETURN TO GROUP ELEMENT CONTENTS

Element 9.1: Client's requirements

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.1.1	Site accommodation.	**1** Site accommodation.	T/E	May be included in group element 12.	Client's site accommodation is optional for inclusion in NRM 3.
		2 Furniture and equipment.	T/E	May be included in group element 12.	Client's furniture and equipment are optional for inclusion in NRM 3.
		3 Telecommunications and IT systems.	T/E	May be included in group element 12.	Client's telecommunications and IT systems are optional for inclusion in NRM 3.
9.1.2	Site records.	**1** Site records.	T/E	Updating operation and maintenance manuals: include with group element 12.	**1** Operation and maintenance manuals – paper and electronic copies on CD ROM/DVD/USB.
				Updating CDM files: include in group element 12.	**2** Compilation of health and safety file if required by installation contractor – paper and electronic copies on CD ROM/DVD/USB (part of NRM 1 works).
			nr	**3** Web-based documentation project management systems for the collation, review and delivery of maintenance requirements, commissioning, asset and other facilities management-related information, and health and safety files: • program software and installation • hardware (e.g. computers, monitors, printers, etc.).	
			item	**4** Uploading data, and initial implementation and training of building management team by system provider.	**3** Attendance on system provider by maintenance contractor (included in component 9.2.9.2).

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.1.3	Completion and post-completion requirements.	**1** Handover requirements.	T/E	May be included in group element 12.	**1** Training of building user's staff in the operation and maintenance of the building engineering services systems (part of construction project works).
			item	**2** Provision of spare parts for the maintenance of building engineering services.	
				3 Provision of tools and portable indicating instruments for the operation and maintenance of building engineering service systems.	
		2 Operation and maintenance services.	per week	**1** Operation and maintenance of building engineering service installations, mechanical plant and equipment, etc. during the defects liability period, period for rectifying defects, maintenance period or other specified period (i.e. additional services to those normally required by the contract).	**1** Ongoing maintenance of internal and external planting (included in sub-elements 4.1.7 or 8.3.2, as appropriate).
9.1.4	Management tasks.	**1** Maintenance specific management tasks.	item/(nr)	**1** Air condition inspections	Note: The management tasks can be undertaken by designated client personnel or delivered by contracted direct labour (when outsourced). For example, security guards and reception duties may include undertaking some of the management tasks.
				2 Building logbooks and O&M manuals	
				3 Display Energy Certificates (DECs)	
				4 Electrical installation – management audit	
				5 Electrical lighting certificates logbook	
				6 Energy Performance Certificate (EPC)	
				7 Evaporating cooling systems – management audits	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			item/(nr)	**8** Fire risk assessments	
				9 Fire safety logbook	
				10 Inventory of Greenhouse Gases (F-Gases)	
				11 Lifting equipment – management audit	
				12 Lifts and escalators – management audit	
				13 Local extract ventilation management audit	
				14 Noise assessment and records	
				15 Pressure systems – management audits	
				16 Smoke control and pressurisation – management audits	
				17 Tree reports	
				18 Waste disposal	
				19 Waste electrical and electronic equipment – (WEEE) management audit	
				20 Water systems – management audit	
				21 Other management tasks (to be stated)	

Element 9.2: Maintenance contractor's cost items

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.2.1	Management and staff.	**1** Project-specific management and staff.	per week (number of staff by number of worker hours per week by number of weeks)	Maintenance contractor's specific management and staff, such as:	**1** External design consultants (included in group element 11).
				1 Maintenance contractor's account manager.	
				2 Maintenance manager.	**2** Security staff (included in sub-element 9.2.4).
				3 Supervisors, including works/trade package managers, building services engineering managers/ coordinators and off-site production managers.	
				4 Health and safety manager/officers.	
				5 Commissioning manager – building engineering services.	
				6 Materials management staff (e.g. store person).	
				7 Administrative staff, including secretary, document controllers, finance clerks, etc.	
				8 Other management and staff.	
		2 Visiting management and staff.	per week (number of staff by number of worker hours per week by number of weeks)	Maintenance contractor's visiting management and staff, such as:	**1** Visiting management and staff for which an allowance has been made within the maintenance contractor's overheads (included in element 10.1).
				1 Managing director, regional director, operations director, commercial director, etc.	
				2 Quality manager.	
				3 Contract/commercial manager.	
				4 Health and safety manager.	
				5 Environmental manager/consultant.	
				6 Other visiting management and staff.	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		3 Extraordinary support costs (if required under the terms of the maintenance contract).	item	**1** Legal advice costs (i.e. solicitors).	**1** Extraordinary support costs for which an allowance has been made within the maintenance contractor's overheads (included in element 10.1).
				2 Recruitment costs.	
				3 Team-building costs.	
				4 Other extraordinary support costs.	
			per week (number of days per week by number of weeks)	**5** Day transport.	
				6 Personnel transport (i.e. transportation of work operatives to site).	
			per week (number of staff by number of days by number of weeks)	**7** Temporary living accommodation (e.g. long/ medium-term accommodation costs).	
				8 Subsistence payments.	
				9 Out-of-hours provision.	
		4 Staff travel.	nr (number of occasions)	Maintenance contractor's visiting management and staff, such as:	
				1 Visits to client and consultants' offices.	
				2 Visits to subcontractors' offices/works.	
				3 Overseas visits.	
				4 Accommodation charges and overnight expenses.	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.2.2	Site establishment.	**1** Site accommodation.	T/E	May be included in group element 12.	Site accommodation for site establishment is not part of NRM 3.
		2 Temporary works in connection with site establishment.		May be included in group element 12.	Temporary works for site establishment is not part of NRM 3.
		3 Furniture and equipment.		May be included in group element 12.	Furniture and equipment for temporary site accommodation are not part of NRM 3.
		4 IT systems.	per person (nr)	**1** Computer hardware, including purchase/ rental, installation, initial setup, maintenance and running costs, such as desktop computers and laptop computers, CAD stations, server and network equipment, printers and plotters, and other computer system hardware.	**1** Computer and printer consumables (included in component 9.2.2.5).
				2 Software and software licences.	**2** Document management, including electronic data management systems (included in component 9.2.2.6).
				3 Internet lines, modems, routers and connections (i.e. email and internet capability).	
				4 Wide-area network (WAN lines and connections).	
				5 Line rental charges.	
				6 Internet/website addresses.	
				7 Internet service provider (ISP) charges.	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			per week (number of staff by number of weeks)	**8** Line call charges.	
			per person (nr)	**9** IT support and maintenance.	
		5 Consumables and services.	quantity per week	**1** Stationery.	
				2 Computer and printer consumables (e.g. ink cartridges).	
				3 Postage.	
				4 Courier charges.	
				5 Tea, coffee, water bottles, etc.	
				6 First aid consumables.	
				7 Photocopier consumables (e.g. paper and toners).	
				8 Fax consumables (e.g. paper and toners).	
				9 Drawing printer consumables (e.g. ink cartridges).	
		6 Bought-in services. **Definition:** services outsourced by the maintenance contractor.	T/E	May be included in group element 12.	Bought-in services are not part of NRM 3.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		7 Sundries.	item	**1** Maintenance contractor's signboards.	
				2 Safety and information notice boards.	
					3 Fire points.
				4 Shelters.	
				5 Tool stores.	
					6 Crane signage.
					7 Client's composite signboards.
9.2.3	Temporary services.		T/E	Taken with work item costs.	Temporary services are not part of NRM 3.
9.2.4	Security.	**1** Security staff.		Security staff is covered by security (part of operations costs) if part of wider LCC.	Security staff are not part of NRM3.
		2 Security equipment.		Security passes are covered by security (part of operations costs) if part of wider LCC.	Provision of security equipment is not part of NRM3.
			T/E	See sub-element 8.7.8 for permanent provision.	Taken in sub-element 8.7.8.
		3 Hoardings, fences and gates.	nr/m/item	Security hoardings covered by security (part of operations costs if part of wider LCC).	Provision of hoardings, fencing and gates is not part of NRM 3.
				See element 8.4 for permanent provision.	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.2.5	Safety and environmental protection. **Definition:** works required to satisfy requirements of CDM Regulations.	**1** Safety programme.	per week (number of staff by number of worker hours per week by number of weeks)	Works required to satisfy requirements of CDM Regulations.	**1** Health and safety manager/officers (included in sub-element 9.2.1). **2** Welfare facilities (included in sub-element 9.2.2).
				1 Health and safety manager/officers.	
			nr	**2** Safety audits, including safety audits carried out by external consultant.	
				3 Staff safety training.	
			item	**4** Site safety incentive scheme.	
				5 Notices and information to neighbours.	
			per set (nr)	**6** Personal protective equipment (PPE), including those for the client and consultants.	
				7 Personal protective equipment (PPE) for multi-service gangs.	
			nr	**8** Fire points.	
				9 Temporary fire alarms.	
				10 Fire extinguishers.	
			item	**11** Statutory safety signage.	
			per week /number of weeks	Include if part of wider LCC.	**12** Nurse.
				Include if part of wider LCC.	**13** Traffic marshals.
				Include if part of wider LCC.	**14** Temporary traffic lights.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		2 Barriers and safety scaffolding.	per week/ item	**1** Guard rails and edge protection (e.g. to edges of suspended slabs and roofs), including supply, erection, maintenance and dismantling on completion of the works.	**1** Debris netting/plastic sheeting provided as part of access scaffolding (included in sub-element 9.2.8). **2** Fan protection provided as part of access scaffolding (included in sub-element 9.2.8).
				2 Temporary staircase balustrades (i.e. to new staircases during construction), including supply, erection, maintenance and dismantling on completion of the works.	
				3 Lift shaft protection, including supply, erection, maintenance and dismantling on completion of the works.	
				4 Protection to holes and openings in ground floor slabs, suspended slabs, etc., including supply, erection, maintenance and dismantling on completion of the works.	
				5 Debris netting/plastic sheeting, including supply, erection, maintenance and dismantling on completion of the works.	
				6 Fan protection, including supply, erection, maintenance and dismantling on completion of the works.	
			per week (number of inspections by number of weeks)	**7** Scaffold inspections.	
			per week/ item	**8** Hoist run-offs, including supply, erection, maintenance and dismantling on completion of the works.	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			per week/ item	**9** Protective walkways, including supply, erection, maintenance and dismantling on completion of the works.	
				10 Other safety measures, including supply, erection, maintenance and dismantling on completion of the works.	
		3 Environmental protection measures.	T/E	Part of operation costs – include if part of wider LCC.	Environmental protection measures are not part of NRM 3. Environmental monitoring (included in sub-element 9.2.5).
9.2.6	Control and protection.	**1** Surveys, inspections and monitoring.	T/E	Taken elsewhere in specialist/consultancy fees.	Refer to specialist fees in group element 11.
		2 Setting out.		Included with construction work items (taken elsewhere).	Part of work item.
		3 Protection of works.		Included with construction work items (taken elsewhere).	
		4 Samples.		Construction-related samples.	
		5 Environmental control of building.		Temporary environmental control of buildings.	Covered by operation costs.
9.2.7	Mechanical plant.	**1** General plant and equipment.		Common user mechanical plant and equipment used specifically for renewal and maintain works.	Plant and equipment used for specific construction operations, such as: **1** Earthmoving plant (included in group elements 1, 8 or 0, as appropriate). **2** Piling plant (included in group elements 1 or 8, as appropriate). **3** Paving and surfacing plant (included in group element 8). **4** Wheel spinners and road sweepers (included in component 9.2.11.2). **5** Access scaffolding (included in sub-element 9.2.8).

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		2 Tower cranes.		Type of craneage to be provided should be stated (with each type separately quantified).	**1** Temporary electrical supply to tower crane (included in sub-element 9.2.3).
			per week	**1** Hire charges (type of tower crane to be stated, including type and length of jib, and lifting capacity).	
			per week (number of operators by number of worker hours per week by number of weeks)	**2** Crane operator.	
				3 Overtime for crane and operator.	
			nr (number of bases)	**4** Piles for tower crane bases, including installation and removal on completion of the works (size of base in m^2, and number of piles supporting base, to be stated).	
			m^2	**5** Temporary bases and/or ground anchors for tower cranes, including installation, maintenance, removal and reinstatement of all disturbed surfaces on completion of the works (size of base in m2 to be stated).	
			per week	**6** Ties.	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			nr	**7** Connections to temporary electrical supply.	
				8 Bringing to site, erection, testing and commissioning.	
			per week	**9** Periodic safety checks/inspections.	
			nr	**10** Dismantling and removing from site.	
			item	**11** Other costs specific to tower crane, such as chain pack and sundries, relief operator, banksman and protection cage.	
					Temporary voids in building structure for craneage, hoists, etc., including filling voids after removal. Note: where the tower crane is sited within the building structure, the completion of works in connection with the building structure and fabric should be measured in accordance with the measurement rules for the specific types of work required (e.g. infilling of voids within suspended floor construction should be measured in accordance with element 2.2).
		3 Mobile cranes.	per week (number of days hired per week by number of weeks)	**1** Mobile crane hire charges, including driver/ operator charges (type of mobile crane to be stated).	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			per week (number worker hours per visit, or day hired, by number of days hired per week by number of weeks)	**2** Attendance.	
			nr (cost per visit)	**3** Other costs specific to mobile crane hire.	
		4 Hoists: type of hoist to be provided should be stated (with each type separately quantified).	per week	State type of hoists to be provided, and include protection systems and bringing to site, erecting, testing and commissioning, and dismantling and removing form site after the works are completed.	Provision of hoists is not part of NRM 3.
		5 Access plant.	item	**1** Forklifts.	
				2 Scissor lifts.	
				3 Loading platforms.	
				4 Maintenance of mechanical access equipment.	
				5 Other costs specific to mechanical access equipment.	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		6 Concrete plant.	per week	Include plant operator and bases for plant, including power connections and bringing plant to site, erecting, testing and commissioning, and dismantling and removing from site.	
		7 Other plant.	per week	Small plant and tools.	
9.2.8	Temporary works.	**1** Access scaffolding.		User access scaffolding (type of stated), including bringing to site, erecting, initial safety checks, dismantling and removing from site after works completed.	
		2 Temporary works.		Common user temporary works (type to be stated), e.g. crash decks, protection for existing trees and floodlights, etc.	
9.2.9	Site records.	**1** Maintenance records.		Unless otherwise indicated, costs associated with the following should be deemed to be included in management and staff costs:	
			item	**1** Photography: • camera purchase • consumables • printing and presentation.	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			item	**2** Maintenance records: • progress reporting • operation and maintenance manuals • as-built/installed drawings and schedules • coordinating, gathering and compiling health and safety information, and presentation to CDM • coordinating, gathering and compiling health and safety information • compilation of health and safety file (if required).	
		2 Document/ information management systems.	per week (number of operators by number of worker hours per week by number of weeks)	**1** Electronic document/information management systems, including web-based platforms. **2** Attendance on system provider.	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.2.10	Transition and exit requirements.	**1** Testing and commissioning plan.	item	If not included in sub-element 9.2.1, costs associated with the following should be included here: **1** Preparation of commissioning plan.	**1** Testing and commissioning of services (included in group elements 5 and/or 8, as appropriate).
		2 Handover.	item	If not included in sub-element 9.2.1, costs associated with the following should be included here: **1** Preparation of handover plan.	
				2 Training of building user's staff in the operation and maintenance of the building engineering service systems.	
				3 Provision of spare parts for the maintenance of building engineering services.	
				4 Provision of tools and portable indicating instruments for the operation and maintenance of building engineering service systems.	
				5 Pre-completion inspections.	
				6 Final inspections.	
		3 Post-completion services.	T/E	May be included in group element 12.	Post-completion services are not part of NRM 3.
9.2.11	Cleaning.	**1** Site tidying.		Site tidying.	
		2 Maintenance of roads, paths and pavings.		Maintenance of roads, paths and pavings.	
		3 Waste disposal.		Removal of waste	

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.2.12	Fees and charges.	**1** Fees.	item	**1** Building control fees, where not paid by the client.	**1** Building control fees, where paid by the client (included in group element 11).
				2 Oversailing fees, where not paid by the client.	**2** Oversailing fees, where paid by the client (included in group element 11).
				3 Considerate Constructors' Scheme fees (or alternative scheme operated by local authority).	**3** Building scheme registration fees or similar fees, where paid by the client (included in group element 11).
				4 Building scheme registration fees (e.g. NHBC Buildmark) or similar fees, where not paid by the client.	
		2 Charges.	N/A	Charges for temporary works and licences are not part of NRM 3.	**1** Statutory undertaker's charges in connection with permanent services to the building (included in element 8.7, as appropriate).
					2 Statutory undertaker's charges in connection with temporary services (included in sub-element 9.2.3).
9.2.13	Site services.	**1** Temporary works.	taken with work item elsewhere	Temporary works are not part of NRM 3.	**1** Temporary screens (included in sub-element 7.1.1).
					2 Supports for small openings cut into existing walls or after removal of internal walls, etc. (included in sub-element 7.1.1).
					3 Temporary or semi-permanent support for unstable structures or facades, i.e. structures not to be demolished (included in sub-element 7.4.1).

RETURN TO GROUP ELEMENT CONTENTS

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		2 Multi-service gang.	per week (number of staff by number of worker hours per week by number of weeks)	**1** Ganger.	
				2 Labour.	
				3 Forklift driver.	
				4 Service gang plant and transport.	
9.2.14	Insurances, bonds, guarantees and warranties.	**1** Works insurances.	item	**1** Contractor's all risks (CAR) insurance.	
				2 Contractor's plant and equipment insurance.	
				3 Temporary buildings insurance.	
				4 Terrorism insurance.	
				5 Other insurances in connection with the works.	
				6 Insurance premium tax (IPT).	
				7 Allowance for recovery of all or part of insurance premium excess.	
		2 Public liability insurances.	item	**1** Non-negligence insurance.	
				2 Professional indemnity insurance.	
				3 Insurance premium tax (IPT).	
				4 Allowance for recovery of all or part of insurance premium excess.	

Sub-element	Component	Unit	Included (aligned to NRM 1 structure)	Excluded
	3 Inspections	item	**1** Statutory compliance inspections.	Refer to section 9.2.15 for specific operational tasks that require inspections.
			2 Air conditioning inspections (COVID-19).	
			3 Other forms of inspections (state types).	
	4 Client's (main contractor's) liability insurances.	item	**1** Management and staff, including administrative staff.	
			2 Works operatives.	
			3 Insurance premium tax (IPT).	
			4 Allowance for recovery of all or part of insurance premium excess.	
	5 Other insurances.	item	**1** Client's loss of liquidated damages.	
			2 Latent defects cover.	
			3 Motor vehicles.	
			4 Other insurances.	
			5 Insurance premium tax (IPT).	
			6 Allowance for recovery of all or part of insurance premium excess.	
	6 Bonds.	T/E	May be included in group element 12.	Bonds are not part of NRM 3.
	7 Guarantees.	item	**1** Parent company guarantees.	
			2 Product guarantees (insurance backed).	
	8 Warranties.	item	**1** Collateral warranties.	
			2 Funder's warranties.	
			3 Purchaser's and tenant's warranties.	
			4 Other warranties.	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
9.2.15	Operational tasks	**1** Operational tasks specific to maintenance	item/(nr)	**1** Abestos register. **2** Emergency and panic escape doors and fire exits. **3** Emergency lighting – power supply and maintained fittings inspections. **4** Fire alarm system – daily/weekly inspections. **5** Automatic doors release mechanisms – electronic secure escape doors and fire exits. **6** Fire evacuation drill. **7** Fire exit signage. **8** Fire hydrant – weekly checks. **9** Hose reels – daily, monthly and annual checks. **10** Insurance periodic inspections. **11** Independent water risk assessment (legionella). **12** Meter readings (electric, gas, oil and water). **13** Oil storage tanks – above ground. **14** Plant room checks. **15** Portable appliance testing – PAT user checks.	Note: the operational tasks are undertaken on a building specific basis and not directly applicable to the physical built asset. Some of these tasks may be undertaken by the resident maintenance operative and some maybe undertaken by the security guards and reception duties or sub-contracted specialist suppliers.

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
			item/(nr)	**16** Portable fire extinguishers – weekly checks.	
				17 Smoke control systems – 3-monthly and annual checks.	
				18 Sprinkler systems – inspections.	
				19 Visual inspections of voids, cavities, etc.	
				20 Water risk assessment (legionella).	
				21 Water sampling and testing – closed systems.	
				22 Other operational tasks (type to be stated).	
9.2.16	Periodic maintenance	**1** Periodic maintenance tasks	Cyclical periods (to be stated)	**1** Ducting – volume control dampers (5 yearly).	Note: these maintenance tasks are undertaken on periodic cycle and are extra to planned maintain services group items in table 5. The annual maintenance costs may include an annual provision for a portion of the item – for example 20% of the electrical wiring testing (so over 5 years all installations are tested).
				2 Electrical fixed wiring testing (2 to 5 yearly).	
				3 Hose reels – static and swinging (5 yearly).	
				4 Main switch panel at supply intake (2 yearly).	
				5 Portable appliance testing (2 yearly).	
				6 Sprinkler system (3 yearly, 5 yearly, etc.).	
				7 Suspended facade access equipment (10 yearly).	
				8 Insurance periodic inspections (2 yearly).	
				9 Vertical platform lifts (2 yearly).	
				10 Other periodic maintenance tasks (to be stated).	

Sub-element		Component	Unit	Included (aligned to NRM 1 structure)	Excluded
		2 Redecorations programme	Cyclical periods (to be stated)	**1** External walls – depending on finishes type. **2** External windows and doors – timber, etc. **3** Internal walls, including skirtings. **4** Internal ceilings. **5** Internal windows and doors.	Note: decorations of renewal works is to be taken with individual items elsewhere. Where there is cyclical redecorations programme then the frequency is to be defined – for example externals every 7 yearly cycle and internal redecorations on a 5 yearly cycle.

Group element 10: Maintenance contractor's overheads and profit

Group element 10 comprises the following elements:

10.1 Maintenance contractor's overheads

10.2 Maintenance contractor's profit

Element	Included	Excluded
1 Maintenance contractor's overheads.	**1** The costs of head office setup and administration proportioned to each contract by the maintenance contractor.	**1** Visiting management and staff for which an allowance has been made within the maintenance contractor's management and administration costs (included in component 9.2.1.2). **2** Extraordinary support costs for which an allowance has been made within the maintenance contractor's management and administration costs (included in component 9.2.1.3).
2 Maintenance contractor's profit.	**1** The amount of net profit that the maintenance contractor needs to achieve.	

Group element 11: Project and design team fees

Group element 11 comprises the following elements:

11.1 Consultants' fees

11.2 Main contractor's pre-construction fees

11.3 Main contractor's design fees

Note: items that are different to NRM 1 are identified by italics in the following table.

Note: where the unit of measurement for a component or a sub-component has been given as 'per week', a week should mean a period of 7 calendar days irrespective of public holidays.

Element 11.1: Consultants' fees

Component	Unit	Included	Excluded
11.1.1 Project team and design team consultants' fees.	%/item	Note: percentage applied to the works cost estimate, or item if actual fees known.	Excluded from NRM 3 as not normally required for maintenance works: **5** *Architect.* **14** *Construction/logistics/sequencing advisers.*
		1 Professional advisers.	
		2 Project managers.	
		3 Contract administrators.	
		4 Client's agents.	
		6 Quantity surveyor/cost manager.	
		7 Building services engineer(s).	
		8 Structural engineers.	
		9 CDM coordinators.	
		10 Interior designers.	
		11 Landscape architects.	
		12 Infrastructure engineers.	
		13 Drainage engineers.	
	sum	**15** Fees in connection with procurement of the maintenance contracts.	
		16 Fees in connection with updating asset register and condition surveys.	
		17 Fees in connection with other forms of assessments (e.g. *Disability Discrimination Act* 1995, etc.).	

Component	Unit	Included	Excluded
11.1.2 Other consultants' fees.	%/item	Note: percentage applied to the works cost estimate, or item if actual fees known. **1** Measuring surveyor to carry out topographical survey of site, and to verify ground levels/contours, physical features, existing boundaries, adjacent properties and site access, etc.	
		2 Drainage and utilities surveyor to trace and locate existing drainage and other services, both underground and above ground, on or near the site, including water, electricity, telecommunications, data lines and oil/fuel pipelines, as well as advising on extent of existing utilities.	
		3 Geotechnical engineer to check trial pits, boreholes and borehole logs, and geology of site, including underground workings, laboratory and soil tests, groundwater observation and pumping tests, geophysical surveys, etc.	
		4 Environmental consultant for environmental audits; contamination surveys for asbestos, methane, toxic waste, chemical waste and radioactive substances; and preparation and management of remediation strategy/action plan.	

RETURN TO GROUP ELEMENT CONTENTS

Component	Unit	Included	Excluded
		5 Ecologist.	
		6 Arboriculturist to survey and provide advice on trees, etc.	
		7 Party wall surveyor to prepare party wall notices and awards/agreements.	
		8 Rights of light surveyor for rights of light agreements.	
		9 Asbestos consultant.	
		10 Acoustics consultant.	
		11 Facade consultant.	
		12 Facade access consultant.	
		13 Lift consultant.	
		14 Fire consultant.	
		15 Building control consultant.	
		16 Traffic consultant to examine traffic records, take traffic count, advise on traffic patterns, carry out computer simulation of existing traffic flows, perform delay analysis and advise on noise levels.	
		17 Invasive weeds consultant.	
		18 Sustainability consultant to advise on renewable technologies and sustainability issues.	

Component	Unit	Included	Excluded
		19 Archaeologists to examine existing records and archaeological remains – desktop study.	
		20 Environmental assessment method assessor (e.g. BREEAM or Code for Sustainable Homes).	
		21 Facilities manager to advise on operational and maintenance matters.	
		22 Value engineering facilitator.	
		23 Risk management facilitator.	
		24 Building surveyor to carry out structural/ dilapidations survey of adjoining buildings and carry out condition surveys.	
		25 Unexploded devices consultant to research and advise on possibility of unexploded bombs on site, etc.	
		26 Photographer to carry out a photographic survey of the site.	
		27 Specialist contractor/consultant to provide early advice on viability of ground source heating.	
		28 Other specialist consultants to be stated.	

Component	Unit	Included	Excluded
11.1.3 Site investigation fees.	item	**1** Site investigation.	**1** Removal of toxic or hazardous materials, e.g. asbestos (included in sub-element 0.1.1).
		2 Geotechnical investigation.	**3** Trial pits.
		5 Intrusive investigations for toxic or hazardous materials (e.g. asbestos-containing materials).	**4** Pile probing.
		6 Other site investigations (to be stated).	
11.1.4 Specialist support consultants' fees.	item	**1** Planning consultants to advise on planning matters and facilitate the planning process.	
		2 Political consultants to assist with planning applications.	
		3 Letting agents (e.g. for advice on market needs, design proposals and selling).	
		4 Legal advice regarding property to advise on ownership of site, restrictive covenants, easements, boundaries, party wall agreements, highway agreements, local authority agreements and air rights.	
		5 Legal advice regarding construction to advise on construction contracts, warranties, financial protection measures, etc.	
		6 Legal advice regarding environmental factors.	
		7 Tax specialists to advise on VAT, availability and recovery of capital allowances, tax relief in respect of land remediation and other specialist tax matters.	
		8 Grants advice, to advise on availability of grants for construction works.	
		9 Other specialist support consultants (to be stated).	

Element 11.2: Main contractor's pre-construction fees

Component	Unit	Included	Excluded
11.2.1 Management and staff fees.	per week (number of staff by number of worker hours per week by number of weeks)	Management and staff, such as: **1** Project director. **2** Project manager. **3** Construction manager. **4** Commercial manager. **5** Quantity surveyors. **6** Procurement manager. **7** Planning/programming manager and staff. **8** Design manager. **9** Temporary works design engineers. **10** Work package managers. **11** Building services engineering managers/co-ordinators. **12** Health and safety manager. **13** Secretary/administrative support. **14** Other pre-construction management and staff.	

RETURN TO GROUP ELEMENT CONTENTS

Component	Unit	Included	Excluded
	sum	**15** Bid costs that are not included as part of the overheads and profit. **16** TUPE costs.	
11.2.2 Specialist support service fees.	item	**1** Legal advice (i.e. solicitors). **2** Specialist subcontractor advice/ participation. **3** Geotechnical investigations, procured by main contractor as part of pre-construction services. **4** Site investigations, procured by main contractor as part of pre-construction services. **5** Other pre-construction support services.	
11.2.3 Temporary accommodation, services and facilities charges.	per week	**1** Offices, including rental of temporary office space. **2** Service providers' charges for water, electricity and gas. **3** Rates. **4** Furniture and equipment, including workstations. **5** Office equipment, including photocopiers.	

Component	Unit	Included	Excluded
	per week	**6** Telecommunications, including internet and intranet access. **7** IT systems, including hardware, printers, plotters, etc. **8** Office consumables. **9** Cleaning. **10** Other costs associated with the provision of pre-construction accommodation, services and facilities. **11** Reinstating accommodation to original condition on completion of pre-construction services.	
11.2.4 Maintenance contractor's overheads and profit.	%	**1** Maintenance contractor's overheads and profit associated with pre-construction services. Note: percentage applied to the total estimated cost of sub-elements 11.2.1, 11.2.2 and 11.2.3. **2** Management and staff fees. **3** Specialist support service fees. **4** Temporary accommodation, services and facilities charges.	
	sum	**5** Contract setup costs included in tender price during mobilisation.	

Element 11.3: Main contractor's design fees

Component	Unit	Included	Excluded
11.3.1 Fees for main contractor's design consultants. Note: where design liability is to be transferred to the main contractor (i.e. where a design and build or other main contractor-led design contract strategy is to be used) and all, or some, of the consultants in the design team are to be novated, the balance of the consultants' fees due after novation has occurred is to be transferred from element 11.1 to element 11.3.	%/item	Note: percentage applied to the building works estimate, or item if actual fees known. **1** Architect. **2** Building services engineers. **3** Structural engineers. **4** Interior designers. **5** Landscape architects. **6** Infrastructure engineers. **7** Drainage engineers. **8** Site investigation services (by specialist subcontractor or consultant). **9** Other design consultants or specialist services. Note: the gap between the design and consultancy services required by the contractor and those covered by the services of the novated design team needs to be considered, with an allowance made for any gaps within (i.e. an allowance for the gap in design and consultancy services provision).	
	sum	**10** Building services engineers. **11** Drainage engineers. **12** Landscape architects. **13** Interior designers.	

Group element 12: Other project costs

Group element 12 comprises the following elements:

12.1 Client-definable maintenance-related costs

Note 1: where the unit of measurement for a component or a sub-component has been given as 'per week', a week should mean a period of seven calendar days irrespective of public holidays.

Element 12.1: Client-definable maintenance-related costs

Component	Unit	Included	Excluded
12.1.1 Land acquisition costs.	item	**1** Costs in connection with land acquisition.	Not normally part of maintenance works unless agreed to be in scope.
12.1.2 Client finance costs.	item	**1** Costs in connection with funding of maintenance and renewal works project.	
12.1.3 Fees.	item	**1** Planning fees.	**1** Building control fees, where paid by the maintenance contractor (included in sub-element 9.2.12).
		2 Building control fees, where not paid by the main contractor	**2** Oversailing fees, where paid by the maintenance contractor (included in sub-element 9.2.12).
		3 Oversailing fees, where not paid by the main contractor.	**3** Building scheme registration fees (e.g. NHBC Buildmark) or similar fees, where paid by the maintenance contractor (included in sub-element 9.2.12).
		4 Fees in connection with party wall awards.	**4** Considerate Constructors' Scheme fees (or alternative scheme operated by local authority), where paid by the main contractor (included in sub-element 9.2.12).
		5 Fees in connection with rights of light agreements.	**5** Other fees in connection with licences, permits and agreements, where paid by the main contractor (included in sub-element 9.2.12).
		6 Building scheme registration fees (e.g. NHBC Buildmark) or similar fees, where not paid by the main contractor.	
		7 Fees in connection with other agreements between the client and neighbours to facilitate the building project.	
		8 Other fees in connection with licences, permits and agreements, where not paid by the main contractor.	

RETURN TO GROUP ELEMENT CONTENTS

Component	Unit	Included	Excluded
12.1.4 Charges.		Excluded from scope of NRM 3.	**1** Adoption charges in connection with highways.
			2 Maintenance costs in connection with highways.
			3 Adoption charges in connection with services (e.g. sewers, water, electricity and gas).
			4 Maintenance costs in connection with services.
12.1.5 Planning contributions.		Excluded from NRM 3 as this relates to new build (which is covered by NRM 1). Typically not included in maintenance works.	**1** Building works subject to a planning contribution that forms an integral part of the building project (included in the appropriate group element, element or sub-element).
			2 Direct financial contributions in connection with planning consent (e.g. section 106 and section 278 contributions in the UK).
			3 Environmental improvement works.
12.1.6 Insurances.	item	**1** Insurance for works to existing buildings.	**1** Insurance for works to new buildings, where insurance taken out by the main contractor (included in sub-element 9.2.14).
		3 Other insurances in connection with the works.	**2** Insurance for the works to buildings where insurance taken out by the client.
		4 Insurance premium tax (IPT).	
12.1.7 Archaeological fieldwork.	item	**1** Fees and charges in connection with fieldwork carried out by an archaeologist.	**1** Physical works in connection with extraordinary site investigations carried out by the main contractor for a specialist, including temporary works and attendance (included in aub-element 11.1.2).
12.1.8 Other specialist fieldwork.	item	**1** Fees and charges in connection with fieldwork carried out by a specialist.	**1** Physical works in connection with extraordinary site investigations carried out by the main contractor for a specialist, including temporary works and attendance (included in sub-element 0.6.3).

Component	Unit	Included	Excluded
12.1.9 Decanting and relocation costs.	item	**1** Temporary relocation costs.	
		2 Fit-out of temporary accommodation.	
	per week	**3** Rents and other running costs.	
12.1.10 Fittings, furnishings and equipment.	item	**1** Fittings, furnishings and equipment that do not form part of a building contract.	**1** Fittings, furniture and equipment that form part of a building contract (included in group element 4).
12.1.11 Tenant's costs/ contributions.	item	**1** Tenant's costs.	
		2 Tenant's contributions.	
12.1.12 Marketing costs.	item	**1** Launch event.	
		2 Site-based advertising (e.g. sales hoardings).	
		3 Show unit/marketing suites (separate or within building to be built).	
	per week	**4** Operating costs associated with show unit/ marketing suites.	
12.1.13 Other client costs.	item	**1** Other client costs in connection with the building project (to be stated).	
		2 Client's costs involved in the management and administration of the life cycle maintenance of the building or part of it.	
		3 Audits and performance monitoring regimes.	
		4 Inspections and compliance management.	
12.1.14 Allowances.	item	**1** Capital allowances.	**2** Asset depreciation/write down provisions (impairments).
12.1.15 Energy efficiency.	item	**1** Energy efficiency initiatives (e.g. upgrades/ improvement works).	

Component	Unit	Included	Excluded
12.1.16 Office churn.	N/A	Note: part of occupancy costs (which are excluded from NRM 3 works).	**2** Churn costs.
12.1.17 Soft services.	item	**1** Helpdesk function (including covering soft service provisions).	
		2 Security equipment maintenance (if agreed in scope). 3 Vending machine maintenance (if agreed in scope).	
		4 Catering and hospitality equipment (if agreed in scope).	
		5 Other operation and occupancy costs (e.g. utilities, cleaning/waste management and taxes, as applicable).	
12.1.18 End of life.	item	Note: if part of contractual obligations, include in renewal works (details to be stated; see Appendix F).	**1** End of life costs not included elsewhere (such as disposal, decommissioning costs, reinstatement costs and salvage costs).
12.1.19 Third-party income.	item	Note: if included in scope. Normally part of wider life cycle costing.	**1** Third-party income during the in-use period.
12.1.20 Loss of income.	item	Note: if included in scope. Normally part of wider life cycle costing.	**1** Loss of income.

Group element 13: Risks

Group element 13 comprises the following elements:

13.1 Design and development risks

13.2 Maintenance risks

13.3 Client change risks

13.4 Client other risks

Note: typical causes of risks that should be considered under these elements are listed in the tables below. The risks that might arise from these causes can then be identified, and the cost implications to the project should any of the risks materialise can be estimated (i.e. the risk allowance required to manage and resolve each risk should it materialise). The tables are not meant to be definitive or exhaustive, but are merely a guide. The tables can be used to prompt the client or other relevant parties associated with the building maintenance works.

Element 13.1: Design and development risks

13.1.1 Design development and standards:

Inadequate maintenance considerations during design and installation, such as:

- inadequate or unclear project brief
- unclear design team responsibilities
- ineffective quality control procedures
- inadequate site investigation
- planning constraints/requirements
- soundness of design data
- degree of novelty (i.e. design novelty)
- ineffective design coordination
- reliability of area schedules
- health and safety/local risk assessment implications
- access for maintenance and services not appropriately addressed
- lack of provision for lifting arrangements when replacing components
- reliability of estimating data
- changes in labour, materials, equipment and plant costs
- inflation (i.e. differential inflation due to market factors and/or timing)
- design solution does not comply with required asset life cycle performance standards
- availability of installation information, and the accuracy of operation and maintenance manuals as-built, health and safety files, etc.

13.1.2 Construction and installation legacy issues:

- adjacent structures (i.e. requiring special precautions)
- geotechnical problems (e.g. mining and subsidence)
- groundwater
- asbestos and other hazardous materials
- tree preservation orders
- ecological issues (e.g. presence of endangered species)
- environmental impact
- physical access to site (i.e. restrictions and limitations)
- appropriateness of specification
- incomplete design
- competence of contractor and subcontractor
- health and safety considerations
- ineffective quality management procedure
- impact of construction using substandard materials ad workmanship
- ineffective testing and commissioning
- latent defects.

13.1.3 Handover:

- ineffective handover procedures
- accuracy and completeness of operation and maintenance manuals, and computer-aided design (CAD) information
- occupancy of facilities significantly different to original design parameters
- reliability of estimating data, e.g. changes in labour, materials, equipment and plant costs
- insurance and inspection implications, e.g. inadequate policies put into practice.

13.1.4 Legislation and changing future regulations, e.g. *The Management of Health and Safety at Work Regulations* 1999 or Building Regulations Part L.

Element 13.2: Maintenance risks

13.2.1 Procurement:

- quality of brief
- information on cost maintenance
- contract terms (allocation of risks)
- work packages (boundaries and interfaces)
- resources and competence
- budget constraints
- mobilisation.

13.2.2 Maintenance delivery:

- maintenance strategy not deliverable
- scope of service provided (not in accordance with fit-for-function maintenance standards)
- non-compliance with statutory/legal and regulatory requirements
- system failure
- organisation and staffing arrangements, e.g. agility and adequacy
  to cover critical risk events
- relationship with client and contract support staff
- ineffective contract mobilisation, operating procedures and controls
- business disruption leading to significant loss of productivity and cost to the end user
- lack of transparency of service standards and accountability
- presence of asbestos and hazardous materials
- weather and seasonal implications
- quality of asset information made available and subsequently not kept up to date
- incompatibility of asset management databases or ineffective use of IT/computerised maintenance management systems (CMMS).

13.2.3 Life cycle replacement works:

- actual costs much higher than predicted
- inappropriate service life planning forecasts that impact on actual frequency of renewal works
- legacy data: inconsistent and missing asset information
- condition data (short-term) and lack of residual life data to predict longer-term replacement plans
- early failure of asset and components
- product failing prior to predicted life due to manufacturer defect
- maximum repair obligations and unclear lines of responsibilities, e.g. confusion over who pays
- competency to effectively predict one-, five- or ten-year forward life cycle replacement schedules.

Element 13.3: Client change risks

13.3.1 Project brief:

- inadequate or unclear project brief
- changes in quality (e.g. specification of materials and workmanship)
- client's specific requirements (e.g. functional standards).

13.3.2 Scope creep:

- specific changes in requirements (e.g. scope of works, time horizon and facilities to maintain)
- agility and mechanism to change the contract and realise cost/performance efficiencies
- change of purpose and use of LCC exercise
- carbon reduction commitments and taxation implications.

13.3.3 System redundancy:

- lack of resilience to prevent major business disruption
- obsolescence: technology and system changes (e.g. renewables)
- disposal risks associated with removal of plant and equipment from occupied areas.

13.3.4 Timescales:

- replacement frequency forecasts wrong
- peaks in expenditure versus forecast profile of life cycle replacement costs
- change in periods of analysis
- base dates altered or not clearly stated from the outset.

Element 13.4: Client other risks

13.4.1 Maintenance brief:

- inadequate or unclear brief, including understanding end user's specific requirements
- uncertainty over who is responsible for repairs and maintenance (limits of liability/thresholds)
- environmental and sustainability considerations
- client's specific requirements (e.g. functional standards, site establishment rules and regulations, and standing orders)
- changes in use or function of facilities
- impact of estate rationalisation, e.g. impact of footprint reductions and disposal of sites.

13.4.2 Timescales:

- reference service life data predictions
- product fails prior to predicted life due to manufacturer defect
- timescales for decision making.

13.4.3 Third party:

- works arising out of party wall agreements
- requirements relating to listed buildings and/or conservation areas
- requirements relating to sites of special scientific interest (SSSI)
- requirements relating to environmental impact assessments.

13.4.4 Management:

- unclear roles and responsibilities
- ineffective cost control procedures
- ineffective performance measures, auditing and monitoring procedures
- ineffective or no risk management strategy
- inadequate design and maintenance review procedures
- ineffective reporting and information management systems.

13.4.5 Financial:

- availability of funds
- unavailable grants/grant refusal
- changing interest rates
- changes in taxation (e.g. VAT)
- liquidation/insolvency of main contractor
- actual costs much higher than estimated (undermining the incentive to deliver maintenance)
- labour costs vary due to labour market/economic climate
- provision for unscheduled maintenance, e.g. historical data (significantly more in reality)
- availability of funds to do minimum maintenance standard
- availability of competent resources
- cash flow effect on timing of approval for extra works
- existing risks and liabilities (e.g. backlog maintenance/condition status)
- service charging obligations: landlord and tenant (could lead to non-recovery of costs)
- changing inflation rates/economic climate conditions.

13.4.6 Other:

- availability of labour, materials and plant
- changes to statutory and legal requirements.

Group element 14: Inflation

Group element 14 comprises the following elements:

14.1 Tender inflation

14.2 Construction inflation

14.3 Life cycle replacement inflation

14.4 Life cycle discount rate

Element	Unit	Included	Excluded
1 Tender inflation.	%	Inflationary price increases during the period from the estimate base date to the date of tender return.	Unexpected price increases associated with market conditions and wider economic factors outside of the provisions in the maintenance and life cycle replacement contract (included in element 13.4).
2 Construction inflation.	%	Inflationary price changes during the period from the tender return to the end of the maintenance contract.	
3 Life cycle replacement inflation.	%	Annual inflation during the period from the end of construction, or such other base date as requested by the client, applied to annualised and periodic costs to provide a cash flow forecast.	Refer to section 3.19 for present value and discounting time value of money rules of measurement.
4 Life cycle discount rate.	%	Annual inflation adjusted for the future value of money during the period from the end of construction, or such other base date as requested by the client, applied to annualised and periodic costs to provide a net present value.	Refer to sections 3.15 and 4.19 for measurement rules for inflation.

Appendix A: Commonly used functional units and functional units of measurement

The table below indicates the main groups and most types of buildings likely to be found by function. While comprehensive, it cannot be exhaustive as there may be buildings with unique functions as well as those developed in the future with new functions. These examples simply provide a guide.

Function	Functional unit of measurement
Administrative, commercial, protective	
Administrative and office buildings	per person or m^2 of NIA
Banks and building society branches	per m^2 of NIA
Car parking	per car parking space
Coach and bus stations	per coach/bus spaces
Shops, supermarkets and hypermarkets	per m^2 of retail area (m^2)
Department stores	per m^2 of retail area (m^2)
Shopping centres	per m^2 of retail area (m^2)
Retail warehouses	per m^2 of retail area (m^2)
Fire stations	per vehicle spaces
Ambulance stations	per vehicle spaces
Law courts	per courtrooms
Prisons	per prisoner space
Industrial facilities	
Livestock buildings – farms (pig pens, milking parlours, etc.)	per animal
Agricultural storage buildings	per m^2 of NIA
Breweries and distilleries	per m^2 of NIA
Factories	per m^2 of NIA
Warehouses/stores/cold stores	per m^2 of NIA
Residential facilities	
Houses	per house type (based on number of bedrooms)
Bungalows	per bedroom

Function	Functional unit of measurement
Apartments/flats	per apartment/flat type (number of bedrooms)
Hotels/motels/guesthouses	per bedroom
Dormitories/Staff/nursing residential accommodation	per bedroom
Student accommodation	per bedroom
Youth hostels	per bedroom per person
Religious	
Churches, chapels, temples, mosques, etc.	per pew or per seat
Convents/monasteries	per ascetic
Education, scientific, information facilities	
Schools	per child or student place
Universities, colleges, etc.	per student place
Research facilities and laboratories	per laboratory space
Record offices archives and patent offices	per thousand volumes/records
Libraries	per location and population served by their local library
Conference centres	per place
Common amenity facilities	
Kitchens	per meals per day or per population served
Public conveniences, toilets, utility blocks	per toilet block
Laundries	per m^2 of net laundry area
Boiler houses	per kW
Health and welfare facilities	
Hospitals	per bed space
Nursing homes	per bed space
Specialist care and treatments units	per patient/bed space
Specialist care homes	per patient/bed space
Doctors' surgeries	per doctor consulting room
Dentists' surgeries	per dentist workspace
Animal clinics and hospitals	per practitioner suite
Animal rearing and living facilities	per animal
Recreational facilities	
Theatres/opera houses	per seat
Cinemas	per seat or per screen
Concert halls, function rooms etc.	per seat

Function	Functional unit of measurement
Drama and music rehearsal studios	per studio
Restaurants/cafes/refectories	per seat
Community centres, etc.	per person
Squash courts, tennis courts, etc.	per court
Sports stadia	per seat
Swimming pools/indoor sports centres	per person or population served
Indoor motor sports centres	per person or population served
Gymnasia and sports halls	per person and halls
Golf/rifle ranges	per range
Indoor ice rinks	per person
Military facilities	
Accommodation blocks – messes, junior, officers etc.	per person
Accommodation blocks – multi-occupancy (armoury, air traffic control tower, communications facility, guard room, fire and police stations, telephone exchange)	per person
Catering facilities	per meal or populated served
Hangars (fixed wing and helicopter, etc.)	per aircraft space
Livestock building (stables, kennels, etc.)	per animal
Mechanical transport facilities (garages, vehicle storage, commercial garages)	per garage
Outside sports and recreational facilities	per location
Single living accommodation (by ranks)	per bed space
Service family's accommodation	per bed space and type 1–5 type A–E
Stores (non-specialised/specialised)	per store
Stores (munitions/hazardous stores)	per store
Training/education facilities (conference centre/lecture hall, classroom, simulator)	per person
Workshops (general shop, processing non-specialised, specialised and hazardous)	per workshop

Table A1: The main groups and most types of buildings likely to be found by function

Appendix B: Maintenance cost categories and definitions

Table B1 below provides the maintenance cost categories and definitions and has been reproduced with the permission of the British Standards Institute (source: BS 8544 guide for LCC of maintenance during the in-use phase).

Definitions of cost categories – operation and occupancy costs (O) and end of life and environmental costs (E) are not covered in the NRM 3 rules.

Cost category	Maintenance cost category definitions
Asset information cost	Information required to manage and optimise the annualised maintenance regimes (maintenance) and predict the timing of the life cycle major repairs and replacement (renewal) programme of works.
Asset maintenance registers[A, B, C]	A record or inventory of all building and engineering services' maintainable assets, applicable for the annualised maintenance and service life planning of major life cycle renewal works, agreed at the brief stage. Costs to include: • asset maintenance registers (initial production and subsequent updates) • identification of applicable level of assets required for the LCC of maintenance and/or renewal plans with or without tagging • verification for completeness and capturing specific assets details (e.g. make, model, capacity, rating and other asset details as required with or without tagging) • asset tagging and bar-coding identification if required (optional) • relevant maintenance information available for the LCC maintenance and renewal programming • relevant as built/computer-aided design (CAD) drawings/room data sheets and object BIM-related information.

Cost category	Maintenance cost category definitions
Condition surveys, reports and the percentage asset remaining life expectancy (PARL) asset assessment data[D]	Assessment of the applicable building or constructed asset's current age, condition grading and percentage of remaining asset life (compared against accepted RSL planning and factoring methods), agreed in the brief stage. Costs for initial, periodic and specialist asset surveys should include: • stock condition surveys • percentage asset remaining life (PARL) assessments • inspection/monitoring regimes, e.g. site tours, thermal imaging and vibration • analysis, etc. • specialist surveys, e.g. historic listed building • other costs, as applicable. Excluded from costs for initial, periodic and specialist asset surveys: • inspections carried out as part of the maintenance contract work (included in the maintenance regime) • general inspections and audits commissioned separately by or on behalf of the client (these costs are to be included in the client's definable maintenance management activities).
Other forms of assessment (optional)[E]	Assessment of wider asset investment planning based on functional and performance considerations, and other predetermined requirements (if required as part of the LCC plan) – as agreed at the brief stage. Included costs for other forms of asset assessment may be: • capacity forecasts/resilience assessments • energy efficiency reviews (EPC) • space utilisation; functional suitability (optional) • Disability Discrimination Act (DDA), Equality Act 2010, e.g. considerations and other regulatory risk surveys • wider sustainability implications (to be defined) • other forms of assessment as applicable (if agreed in scope), for example carbon reduction commitments resulting in energy efficiency improvement work.

Cost category	Maintenance cost category definitions
Notes	**A** Applies to asset registers in any form (hardcopy, electronic, building information model, etc.). **B** Refer to information and data sources in BS8544, clause 9 for more detailed guidance on costing for gathering relevant asset information and establishing robust asset maintenance registers for LCC of maintenance exercises. **C** Stock surveys include obtaining relevant information from as-built/ O&M data files and site logbooks, plus capturing local knowledge to inform findings. **D** Refer to the information assumptions and data sources in BS8544, Clause 9, for detailed guidance on remaining service life data sources. **E** See NRM clause 4.6 in Part 4 for guidance on costing other forms of assessment.
Maintenance cost	Planned, reactive, and proactive maintenance costs (including on costs and client costs)
Planned maintenance (including PPM regime), including minor repairs and asset subcomponent replacement costs (up to sub-limit of liability)	Scheduled replacement of parts and scheduled servicing, maintenance and repairs to components and associated making good and minor redecorations, including PPM and/or reliability-centred maintenance, proactive maintenance. Included costs: • labour (annual man hours for scheduled or PPM programmed work) • subcontracted and specialist scheduled or PPM works • consumables, plant and equipment, sundries • premium costs for out of normal hours of working. Plus on-cost items, if it is a PPM-only contract.[F] Costs include both work with a frequency of less than a year and a cycle of more than a year, expressed as an AE cost. Excluded costs: major repair, refurbishing replacement costs (included in life cycle renewal costs). **Note**: See life cycle renewal costs for guidance on definitions of 'major' and 'minor' replacement.

Cost category	Maintenance cost category definitions
Reactive, responsive and corrective maintenance, including unscheduled component replacement, repair costs (up to sub-limit of costs or liability)	Allowance for unforeseen or unplanned maintenance arising from early failure, inappropriate use, etc. and associated making good and minor redecorations. Included costs: • labour (man hours for reactive first-line work) • subcontracted and specialist reactive cover • consumables, plant and equipment, sundries • premium costs for out of normal hours of working. Plus on-cost items, if it is a reactive cover only.[F]
Proactive maintenance provision, including planned inspections and monitoring and site management procedures	Allowance for proactive maintenance provision. Included costs: • planned inspections of buildings (PIB) • tours of plant rooms and critical systems • targeted monitoring, e.g. energy focused (BMS controls) • client-definable maintenance-related management activities • others (as defined in scope). Plus on-cost items, if the proactive cover is costed separately. Also, the cost of works resulting from inspections should be included in reactive maintenance.
Maintenance contractors on costs and risk allowance, consultant fees and inflation, taxation etc.[G]	Included costs (for planned, reactive and proactive): • maintenance contractor's management prelims notes and administration • maintenance contractor's overheads and profit • contractor's consultants' fees and specialist works costs • risk (including commercial/other considerations)[H] • inflation/deflation to bring current cost estimate to the start date of the costing exercise (year zero); inflation during the period of the costing exercise should be covered by discounting using stated method of economic evaluation. • taxation and incentives – if required to be in scope (e.g. VAT normally excluded for costing).

Cost category	Maintenance cost category definitions
Notes	**F** On-costs to be costed separately, depending on the type of contract for maintenance (e.g. PPM, reactive only and/or combined or fully comprehensive cover contract). **G** Proactive maintenance activity to include for early interventions to failing assets. **H** Risks to include costs for relevant commercial or other considerations.
Renewal cost	Planned major repairs, refurbishing, replacements, redecorations – plus specific improvements and upgrade works (if required for certain LCC outcomes, e.g. improve energy efficiency)
Major repairs[J] and replacements	Scheduled major repairs, refurbishing and replacement of major system elements and components (within set limits of liability) and associated making good and minor redecorations. Specific asset improvements and upgrades were applicable to achieve certain LCC outcomes, or as a result of obsolescence/technology etc. Costs to include: • repair and replacement of major building assets and plant and equipment items[B] + access and location adjustment factors • travel, transport and subsistence costs • facilitating works • pre-inspection costs • landfill tax and income/disposal costs • maintenance contractor's management of the works and specialist's on-costs • maintenance contractors on-costs • costs and income from disposal of replaced components and parts, where applicable • any life cycle fund management and the employed direct labour where those costs are considered to be direct overheads to the works. On-cost items, temporary works, access costs, out of hours premium, design and commissioning costs in connection with replacement should also be included if applicable.

Cost category	Maintenance cost category definitions
Refurbish and adaptation **Note**: normally dealt with as construction project works	Scheduled refurbishment, improvement, adaptation and upgrades during the in-use period of analysis. If in scope, this includes: • improvement works to buildings or parts thereof • refurbishment of whole installations, including associated works • upgrade works (e.g. carbon reduction/Part L) • renewables (e.g. combined heat and power, solar panelling) • alterations and churn costs. This excludes refurbishment and major adaptation carried out as part of initial construction or fit-out works, or a subsequent refurbishment project (dealt with as part of construction works).
Redecorations	Scheduled redecoration works to existing buildings.[K] This excludes decorations carried out in connection with maintenance or replacement work. Plus on-cost items, if separate contracts.
Maintenance contractor's on-costs and risk allowance, fees, taxation, inflation allowances[L]	Costs to include (for renewal works): • maintenance contractor's preliminaries and administration • maintenance contractor's overhead and profit • consultants' fees and specialist works costs • client-definable maintenance-related works (if in scope) • risk (including commercial/other considerations)[M] • inflation • taxes (e.g. VAT normally excluded for costing).
Notes	I Costs should be presented in elemental and sub-elemental cost structure categories for buildings and external works. J The split between 'major' replacement costs and 'minor' repairs and replacement will depend on the funding arrangements and contractual interface arrangements, and should be defined for each LCC exercise. For example, if the life cycle major replacement fund is set up, it may be defined by the life of the components or the cost of the replacement. It is recommended that the detailed split by asset or sub-asset is made transparent and recorded at the outset of the LCC exercise, including references to any specific interface or contractual agreement where applicable.

Cost category	Maintenance cost category definitions
Notes	**K** Redecoration costs can be calculated within their associated elemental costings but should be shown separately. **L** On-costs to be costed separately, depending on the type of contract for maintenance (e.g. planned preventative maintenance, reactive only and/or combined or fully comprehensive cover contract). **M** Risks to include costs for relevant commercial or other considerations.
Other client-defined costs	Other client-definable costs required to be included by the client, as agreed in scope
Client costs	Client-definable costs in managing the work and any other project costs required to be included by the client or project sponsor, as agreed in scope.
Client-definable management and administrative costs	All client costs involved in managing and administration of the maintenance of the building or its parts. Included costs: • supervisory staff (e.g. building maintenance supervisors maintenance managers) • professional staff or consultants (e.g. architects, engineers, surveyors) • clerical and administration staff • any relevant general and regulatory inspections and surveys commissioned by or on behalf of the client • staff engaged to maintain the building (e.g. care-takers and other responsible persons). Staff costs should include: • wages • expenses • overtime • insurances • administrative support • overheads • accommodation • supply of uniforms • travel costs • pensions.

Cost category	Maintenance cost category definitions
Client-definable management and administrative costs	Excluded costs: • contractor's management of the works and of any life cycle fund covered by the contractor on costs (included in annualised maintenance, grounds maintenance or periodic life cycle renewal works) • inspections carried out in connection with pricing the items of maintenance works (included in annualised maintenance, grounds maintenance or periodic renewal works) • dilapidation surveys or remaining life surveys carried out in connection with disposal of the built asset or facility (included in client-definable maintenance costs outside of normal maintenance work). **Note**: Condition surveys and other forms of assessment data (see clause 4.7 in Part 4 on asset registers and assessment data).
Other client-definable costs included in the study	Other client-definable cost and benefits required to be included in the maintenance life cycle cost plan. Examples of included costs: • mothball maintenance • operation costs (as defined in BS 8544 Table 2) • occupancy costs (as defined in BS 8544 Table 2) • end of life liabilities, recycling, salvage, etc. • hand-back contractual obligations • capital allowances • asset depreciation/write down • other elements (to be defined). This is not an exhaustive list, but simply a guide.
Notes	If user-defined maintenance costs are included in the study, it is important that these items are costed separately, in order to facilitate comparative benchmarking of the maintenance cost categories.

Table B1: BS 8544 Maintenance cost categories and definitions

BS 8544 Table 2 defines the wider LCCs as follows.

Operation costs may include the following:

- cleaning and janitorial services
- utilities (energy, carbon emission)
- security (managed and patrols)
- staff engaged in supporting the occupiers

- waste management and disposal
- property management of operation and occupancy
- insurances.

Occupancy costs may include the following:

- ICT and IT systems
- helpdesk when part of customer service function
- catering and hospitality services
- other client-definable items (stationery, reprographics, etc.).

End of life costs may include the following:

- disposal/dilapidations inspections
- reinstatement to meet the landlords/contractual requirements
- demolitions
- salvage and recycling
- other client-definable items.

Appendix C: Methods of economic evaluation and discounting equations (time value of money)

C1 Methods of economic evaluation

Several widely-used economic evaluation techniques are available for the assessment of alternative investment options. Using two or more of these techniques together provides a broader picture of value implications.

C1.1 Annual cost/annual equivalent value

The annual cost or annual equivalent value (AEV) is a uniform annual amount that, when totalled over the period of analysis, equals the total net cost of the project, taking into account the time value of money over the period. It is used to compare investment options where the natural replacement cycle cannot easily be directly related to the period of analysis. The lowest AEV indicates the lowest cost option.

C1.2 NPV, net present cost (NPC)

The NPV is the sum of the discounted future cash flows, both cost and benefits/revenues. Where only costs are included, this may be termed the NPC.

The NPV is a standard measure in LCC analyses, used to determine and compare the cost effectiveness of proposed solutions. It can be applied across the full range of construction investments, covering whole investment programmes, assets, systems, components and operating and maintenance models. The costs and revenues/benefits to be included in each analysis are defined according to its objectives. For example, revenues from recycling of materials or from surplus energy generation are typically included in LCC analysis of alternative sustainability options.

C1.3 Payback

The payback period (PBP) is the measure of how long it takes to recover initial investment costs and is a useful basis for evaluating alternative investment options. It may be calculated using either real (non-discounted) values for future costs (‘**simple PB**’), or present (discounted) values (‘**discounted PB**’). PB in general ignores all costs and savings after the payback point has been reached, and it is possible that an investment with a short PB is a poorer option than one with a longer payback over the entire period of analysis.

PB is a useful technique for assessing whether additional investment in, for example, lower energy plant is worthwhile. It enables users to weigh the additional capital costs against the time it takes for these costs to be recouped through savings or income during the operational period. This may be a useful means of judging whether an investment represents good value for money, although the subjective nature of the value for money assessment may make it inappropriate for some public sector investment decisions.

C1.4 Net savings, net benefits

Net savings (NS) and net benefits (NB) are the PV of savings/benefits in the operation 'in use' phase, less the PV of the additional investment costs to achieve them. They provide a measure of cost effectiveness and of the benefits to be achieved from investment options. NS/NB greater than 0 (zero) indicates positive cost-effectiveness.

C1.5 Savings to investment ratio

The savings to investment ratio (SIR) is a measure of the cost-effectiveness of a proposed investment (an SIR greater than 1 is positive), and can be used to prioritise and select investment options.

C1.6 Adjusted internal rate of return

The adjusted internal rate of return (AIRR) is a measure of the annual yield from a project over the period of analysis, taking into account reinvestments of interim receipts. It indicates projects with greater NS. An AIRR greater than the minimum acceptable rate of return (i.e. the discount rate) is positive.

C2 Discounting equations

PV of £x received in time (t) at discount rate (r%) =

PV of £x = £x (1+r) t

Present value factor (PVF) or discount factor (DF) =

PVF (or DF) = 1/ (1+r) t

PV of an annuity (PVA) of £1 for N years at discount rate (r) =

$$\text{PVA} = \frac{(1 + r)\,N - 1}{(1 + r)\,N \times r}$$

AEC of PV over N years at discount rate (r%) =

$$\text{AE} = \frac{\text{PV}}{\text{PVA}}$$

C3 Discounting (time value of money)

C3.1 The purpose of discounting

Discounting is a widely used technique for comparing costs and revenues occurring at different points in time. It is based on the principle that a sum of money at the current time has a higher value than the same sum at a future date, because of the earning power of the sum in the interim.

Discounting to PV makes an adjustment to the future costs of an asset that takes account of inflation and the real earning power of money, allowing them to be compared and evaluated on the same basis as costs incurred at the current time.

The need to discount depends on the use of the cost analysis. It is necessary only where a series of costs over time require a common basis for the purpose of a decision, not where the objective is simply to project annual costs on a year-by-year basis. Therefore, when carrying out an evaluation of two or more options with different cost profiles over time, it is likely that discounting will need to be applied, whereas it may not be necessary if the aim is to prepare a cost profile for one option alone.

C3.2 The effect of discount rates

A decision not to discount, i.e. to apply a zero rate, implies that the timing of a cost (e.g. for repair and renewal) is immaterial and disregards the earning power of money. However, use of a zero rate presents the best case for spending a greater sum upfront (i.e. capital costs) to generate greater savings through the analysis period (e.g. operating, maintenance and energy costs).

Conversely, a high discount rate will present options with low upfront costs as appearing more desirable. It can be argued that this has the effect of sacrificing the interests of future generations to the present decision makers. However, future uncertainties and external influences unrelated to the asset (e.g. budgetary constraints, changed economic climate, etc.) may have an impact on the timing or extent of future costs. There is, therefore, an argument for affording future costs less weight in decision making, and hence for discounting.

C3.3 Selecting the discount rate

In the public sector, national ministries of finance generally specify the discount rates to be used in the economic analysis of publicly-funded projects. These are typically 3–5%. The rate may also be assessed on a case-by-case basis by considering:

- the opportunity cost of capital
- the societal rate of time preference
- the cost of borrowing funds.

The **opportunity cost of capital** is the cost of foregoing an alternative investment. This approach assumes that finance for public sector projects is withdrawn from private savings and would otherwise have gone into private investment. Hence, the discount rate is equated to the pre-tax rate of return available to private capital.

The **societal rate of time preference** is the interest rate that reflects a government's judgement about the relative value that society assigns (or that the government feels it should assign) to present versus future consumption. The societal time preference rate is not observed in the market and bears no relation to the rates of return in the private sector, interest rates or any other measurable market phenomena.

The rationale of the cost of borrowing funds approach is that the interest rate should match the rate paid by the government for borrowed money.

C3.4 The discount rate

The LCC is concerned with the assessment of the time stream of costs and revenues that will flow throughout the life of a built asset or facility option.

As 'money today' has a different value from 'money tomorrow' or 'money in 15 years' time', a technique has to be adopted that will express future costs and revenues in PVs. The process of converting 'future money' to 'present money' is called discounting.

Discounting involves establishing the discount rate to be used. In making the decision on a discount rate for a building project, some judgement will need to be made about the degree of risk return (interest) and the likely levels of future interest.

Interest rates are particular to the client and the degree of risk. It is therefore important to involve the client (and their accountant if appropriate) in the process and reach agreement on the discount rate.

There are different views about future levels of inflation and interest rates. Some forecasters might take the view there are different categories of inflation that should be taken into account in setting discount rates. These diversities of views 'before the fact' make it difficult to recommend any firm guidelines for quantity surveyors/cost managers to adopt for selecting discount rates.

Selection of a suitable discount rate is crucial, as it can overwhelm all other discussions.

The two main approaches to discounting are:

- use a rate that 'implies' inflation of future costs and values (in this case, future costs and values will be costed at today's prices)
- use a rate that requires an 'explicit treatment' of inflation in relation to future costs and values (in this case, future costs and values will be costed at today's prices and adjusted by a factor to reflect future inflation).

It is suggested that it is easier to deal with the former approach where future costs and values are assessed at current prices (i.e. PV).

It should be noted that some clients, particularly central government, will require the quantity surveyor/cost manager to use a prescribed client discount rate based on their internal procedures and policies.

C3.5 The cost and frequency of future payments

Costs are generally dealt with using current prices (using the discount rate to allow for inflation), with assumptions made regarding when payments will occur in the future. Again, due to the

very early stage of design development, the quantity surveyor/cost manager will need to estimate costs based on assumptions about future events. Such assumptions should be clearly stated. Indeed, any additional advantage of life cycle costing for maintenance and replacement works is that they require design, maintenance and replacement assumptions to be stated explicitly rather than implied.

Although current costs can be used, it is important that future cost assessments of M and R works reflect any expected divergence of a specific cost from the level of inflation allowed in the discount rate. For example, it would be unwise to assume that market conditions will remain unchanged for any extended period when tender levels for maintenance and replacement works are very depressed. Consequently, some allowance should be made to adjust current prices and rates for maintenance and replacement works to more normal market conditions when estimating the cost of future maintenance and replacement works.

C3.6 Inflation and the effect of procurement type

This adjustment will be different for different types of procurement.

- **Fixed price contract**: The client will pay for work at the prices in the tender documents. Therefore, an estimate of the maintenance contractor's allowance for inflation during the period of contract is required. This can be calculated by applying inflation on an annual basis to estimates, but should be totalled for the contract period and spread equally across the years.
- **Fluctuating contracts with annual index linking**: An estimate of annual inflation will need to be applied.
- **Cost reimbursement contracts or where direct labour costing is being used**: An estimate of the annual inflation will need to be applied.

C3.7 The building life

For order of cost estimates, the building life of the whole building is considered. This is because, at this very early stage of design development, extremely limited or no information will be known about the components and subcomponents that will form the building structure, fabric, finishes and services. As the design is developed, more design information will become available (together with details of products, plant and equipment to be incorporated) on which more detailed life assumptions can be made. This will help inform the cost planning process (see section 3.7: Elemental method).

Typically, the relevant building life will be the period over which the client, for whom the estimate is being prepared, will be expected to hold an interest in the built asset or facility, and would take into account the residual value.

At the end of the life of a built asset or facility, there will be one of two situations. Either the built asset or facility will have reached the end of its life with no alternative use, or the built asset or facility will have reached the end of the life for its planned purpose, but will have an alternative use. In either situation, the residual value of the built asset or facility (and/or the land) may be significant and will need to be carefully assessed as it could have a substantial effect on life cycle costing calculations. Residual values will be of particular significance if the time horizon used for the life cycle costing calculations is relatively short. Consequently, residual values can be a very significant factor in determining the optimum life cycle cost options.

In considering residual values, an allowance should be made for the cost of disposing of plant and equipment, and for the demolition of the built asset or facility, if appropriate. In assessing demolition costs, allowance should be made for the value of any reusable materials.

Built asset or facility life will also be influenced by obsolescence and the causes are summarised in Table C1.

Type of obsolescence	Definition	Basis for assessment of building life	Examples of factors leading to obsolescence
Physical	Life of the building to when physical collapse is possible.	How long will the building meet human needs (with the exclusion of economic considerations)?	Deterioration of external brick walls affecting their structural stability. Deterioration of structural steel frame affecting structural stability of the building.
Economic	Life of the building to when occupation is not considered to be the least cost alternative of meeting a particular objective.	How long will the building be economic for the client to own or operate?	The value of land on which the building stands is more than the capitalised full rental value that could be derived from letting the building. The asset would achieve a better rate of return in the possession of another, or in the redevelopment or refurbishment scheme.
Functional	Life of the building to when the building ceases to function for the same purpose as that for which it was built.	How long will the building be used for the purpose for which it was built?	Churches converted to restaurants, retail units and residential homes. Cinemas converted into bingo halls. Railway stations converted into residential homes. Bus depots converted into industrial, retail and residential homes.

Type of obsolescence	Definition	Basis for assessment of building life	Examples of factors leading to obsolescence
Technological	Life of the building until the building is no longer technologically superior to alternatives.	How long will the building be technologically superior to alternatives?	Prestige offices unable to accommodate introduction of high level of computing facilities. Storage warehouse unable to accommodate introduction of robotics for goods handling.
Social and legal	Life of the building until the time when human desire or legal requirement dictates replacement for reasons other than economic considerations.	How long will the building meet human needs (excluding economic considerations)?	Timber football stands replaced. Multi-storey flats in inner city demolished following social and community problems.

Table C1: Categories, definitions, basis of assessment and examples of obsolescence

Every built asset or facility has a predicted length of life when physical collapse is possible. However, most buildings and facilities never reach that point and are demolished or replaced beforehand, generally due to economic obsolescence.

Buildings usually end their 'life' before the end of their physical life. The most common reasons for buildings becoming obsolete are normally economic and functional considerations. Buildings and facilities designed for a specialised use, with little or no flexibility for changing their use, are likely to have shorter lives than buildings and facilities offering flexibility of function.

The quantity surveyor/cost manager, in consultation with the client, will have to make an informed assessment of the building life to be used in the life cycle costing of capital building works and maintenance and replacement works. In making that assessment, the quantity surveyor/cost manager will need to take account of a number of factors that can influence the final assessment.

It should be noted that some clients, particularly central government, will require the quantity surveyor/cost manager to base the life cycle calculation on an 'arbitrary life' (e.g. 25, 30 or 50 years, or longer, as agreed in the brief) based on their internal procedures and policies.

Appendix D: Information requirements for formal cost plans, for construction and maintenance work procurement and during the building's life cycle

This appendix includes the key information required to enable the preparation of formal cost plans for annualised M and life cycle R works during the construction procurement (formal cost plans 1–3) and post-construction (formal cost plan 4) stages of a building's life cycle.

NRM 1 Appendix C comprises a list of the key information required to enable the preparation of the formal cost plan for construction works. Where the 'available information' used for construction formal cost plans is relevant or could be useful in the preparation of the 'maintenance and renewal' cost plans, it has been reproduced in this document. Available information should be utilised as reference information, but it is not always necessary for cost planning maintenance work.

For a new or refurbished building, formal cost plans 1–3 will be based on technical design, specifications and detailed production information produced for construction – plus specific additional information applicable to maintenance and renewal works cost planning. Formal cost plan 4 is based on actual built asset information derived from as-built information, and/or from asset registers, condition status and remaining life assessments, along with analysis of historical maintenance expenditure and trends. The technical task specifications for planned maintenance can be obtained from BESA (SFG20 schedules) and other industry sources and manufacturers.

It is important to use specific building maintenance information available from industry data sources appropriately, such as BCIS, BRE, BSRIA and CIBSE (Guide M indicative economic life tables). Information is also available from maintenance providers and industry trade associations. BESA provides SFG20 task schedules, industry-recognised maintenance specifications for planned preventative maintenance, along with skilling and task times.

The methods used for formal cost planning relating to 'maintenance and renewal' works during construction procurement (e.g. floor area method, functional unit method or elemental method) will be based on using unit cost rates derived from previous project benchmarks, published unit costs and/or cost analysis of building maintenance tender prices. This will be a factor in determining the relevant level of information requirements needed for undertaking formal cost plans 1–3.

D1 Formal cost plan 1

The formal cost plan 1 for a new built asset or facility is prepared when the scope of work is fully defined, and key criteria are specified, but no detailed design development or maintenance planning has commenced. Formal cost plan 1 will provide the frame of reference for formal cost plan 2, when the cost plans are developed in more detail.

To enable preparation of formal cost plan 1 at RIBA project stage 2 or OGC Gateway 3A, the following information is required.

D1.1 From the project manager/project lead or the client (if no project manager/project lead appointed)

a Confirmation of the cost limit (i.e. the authorised budget for maintenance and renewals work).

b Details of any exclusions from the scope – relevant to the 'maintenance and renewal' costs.

c Details of any non-building-related maintenance (e.g. salvage, loose furniture, fittings and equipment) and/or non-maintenance (i.e. operation or occupancy) costs to be included in the formal cost plans.

d Confirmation of the specific purpose of the study, e.g. for a project options appraisal study.

e Confirmation of the project/design brief (from a service life planning perspective), including a statement of design quality, the service life performance and fit-out work requirements.

f Confirmation of the programme as it relates to completion dates and required occupation dates and warranty periods.

g Confirmation of construction project requirements regarding:

- maintenance responsibilities incorporated in the initial construction contract
- procurement strategy (e.g. work packages and phasing of the construction works)
- contract strategy (e.g. warranties, setting the cost thresholds for renewals works)
- BIM costs for maintenance and renewals for specific asset classes, elements or objects
- access, security arrangements, temporary moves, etc.
- treatment of project consultancy and specialist fees (e.g. condition surveys)
- insurances
- treatment of client's risk
- treatment of VAT
- other considerations (e.g. dealing with capital allowances and grants).

h Copy of construction formal cost plan 1 (if not carried out as integral part of the study).

i Confirmation of the project-specific 'maintenance and renewal' requirements regarding:

- maintenance and life cycle renewal strategies and related asset management plans
- boundaries and lines of responsibility for construction, maintenance and renewal works
- treatment of end of life or period of interest, e.g. hand back obligations and liabilities

- treatment of maintenance and renewal-related specialist costs/consultant's fees
- approach to dealing with other client-definable maintenance costs, e.g. inspections
- treatment of the client's and maintenance contractors' risk, allocation/mitigation plans
- obligations for contractual unscheduled maintenance, e.g. comprehensive provisions
- treatment of inflation and basis of pricing used for the building maintenance cost plans
- treatment of VAT
- other considerations, such as dealing with capital allowances and taxation incentives
- treatment of wider life cycle costing elements (as agreed to be included in scope).

j Confirmation of the initial project brief and maintenance and operation strategy, including a statement of the most important information regarding functional usage, hours of intended occupation, space utilisation (office, stores) and performance requirements (e.g. carbon reduction commitments), as applicable to the building maintenance and life cycle renewal works.

k Confirmation of the period of analysis for the maintenance works and life cycle renewal forecasting, including agreeing the base dates and critical events (i.e. required post-occupation dates and schedule frequency for life cycle costing over an agreed period).

l Confirmation of the specific study rules of measurement, level of cost planning and method of economic evaluation to be applied (e.g. NPV analysis), including:

- base date(s) for costs for the maintenance works and renewal works
- unit of time, i.e. the increments to which the calculations refer, e.g. yearly or cycles
- levels at which the costs are to be analysed and reported, and the required format (whole building, functional unit, element unit or at detailed sub-element or component level)
- method of costing the maintenance and renewal works (e.g. unit cost method, floor area method, or functional unit method, annualised equivalent value for renewal works)
- source of the cost data/benchmarks available and record the cost assumptions used
- factoring methods used to prioritise and optimise the maintenance and renewal cost plans
- method of economic evaluation to be used (e.g. NPV, payback, etc.)
- discount rates to be applied, including which costs are to be discounted.

m Confirmation of the required reporting output(s) and how to express and present them and interest or discount rates to be applied, where appropriate.

n Confirmation of the extent of risks/mitigation treatment and cost sensitivity analysis to be used.

o Confirmation on whether there is current building maintenance and/or life cycle renewal cost model, or a base case cost model, that is to be used as a comparator.

p Authority to commence the next RIBA project stage or progress to the next OGC Gateway.

D1.2 From the architect (available information from the preparation of the construction formal cost plan, i.e. formal cost plan 1)

a Concept design drawings to a suitable scale, comprising:

- general arrangement plans (for all floors, including basement levels and roofs)
- general elevations (with materials clearly annotated)
- general sections
- external landscaping – general arrangement plan(s)
- plans of key building functions
- detailed elevations showing construction of external walls, roofs, ground floor construction and upper floor construction
- sketches showing key details/interfaces (e.g. interface between curtain walling system and structure, balconies, etc.)
- concept design for rooms and common areas.

b Schedule of GEA, GIFA and NIA. Client's schedule of accommodation (e.g. usable area for shops, supermarkets and offices, etc., departmental areas for hospitals) and SA.

c Outline specification information, including:

- specification/design intent for all main elements
- statement of required quality
- outline specification for components, materials and finishes
- acoustics/vibration requirements
- outline performance criteria for main element
- schedule of finishes
- details of alternative specifications.

d Room data sheets.

e Schedules of key fittings, furnishings and equipment.

f Project strategies, that includes environmental/sustainability information (in conjunction with the mechanical and electrical services engineer), including:

- measures to achieve required environmental rating
- Building Regulation requirements
- sustainability requirements and assumptions
- renewable energy requirements and assumptions
- client's specific requirements
- car parking, including motorcycles and bicycles
- vertical movement (in conjunction with the mechanical and electrical services engineer)
- ICT
- fire

- acoustics
- security
- window cleaning
- refuse/waste disposal
- public art
- conservation/listed buildings, etc. (if applicable)
- other important aspects of the building project.

g Reports, including:

- archaeological assessment/report (desktop study)
- measured surveys.

h Definition of fit-out works and reinstatement obligations and timings.

i Risk register.

D1.3 From the mechanical and electrical services engineer (available information from the preparation of the construction formal cost plan, i.e. formal cost plan 1)

a Concept design drawings to a suitable scale, comprising:

- general arrangement for each main system
- schematic diagrams for each major system
- plant room layouts, including roof plant layout
- single-line diagrams showing primary service routes
- typical layouts of landlord's areas, service areas and cores.

b Outline specification information, including:

- mechanical services
- electrical services
- transportation systems (e.g. lifts, hoists and escalators)
- protective installations
- communication, security and control systems
- special installations
- plant/equipment schedule (for primary plant/equipment)
- approximate duties, output and sizes of primary plant/equipment
- schedule of cost-significant builder's work in connection with mechanical and electrical engineering service installations/systems
- details of alternative specifications.

c Project strategies, which include environmental/sustainability information (in conjunction with the architect), including:

- measures to achieve required environmental rating

- building regulations requirements
- sustainability requirements and assumptions
- renewable energy requirements and assumptions
- client's specific requirements
- vertical movement (in conjunction with the architect).

d Reports, including existing utilities:

- gas
- electricity
- communications cables (including telecommunications and networking)
- water
- surface and foul drainage.

e Identification of requirements for any abnormal mechanical and electrical engineering service installations/systems.

f Details of utilities service connections, including:

- connections
- upgrading requirements
- diversions.

g Risk register.

D1.4 From the structural engineer (available information from preparation of the construction cost plan, i.e. formal cost plan 1)

a Reports based on desktop studies, including:

- environmental contamination (phase 1 audit to establish the nature of any subsurface contaminated soil and/or groundwater)
- geotechnical properties
- bombs.

b Reports based on fieldwork, sampling and analysis (where commissioned by the client), including:

- environmental contamination (phase 2 audit)
- geotechnical properties.

c Environmental risk assessment.

d Advice on ground conditions.

e Concept design drawings to a suitable scale, comprising:

- general arrangement
- frame configuration
- layout of shear walls, core walls, columns and beams

- foundation layouts, including pile (and pile cap and ground beam) layouts
- sections, showing ground slab construction, basement wall construction, pile caps construction, etc. and indicative drainage solution.

f Outline specification information.

g Drainage (indicative solution).

h Risk register.

D2 Formal cost plan 2

Formal cost plan 2 for a new built asset or facility does not involve the preparation of a completely new cost plan; it is a progression of formal cost plan 1. It is developed through cost checking the R and M works costs applicable to the building elements, components and cost targets, as more design and maintenance information and any further information updates about the elements and components becomes available.

To enable preparation of formal cost plan 2 at RIBA project stage 3 or OGC Gateway 3B, the following information is required.

D2.1 From the project manager/project lead or the client (if no project manager/project lead appointed)

a Confirmation that formal cost plan 1 prepared at RIBA project stage 2 or OGC Gateway 3A is acceptable.

b Formal cost plan 1 for capital building works (if not carried out as an integral part of this exercise).

c Confirmation of any preferred alternatives given in cost report for cost plan 1.

d Confirmation of the final project brief, including statement of quality and fit-out requirements.

e Confirmation of initial maintenance and operation strategy.

f Confirmation of the programme as it relates to completion dates and required occupation dates.

g Confirmation of any exclusions from the scope of the maintenance and renewal cost plans.

h Confirmation of any non-building-related maintenance or non-maintenance (operation or occupancy) costs to be included in the maintenance and renewal cost plans.

i Confirmation of project construction requirements in respect of maintenance and renewal works:

- maintenance responsibilities incorporated in the initial construction contract
- procurement strategy
- contract strategy
- BIM cost information

- access, security, temporary moves, etc.
- treatment of project/design and consultancy/specialist fees
- insurances
- treatment of client's risk
- treatment of VAT
- other considerations (e.g. taxes, allowances and grants).

j Confirmation of practical completion and post-construction requirements.

k Confirmation of the project-specific M and R requirements:

- maintenance and life cycle renewal strategies, and related asset management plans
- boundaries and lines of responsibilities of construct, maintenance and renewal works
- treatment of end of life or period of interest, e.g. hand-back obligations and liabilities
- treatment of maintenance and renewal-related specialist costs/consultant's fees
- approach to dealing with other client-definable maintenance costs, e.g. inspections
- treatment of client's and maintenance contractors' risk, allocation/mitigation plans, obligations for contractual unscheduled maintenance, e.g. comprehensive provisions
- treatment of inflation and basis of pricing used for the building maintenance cost plans
- treatment of VAT
- other considerations, such as dealing with capital allowances and taxation incentives
- treatment of wider life cycle costing elements (as agreed to be included in scope).

l Confirmation of the final project brief and maintenance and operation strategy, including a statement of the salient information regarding the functional usage, hours of intended occupation, space utilisation (office, stores) and performance requirements (e.g. carbon reduction commitments) as applicable to the building maintenance and life cycle renewal works.

m Confirmation of the period of analysis for the maintenance works and life cycle renewal forecasting, including agreeing the base dates and critical events (i.e. required post-occupation dates and schedule frequency for life cycle costing over an agreed period).

n Confirmation of the specific study rules of measurement, level of cost planning and method of economic evaluation to be applied (e.g. NPV analysis), including:

- base date(s) for costs, for the M works and R works
- unit of time, i.e. the increments to which the calculations refer, e.g. yearly or cycles
- levels at which the costs are to be analysed and reported, and the required format (whole building, functional unit, element unit or at detailed sub-element or component level)
- method of costing the maintenance and renewal works (e.g. unit cost method, floor area method or functional unit method, annualised equivalent value for renewal works)
- source of the cost data/benchmarks available and record the cost assumptions used

- factoring methods used to prioritise and optimise the maintenance and renewal cost plans
- method of economic evaluation to be used (e.g. NPV, payback, etc.)
- discount rates to be applied, including which costs are to be discounted.

o Confirmation of the required reporting output(s), how to express and present them, and interest or discount rates to be applied, where appropriate.

p Confirmation of the extent of risks/mitigation treatment and cost sensitivity analysis to be used.

q Confirm whether there is a current building maintenance and/or life cycle renewal cost model, or a base case cost model, that is to be used as a comparator.

r Authority to commence the next RIBA project stage or progress to the next OGC Gateway.

D2.2 From the architect (available information from the preparation of the construction formal cost plan, formal cost plan 2)

a Detailed design drawings to a suitable scale, comprising:

- general arrangement plans (for all floors, including basement levels and roofs)
- general elevations (with materials clearly annotated)
- general sections
- external landscaping – general arrangement plan(s)
- plans of key building functions
- detailed elevations showing construction of external walls, roofs, ground floor construction and upper floor construction
- sketches showing key details/interfaces (e.g. interface between curtain walling system and structure, balconies etc.), concept design for rooms and common areas.

b Updated site constraints plan.

c Schedule of GEA, GIFA, NIA for clients' schedule of accommodation (e.g. usable area for shops, supermarkets and offices, etc., departmental areas for hospitals) and SA.

d Updated outline specification information, including:

- specification/design intent for all main elements
- statement of required quality
- outline specification for components, materials and finishes
- acoustics/vibration requirements
- outline performance criteria for main element
- schedule of finishes
- details of alternative specifications.

e Updated room data sheets.

f Updated schedules of key fittings, furnishings and equipment.

g Updated strategies, such as initial maintenance and operation environmental/sustainability strategies (in conjunction with the mechanical and electrical services engineer), including:

- measures to achieve required environmental rating
- Building Regulation requirements
- sustainability requirements and assumptions
- renewable energy requirements and assumptions
- client's specific requirements
- car parking, including motorcycles and bicycles
- vertical movement (in conjunction with the mechanical and electrical services engineer)
- information and communications technology (ICT)
- fire
- acoustics
- security
- window cleaning
- refuse/waste disposal
- public art
- conservation/listed buildings, etc. (if applicable)
- other important aspects of the building project.

h Updated reports including archaeological assessment/report (desktop study).

i Updated definition of fit-out.

j Updated risk register.

D2.3 From the mechanical and electrical services engineer (available information from the preparation of the construction formal cost plan, formal cost plan 2)

a Developed design drawings to a suitable scale, comprising:

- general arrangement for each main system
- schematic diagrams for each major system
- plant room layouts, including roof plant layout
- single-line diagrams showing primary service routes
- typical layouts of landlord's areas, service areas and cores.

b Updated outline specification information, including:

- mechanical services
- electrical services
- transportation systems (e.g. lifts, hoists and escalators)
- protective installations

- communication, security and control systems
- special installations
- plant/equipment schedule (for primary plant/equipment)
- approximate duties, output and sizes of primary plant/equipment
- schedule of cost-significant builder's work in connection with mechanical and electrical engineering service installations/systems.

c Project strategies, which include environmental/sustainability information (in conjunction with the architect), including:

- measures to achieve required environmental rating
- Building Regulation requirements
- sustainability requirements and assumptions
- renewable energy requirements and assumptions
- client's specific requirements
- vertical movement (in conjunction with the architect)
- removal/decommissioning of existing plant and/or equipment.
- Updated reports, including survey of underground services.

d Identification of requirements for any abnormal mechanical and electrical engineering service installations/systems.

e Details of utilities service connections, including:

- connections
- upgrading requirements
- diversions
- quotes from statutory undertakers.

f Updated risk register.

D2.4 From the structural engineer (available information from the preparation of the construction formal cost plan, formal cost plan 2)

a Reports based on fieldwork, sampling and analysis (where commissioned by the client), including:

- environmental contamination (phase 2 audit)
- geotechnical properties.

b Environmental risk assessment.

c Updated advice on ground conditions.

d Developed design drawings to a suitable scale, comprising:

- general arrangement
- frame configuration
- layout of shear walls, core walls, columns and beams

- sections
- foundation layouts, including pile (and pile cap and ground beam) layouts
- sections, showing ground slab construction, basement wall construction, pile cap construction, etc.
- indicative drainage solution.

e Updated outline specification information.

f Drainage (indicative solution).

g Updated risk register.

D2.5 From the specialist consultants

a Developed design drawings.

b Outline specification information.

D3 Formal cost plan 3

Formal cost plan 3 for a new built asset or facility is a progression of formal cost plan 2. It is developed through cost checking and cost planning the R and M works costs applicable to the building's elements, components and cost targets, as the finalised design and more detailed maintenance information become available.

To enable preparation of formal cost plan 3 at RIBA project stage 4 and OGC Gateway 3B, information is required as follows.

D3.1 From the project manager/project lead or the client (if no project manager/project lead appointed)

a Confirmation that formal cost plan 2 prepared at RIBA project stage 3 or OGC Gateway 3B is acceptable.

b Formal cost pan 2 for capital building works (if not carried out as an integral part of this exercise).

c Confirmation of any preferred alternatives given in cost report for cost plan 2.

d Confirmation of the final project brief, including statement of quality and fit-out requirements.

e Confirmation of the programme as it relates to completion dates and required occupation dates.

f Confirmation of any exclusions from the scope of the maintenance costs.

g Confirmation of any non-building-related maintenance or non-maintenance (operation or occupancy) costs to be included in the cost plan.

h Confirmation of project construction requirements for M and R works:

- maintenance responsibilities incorporated in the initial construction contract

- procurement strategy
- contract strategy
- BIM cost information
- access, security, temporary moves, etc.
- treatment of project/design and consultancy/specialist fees
- insurances
- treatment of client's risk
- treatment of VAT
- other considerations (e.g. taxes, allowances and grants).

i Confirmation of practical completion and post-construction requirements.

j Confirmation of the project-specific 'maintenance and renewal' requirements:

- maintenance and life cycle renewal strategies, and related asset management plans
- boundaries and lines of responsibility for construct, maintenance and renewal works
- treatment of end of life or period of interest, e.g. hand-back obligations and liabilities
- treatment of maintenance and renewal related specialist costs/consultant's fees
- approach to dealing with other client-definable maintenance costs, e.g. inspections
- treatment of client's and maintenance contractors' risk, allocation/mitigation plans
- obligations for contractual unscheduled maintenance, e.g. comprehensive provisions
- treatment of inflation and basis of pricing used for building maintenance cost plans
- treatment of VAT
- other considerations, such as dealing with capital allowances and taxation incentives
- treatment of wider life cycle costing elements (as agreed to be included in scope).

k Confirmation of the final project brief and maintenance and operation strategy, including a statement of the salient information regarding the functional usage, hours of intended occupation, space utilisation (office, stores) and performance requirements (e.g. carbon reduction commitments), as applicable to the building maintenance and life cycle renewal works.

l Confirmation of the period of analysis for the maintenance works and life cycle renewal forecasting, including agreeing the base dates and critical events (required post-occupation dates and schedule frequency for life cycle costing over an agreed period).

m Confirmation of the specific study rules of measurement, level of cost planning and method of economic evaluation to be applied (e.g. NPV analysis), including:

- base date(s) for costs for the M works and R works
- unit of time, i.e. the increments to which the calculations refer, e.g. yearly or cycles
- levels at which the costs are to be analysed and reported, and the required format (whole building, functional unit, element unit or at detailed sub-element or component level)

- method of costing the maintenance and renewal works (e.g. unit cost method, floor area method or functional unit method, annualised equivalent value for renewal works)
- source of the cost data/benchmarks available and record of the cost assumptions used
- factoring methods used to prioritise and optimise the maintenance and renewal cost plans
- method of economic evaluation to be used (e.g. NPV, payback, etc.)
- discount rates to be applied, including which costs are to be discounted.

n Confirmation of the required reporting outputs, how to express and present them, and interest or discount rates to be applied, where appropriate.

o Confirmation of the extent of risk/mitigation treatment and cost sensitivity analysis to be used.

p Confirm whether there is a current building maintenance and/or life cycle renewal cost model, or a base case cost model, that is to be used as a comparator.

q Authority to commence the next RIBA project stage or progress to the next OGC Gateway.

D3.2 From the architect (available information from the preparation of the construction formal cost plan, formal cost plan 3)

a Technical design drawings to a suitable scale, comprising:

- final plans/layouts
- elevations (with materials clearly annotated)
- sections
- location drawings
- assembly drawings
- component drawings.

b Schedule of GEA, GIFA, NIA for clients' schedule of accommodation (e.g. usable area for shops, supermarkets and offices, etc., departmental areas for hospitals) and SA.

c Final specification information, including:

- specification/design for all main elements
- statement of required quality
- final specification for components, materials and finishes
- acoustics/vibration requirements
- final performance criteria for main element
- schedule of finishes
- details of alternative specifications.

d Final room data sheets.

e Final schedules of fittings, furnishings and equipment.

f Final project strategies, which include environmental/sustainability information (in conjunction with the mechanical and electrical services engineer), including:

- measures to achieve required environmental rating
- building regulation requirements
- sustainability requirements and assumptions
- renewable energy requirements and assumptions
- client's specific requirements
- car parking, including motorcycles and bicycles
- vertical movement (in conjunction with the mechanical and electrical services engineer)
- information and communications technology (ICT)
- fire
- acoustics
- security
- window cleaning
- refuse/waste disposal
- public art
- conservation/listed buildings, etc. (if applicable)
- other important aspects of the building project.

g Updated reports, including:

- archaeological assessment/report (desktop study)
- final definition of fit-out.

h Updated risk register.

D3.3 From the mechanical and electrical services engineer (available information from the preparation of the construction formal cost plan, formal cost plan 3)

a Detailed design drawings to a suitable scale.

b Final specification information, including:

- mechanical services
- electrical services
- transportation systems (e.g. lifts, hoists and escalators)
- protective installations
- communication, security and control systems
- special installations
- plant/equipment schedule (for primary plant/equipment)
- approximate duties, output and sizes of primary plant/equipment

- schedule of cost-significant builder's work in connection with mechanical and electrical engineering service installations/systems.

c Project strategies, which include environmental/sustainability information (in conjunction with the architect), including:

- measures to required environmental rating
- building regulations requirements
- sustainability requirements and assumptions
- renewable energy requirements and assumptions
- client's specific requirements
- vertical movement (in conjunction with the architect)
- removal/decommissioning of existing plant/equipment.

d Details of utilities service connections, including:

- connections
- upgrading requirements
- diversions
- quotation from statutory undertakers.

e Updated risk register.

D3.4 From the structural engineer (available information from the preparation of the construction formal cost plan, formal cost plan 3)

a Reports based on fieldwork, sampling and analysis (where commissioned by the client), including:

- environmental contamination (phase 2 audit)
- geotechnical properties.

b Updated environmental risk assessment.

c Updated advice on ground conditions.

d Technical design drawings to a suitable scale, comprising:

- general arrangement
- frame configuration
- layout of shear walls, core walls, columns and beams
- foundation layouts, including pile (and pile cap and ground beam) layouts
- sections, showing ground slab construction, basement wall construction, pile cap
- construction, etc.
- final drainage solution.

e Final specification information.

f Final drainage design.

g Updated risk register.

D3.5 From the specialist consultants

a Technical design drawings to a suitable scale.

b Final specification information.

D4 Formal cost plan 4

Formal cost plan 4 for a 'new built asset or facility' does not require the preparation of a completely new cost plan. It is a progression of formal cost plan 2 or 3 prepared for RIBA project stages 3 (Spatial Coordination) or 4 (Technical Design), whichever is applicable. Formal cost plan 4 (new build) is developed through cost checking and cost planning the R and M works costs applicable to 'maintainable' building elements, sub-elements and components (as defined in the group tables in Part 6), at a point where the design quality, operational and performance criteria have been fully defined and specified. It is normally based on the as-built information (including customised asset task schedules) as it becomes available.

Formal cost plan 4 for an 'existing built asset or facility' will require a new formal cost plan. It is based on data derived from record drawings, asset registers and the findings and recommendations obtained from inspections (e.g. technical inspections, condition and remaining life surveys, structural surveys, etc.).

To enable preparation of formal cost plan 4 at RIBA project stage 7 and OGC Gateways 4 and 5, the following information is required.

D4.1 Formal cost plan 4 – for a new built asset or facility

At project stage 7 or OGC Gateways 4 and 5.

D4.2 From the project manager/project lead or the client (if no project manager/project lead appointed)

a Maintenance and operation strategy.

b Confirmation that formal cost plan 2 or 3, prepared at RIBA project stage 3 or 4, or OGC Gateway 3B, is acceptable.

c Formal cost plan 2 or 3, as applicable, for capital building works (if not carried out as an integral part of this exercise).

d Post-practical completion adjustment to the construction cost plans, based on agreed final costs.

e Final project brief and maintenance and operation strategy.

f Confirmation of the programme as it relates to completion dates and required occupation dates.

g Confirmation of project construction requirements for maintenance and renewal works.

h Confirmation of practical completion and post-construction requirements.

i Confirmation of any maintenance and renewal cost forecasts given in the cost report for formal cost plan 2 or 3, as applicable.

j Confirmation of the cost limits for the maintenance and renewal works (i.e. the authorised budget).

k Confirmation of any exclusions from the scope of the maintenance and renewal cost plans.

l Confirmation of any non-building-related maintenance or non-maintenance (operation or occupancy) costs to be included in the maintenance and renewal cost plans.

m Confirmation of the project-specific maintenance and renewal requirements for:

- maintenance and life cycle renewal strategies and related asset management plans
- boundaries and lines of responsibilities of construct, maintenance and renewal works
- treatment of end of life or period of interest, e.g. hand-back obligations and liabilities.
- treatment of maintenance and renewal-related specialist costs/consultant's fees
- approach to dealing with other client-definable maintenance costs, e.g. inspections
- treatment of client's and maintenance contractors' risk, allocation/mitigation plans
- obligations for contractual unscheduled maintenance, e.g. comprehensive provisions
- treatment of inflation and basis of pricing used for the building maintenance cost plans
- treatment of VAT
- other considerations, such as dealing with capital allowances and taxation incentives
- treatment of wider life cycle costing elements (as agreed to be included in scope).

n Confirmation of the project brief, including a statement of the salient information regarding the functional usage, hours of intended occupation, space utilisation (office, stores) and performance requirements (e.g. carbon reduction commitments).

o Confirmation of the period of analysis for the maintenance works and life cycle renewal forecasting, including agreeing the base dates and critical events (required post-occupation dates and schedule frequency for life cycle costing over an agreed period).

p Confirmation of the specific study rules of measurement, level of cost planning and method of economic evaluation to be applied (e.g. NPV analysis), including:

- base date(s) for costs for the maintenance works and renewal works
- unit of time, i.e. the increments to which the calculations refer, e.g. yearly or cycles
- levels at which the costs are to be analysed and reported, and the required format (whole building, functional unit, element unit or at detailed sub-element or component level)
- method of costing the maintenance and renewal works (e.g. unit cost method, floor area method or functional unit method, annualised equivalent value for renewal works)
- source the cost data/benchmarks available and record the cost assumptions used
- factoring methods used to prioritise and optimise the maintenance and renewal cost plans
- method of economic evaluation to be used (e.g. NPV, payback, etc.)

- discount rates to be applied, including which costs are to be discounted.

q Confirmation of the required reporting output(s), how to express and present them, and the interest or discount rates to be applied, where appropriate.

r Confirmation of the extent of risk/mitigation treatment and cost sensitivity analysis to be used.

s Confirm whether there is a current building maintenance and/or life cycle renewal cost model, or a base case cost model, that is to be used as a comparator.

t Obtain formal acceptance to the brief for formal cost plan 4, including other matters within the formal cost plan 2 or 3 report, whichever is applicable.

u Authority to commence the next RIBA project stage or progress to the next OGC Gateway.

D4.3 From the architect

All as defined in formal cost plan 2 or 3, whichever is applicable. Based on as-constructed and/or as-installed drawings.

D4.4 From the mechanical and electrical services engineer

All as defined in formal cost plan 2 or 3, whichever is applicable, based on commissioned as-constructed and/or as-installed drawings, operating and maintenance manuals and documentation (as they become available from the construction contractor and the installation suppliers post-practical completion), and including as-built variations.

D4.5 From the structural engineer

All as defined in formal cost plan 2 or 3, whichever is applicable. Based on as-constructed drawings and the final specifications information and updated risk assessments, etc.

D4.6 From other specialist consultants

As defined in formal cost plan 2 or 3, whichever is applicable (see other specialist/consultant in group element 11 table).

D4.7 Formal cost plan 4 for an existing built asset or facility

At RIBA project stage 7 and/or OGC Gateway 5.

D4.8 From the project manager/project lead or the client (if no project manager/project lead appointed)

a Maintenance and operation strategy.

b The building(s) description and the site location(s).

c A statement of the building use and occupancy details (e.g. in use/sub-let/vacate).

d A statement of the GIFA of each of the building(s) or function type(s).

e Functional unit category (e.g. hotel bed spaces) and a schedule of accommodation (including details by space classifications by building/blocks and naming conventions and/or numbering).

f NIA, if the functional unit is to be expressed in NIA (e.g. shop/retail units).

g External SA if grounds maintenance and external works are required in scope.

h Access considerations and hours of operation, e.g. 24/7 security for 365 days a year use.

i Building life (see Appendix C for guidance) and/or period of interest in the built asset or facility.

j Period of analysis for the cost (e.g. 5 years, 10 years, 30 years, 60 years or more).

k Maintenance procurement strategies (type of contract, packages, in house and/or outsourced).

l Discount rate (the difference between the interest rate and is used to convert the future payments to PV, see Appendix C).

m Budget/cashflow requirements (both short-term and long-term perspectives).

n Requirements for refurbishments (i.e. details of all outstanding maintenance necessary so the built asset or facility meets the defined asset performance/condition standard for a set service life period).

o Particular requirements for building envelope and service installations (e.g. carbon reduction commitments, availability and critical system-specific requirements, e.g. security, information and communications technology).

p Salient project brief information (e.g. statement of quality, sustainability requirements, any specific fit-out plans, responsibilities for reinstatement, etc.).

q Requirements for the treatment of consultant and specialist fees, other client-defined maintenance-related costs, treatment of risks, treatment of VAT and other taxation/ incentives.

r Other considerations (e.g. approach to dealing with capital allowance and grants).

D4.9 Additional information for R and M cost planning during existing built asset's life cycle

Asset information:

a Current asset registers and/or BIM data available (which may need updating in line with NRM 3).

b List of applicable 'maintainable' assets for all M and R elements and components in scope.

c Details of service level regimes (e.g. compliant/fit for function).

Details of built asset or facilities:

a Age of the building, measured from practical completion date of the building.

b Last major refurbishment date and salient details to inform the service life planning of renewals.

c Details of renewal works from condition surveys, predicted asset remaining life and other factors.

d Period of analysis or usage life (or period of interest, as defined in the maintenance strategy) of built asset or facility.

e Specific characteristics, e.g. listed buildings and legal notices (such as dangerous structures, etc.).

Appendix E: Reporting template for elemental cost plans for R and M works (condensed: based on level 1 codes)

Project title:		Functional unit:		Number of storeys:	
Cost plan no:		Asset classification:		Floor area (GIFA m^2):	
Base date:		Space usage (m^2):		Maintainable area (NIA) (m^2):	
Period of analysis (years)	X	Hours of operation:		Location (BCIS index):	

Cost centre	**Group element/element**	**£Y_1**	**£Y_2**	**£Y_3**	**...**	**£Y_n**	**X year total**	**Cost per m^2 GIFA per annum**
							£	£/m^2pa
	Renewal	**[Insert summation of all sub-elements]**						
0	Facilitating works							
1	Substructure							
2	Superstructure							
3	Internal finishes							
4	Fittings, furnishings and equipment							
5	Services							
7	Works to existing buildings							
8	External works							
	Subtotal: Renewal	[Insert summation of all sub-elements]						
	Maintain	**[Insert summation of all sub-elements]**						
0	Facilitating works							
1	Substructure							
2	Superstructure							
3	Internal finishes							

4	Fittings, furnishings and equipment							
5	Services							
6	Prefabricated buildings and building units	Not applicable						
7	Works to existing buildings							
8	External works							
	Subtotal: Maintain							
	Subtotal – Maintain + Renewal (A)							
9	Maintenance contractor's management and administration costs (B)							
	Subtotal – Maintain + Renewal (including maintenance contractor's preliminaries (C) [C = A + B]							
10	Maintenance contractor's overheads and profit (D)							
	Total – Maintain + Renewal estimate (E) [E = C + D]							
11	Consultants' and specialists' fees (F)							
12	Client-definable costs (G)							
	Total – Consultants' fees/ employer-definable costs (H) [H = F + G]							
	Base elemental cost estimate (I) [I = E + H]							
13A–B	Risk allowances – as item 3.14							
13C	Commercial and other considerations – as items 3.16 and 3.18							
	Total – Risk allowance estimate (J)							

	Cost limit (excluding inflation) (K) [K = I + J]							
14	Inflation/deflation – as item 3.15							
	Total – Inflation/deflation (L)							
	Cost limit (excluding VAT assessment) (M) [M = K + L]							
	VAT assessment	Excluded (see note)						
Maintenance functional unit rate (FUR) £/m²pa								

1 Base date of cost plan: .....

2 All transfers are to be to/from the risk allowance cost centres and balanced by an equal but opposite adjustment to the risk allowance centres.

VAT in relation to buildings is a complex area. Therefore, it is recommended that VAT be excluded from elemental cost estimates. It is recommended that specialist advice is sought on VAT matters to ensure that the correct rates are applied to the various aspects of a building project.

Refer to 4.24.4 for details of the level of analysis of maintenance costs information collected for R and maintain (M) and how this can be expressed as unit rates, as defined in 3.5 (floor area and functional unit methods) and 3.6 (elemental method) of NRM 3.

Appendix F: Report template for elemental cost plans for R and M works (expanded: based on level 2 codes)

Project title:		Functional unit:		Number of storeys:	
Cost plan no:		Asset classification:		Floor area (GIFA m^2):	
Base date:		Space usage (m^2):		Maintainable area (NIA) (m^2):	
Period of analysis (years)	X	Hours of operation:		Location (BCIS index):	

Cost centre	**Group element/element**	**£Y_1**	**£Y_2**	**£Y_3**	**...**	**£Y_n**	**X year total**	**Cost per m^2 GIFA per annum**
Renewal								
0	Facilitating works	[Insert summation of all sub-elements]						
0.1	Toxic/hazardous/ contaminated material treatment							
0.2	Major demolition works	Not covered by NRM 3						
0.3	Temporary support to adjacent structures	Not covered by NRM 3						
0.4	Specialist groundworks							
0.5	Temporary diversion works	Not covered by NRM 3						
0.6	Extraordinary site investigation works							
1	Substructure	[Insert summation of all sub-elements]						
1.1	Substructure							
2	Superstructure	[Insert summation of all sub-elements]						
2.1	Frame							
2.2	Upper floors							
2.3	Roof							

2.4	Stairs and ramps							
2.5	External walls							
2.6	Windows and external doors							
2.7	Internal walls and partitions							
2.8	Internal doors							
3	Internal finishes	[Insert summation of all sub-elements]						
3.1	Wall finishes							
3.2	Floor finishes							
3.3	Ceiling finishes							
4	Fittings, furnishings and equipment	[Insert summation of all sub-elements]						
4.1	Fittings, furnishings and equipment							
5	Services	[Insert summation of all sub-elements]						
5.1	Sanitary installations							
5.2	Services equipment							
5.3	Disposal installations							
5.4	Water installations							
5.5	Heat source							
5.6	Space heating and air conditioning							
5.7	Ventilation systems							
5.8	Electrical installations							
5.9	Fuel installations							
5.1	Lift and conveyor installations							
5.11	Fire and lightning protection							
5.12	Communication, security and control systems							
5.13	Special installations							
5.14	Builders' work in connection with services							
6	Prefabricated buildings and building units	Not covered by NRM 3						
6.1	Prefabricated buildings and building units	Not covered by NRM 3						
7	Works to existing buildings	[Insert summation of all sub-elements]						

7.1	Minor demolition and alteration works							
7.2	Repairs to existing services							
7.3	Damp-proof courses/fungus and beetle eradication							
7.4	Facade retention							
7.5	Cleaning existing surfaces							
7.6	Renovation works							
8	External works	[Insert summation of all sub-elements]						
8.1	Site preparation works	Not covered by NRM 3						
8.2	Roads, paths and pavings and surfacings							
8.3	Soft landscaping, planting and irrigation systems							
8.4	Fencing, railings and walls							
8.5	External fixtures							
8.6	External drainage							
8.7	External services							
8.8	Minor building works and ancillary buildings							
	Subtotal: Renewal							
Maintain								
0	Facilitating works	[Insert summation of all sub-elements]						
0.1	Toxic/hazardous/ contaminated material treatment							
0.2	Major demolition works	Not covered by NRM 3						
0.3	Temporary support to adjacent structures	Not covered by NRM 3						
0.4	Specialist groundworks							
0.5	Temporary diversion works	Not covered by NRM 3						
0.6	Extraordinary site investigation works							
1	Substructure	[Insert summation of all sub-elements]						
1.1	Substructure							
2	Superstructure	[Insert summation of all sub-elements]						
2.1	Frame							

2.2	Upper floors							
2.3	Roof							
2.4	Stairs and ramps							
2.5	External walls							
2.6	Windows and external doors							
2.7	Internal walls and partitions							
2.8	Internal doors							
3	Internal finishes	[Insert summation of all sub-elements]						
3.1	Wall finishes							
3.2	Floor finishes							
3.3	Ceiling finishes							
4	Fittings, furnishings and equipment	[Insert summation of all sub-elements]						
4.1	Fittings, furnishings and equipment							
5	Services	[Insert summation of all sub-elements]						
5.1	Sanitary installations							
5.2	Services equipment							
5.3	Disposal installations							
5.4	Water installations							
5.5	Heat source							
5.6	Space heating and air conditioning							
5.7	Ventilation systems							
5.8	Electrical installations							
5.9	Fuel installations							
5.1	Lift and conveyor installations							
5.11	Fire and lightning protection							
5.12	Communication, security and control systems							
5.13	Special installations							
5.14	Builders' work in connection with services							
6	Prefabricated buildings and building units	Not covered by NRM 3						
6.1	Prefabricated buildings and building units	Not covered by NRM 3						

7	Works to existing buildings	[Insert summation of all sub-elements]						
7.1	Minor demolition and alteration works							
7.2	Repairs to existing services							
7.3	Damp-proof courses/fungus and beetle eradication							
7.4	Facade retention							
7.5	Cleaning existing surfaces							
7.6	Renovation works							
8	External works	[Insert summation of all sub-elements]						
8.1	Site preparation works							
8.2	Roads, paths and pavings and surfacings							
8.3	Soft landscaping, planting and irrigation systems							
8.4	Fencing, railings and walls							
8.5	External fixtures							
8.6	External drainage							
8.7	External services							
8.8	Minor building works and ancillary buildings							
	Subtotal: Maintain							
	Subtotal – Maintain + Renewal (A)							
9	Maintenance contractor's management and administration costs (B)							
	Subtotal – Maintain + Renewal (including maintenance contractor's preliminaries (C) [C = A + B]							
10	Maintenance contractor's overheads and profit (D)							
	Total – Maintain + Renewal estimate (E) [E = C + D]							
11	Consultant's and specialist's fees (F)							

12	Client-definable maintenance-related costs (G)							
	Total – Consultants' fees/ employer-definable costs (H) [H = F + G]							
	Base elemental cost estimate (I) [I = E + H]							
13A–B	Risk allowances – as item 3.14							
13C	Other considerations – as item 3.16 and 3.18							
	Total – Risk allowance estimate (J)							
	Cost limit (excluding inflation) (K) [K = I + J]							
14	Inflation/deflation – as item 2.15							
	Total – Inflation/deflation (L)							
	Cost limit (excluding VAT assessment) (M) [M = K + L]							
15	VAT assessment	Excluded (see note below)						
Discount factor @	%							
Net present value								
Maintenance functional unit rate (FUR) £/m²pa								

1 Base date of cost plan: .....

2 All transfers are to be to/from the risk allowance cost centres and balanced by an equal but opposite adjustment to the risk allowance centres.

VAT in relation to buildings is a complex area. Therefore, it is recommended that VAT be excluded from elemental cost estimates. It is recommended that specialist advice is sought on VAT matters to ensure that the correct rates are applied to the various aspects of a building project.

Refer to 4.24.4 for details of the level of analysis of maintenance costs information collected for R and M, and how this can be expressed as unit rates, as defined in 3.5 (floor area and functional unit methods) and 3.6 (elemental method) of NRM 3.

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