

5 DESIGN STAGE REPORTS

The design process can involve the preparation of various types of reports with different objectives and purposes, conveying information as part of the design decision process.

A design stage report needs to convey technical information in a clear and easily accessible format and provide the correct level of information at the right point in the project delivery process.

5.1 CONCEPT DESIGN REPORTS

The concept design report is an output of RIBA (2013) Stage 2: Concept Design.

This work stage involves the preparation of the outline design proposals for the building services systems as part of developing the brief. The concept design solution will form the basis for the future design development. It is important that the concept design is clearly communicated.

It is important to check that the concept design satisfies the project brief. The brief may need to be updated with agreed alterations to form the final project brief at the end of Stage 2. Some less important concepts may not be agreed at this stage and instead carried forward to the next project stage.

The concept design report should supplement and develop any project brief, including feasibility information, with the aim of communicating:

- The reasoning behind the proposed design
- The range of design concepts considered, highlighting the advantages and disadvantages of each
- The design solution and key aspects to be developed during the next stage

The concept design report provides an opportunity to:

- Demonstrate the feasibility of the design solution to meet the brief, together with highlighting any constraints arising from the brief and defining any agreed amendments
- Facilitate a greater understanding of the proposed building services design to the client and professional team
- Capture the design philosophies and the design development work undertaken up to the end of the stage, together with any research on innovative solutions. The report provides a record of the building services concept design.
- Define preliminary design criteria
- Provide an evaluation of the key issues
- Provide a reference point for future design work and a design 'yardstick' against which any future significant changes can be measured

- Highlight information required to progress the design at the next stage

Ideally, sketch drawings and schematics of the concept design proposals should be included as part of the report. BSRIA BG 6^[1] provides definitions and information levels for these types of drawings, together with examples.

BSRIA BG 6 drawing definitions

Concept sketch drawings

Line diagrams and layouts indicating basic proposals, location of areas of central plant, location and extent of main vertical and horizontal distribution routes in such detail as to illustrate the incorporation of the engineering services within the project as a whole and with respect to any zoning

Concept schematics

Line diagrams indicating main items of plant and their interrelationships in such detail as to illustrate the incorporation of the engineering services within the project as a whole.

Further considerations for reporting at RIBA Stage 2 are included in Appendix A.

5.2 DEVELOPED DESIGN REPORTS

The developed design report is an output of RIBA (2013) Stage 3: Developed Design.

BSRIA BG 6^[1] splits Stage 3 into two parts, which provides an additional opportunity for design reporting and a review at the end of the first part of this stage.

The first part of Stage 3 is a collaborative design stage where any remaining concepts from Stage 2 are decided. In the absence of an alternative project strategy, this stage also covers the development of the design to the point where a planning application can be submitted, with emphasis on external matters rather than internal coordination.

By the end of Stage 3 the design team should have arrived at a design where each discipline has its allocated volumes within the building. From a building services perspective, there should be sufficient evidence to show that the services volume is sufficient to contain the proposed services.

The developed design report should aim, as a minimum, to:

- Demonstrate the feasibility of initial spatial planning and distribution philosophy
- Confirm the design criteria for the engineering services
- Outline the principal metering strategy
- Provide preliminary information on specialist systems (this may include performance specifications, loads, schedules etc.)

- Advise on Building Regulations compliance particularly in relation to energy performance and (if relevant) EPC (Energy Performance Certificate) criteria
- Provide an energy statement based on an agreed energy strategy
- Advise on access routes and plant size and weight in relation to future plant removal and replacement
- Identify any potential problems for the building services (this allows solutions to be developed early in the detail design stage so reducing any risks)
- Provide updated design risk assessments.

In addition, the report should aim to facilitate greater accuracy in cost estimates.

The report, in most cases, will be supplemented with drawings and schematics showing the extent of the services installation. The main features of developed design drawings and schematics prepared at stage 3 are outlined in BSRIA BG 6^[1].

Further considerations in reporting at RIBA Stage 3 are included in Appendix B.

APPENDIX A : CONCEPT DESIGN REPORTS

Considerations in reporting at RIBA Stage 2 may include:

Building Regulations and legislation compliance

This section of the report may include:

- An outline of the building services approvals process for the project
- An outline of the Building Regulations requirements and criteria for the project together with any issues or possible non-compliance at this stage
- Any issues known at this stage with respect to Building Regulations and legislation compliance
- Advice on the regulatory compliance, including any local authority policy, of the concept design

Sustainable design approach

This section of the report may include:

- The significance of sustainable design in relation to the specific project
- An outline of the reasons for adopting a sustainable approach
- An outline of the regulatory requirements and initiatives
- An outline of the sustainability approach, strategy, considerations and alternatives with respect to building services

Environmental rating system

Depending on the appointment, brief and particular client requirements for the project, this section should outline the approach and key considerations with respect to the environmental rating system to be adopted. This section may include:

- A brief description of the environmental rating system to be used and the design team's approach to achieving compliance with it
- The particular rating level to be achieved
- The approach to reducing energy demand
- The approach to reducing water consumption
- Key considerations for further development at the next stage

If a decision is not taken at this stage, this section of the report may outline the benefits of certification under an environmental rating system together with recommendations for consideration.

Future-proofing

A future-proofing strategy may be required to be developed at this stage of the design with careful consideration for future scenarios ranging from climate change to demographic change. Future-proofing is an assessment process that involves clients, designers, end users and others in the supply chain. Issues that might be considered include:

- Flexibility
- Cost of energy and energy security
- Provision of building infrastructure to accommodate likely future advances in technology
- Resilience to climate changes such as temperature rise or rainfall increase
- Legislation change
- After use business change
- Social attitudes – building users' tolerance can change and issues such as privacy, noise pollution, light pollution or air quality which are now acceptable might in the future be a problem.

Energy strategy and approach

This section of the report may include:

- An outline of the findings of any energy strategy studies such as those covering initial carbon emissions rating and building fabric
- Issues and risks relating to the energy strategy and in achieving the carbon emissions rating
- An outline of the options for renewable energy systems including advantages, disadvantages, risks, considerations etc.
- Information on early stage life cycle costing studies with respect to strategy and approach
- A high-level metering strategy
- An outline of any proposed performance metrics and energy targets for the building

Building services design philosophy

This section of the report may include:

- An outline of the proposed design concept solutions (cross-referencing the concept drawings and schematics), system philosophies (mechanical, electrical, public health, building management system etc.), services distribution strategy, plant/equipment space planning strategy etc.
- Initial strategies agreed at this stage relating to acoustic performance, fire engineering and how they influence the design of the building services. The philosophy may include other project strategies, not identified elsewhere in the report, which will be developed at this stage.

Utility services

This section of the report may include:

- A list of the utility authorities for the particular location
- An outline of findings on the existence and extent of utilities
- Comment on the adequacy of utilities supplies
- Any particular requirements of the utility authority, possible effects on the design and considerations to be further developed at the next stage

Building services health and safety philosophy

It is often necessary to demonstrate that access for maintenance, repair and future replacement has been addressed as part of developing the engineering services design philosophy. It is important that the principles of access are tested and agreed with the client, as well as any assumptions and expectations at this stage. Specific safety measures assumed and specific risks with respect to the design philosophies should be stated.

APPENDIX B : DEVELOPED DESIGN REPORTS

Considerations in reporting at RIBA Stage 3 may include:

Design standards and codes

It is important to define and confirm the standards and codes the engineering services design will be developed in accordance with. This should include any standards and requirements defined by the client or specific to the project. This could be particularly important on international projects where there can be conflicting information regarding standards.

Design criteria

The design criteria applied to the project should be identified together with the source of all data being stated. It is important to ensure that all key information is included and to identify any particular limitations or comments so as to provide a clear understanding of the proposed internal environment to be provided.

The overall design margin philosophy and strategy should be outlined including safety margins, redundancy, diversities, spare capacity allowances and future need requirements. As necessary, the effects of any margins should be indicated. Consideration of design margins is essential for:

- Avoidance of unnecessary over-sizing of plant and systems
- Good part load performance of plant and systems
- Future need requirements
- Equipment and system selection
- Plant space allowance

Sustainable design approach

This section of the report may include:

- The significance of sustainable design for the project and reasons for adopting a sustainable approach
- Regulatory requirements and initiatives
- An outline of the sustainability proposals, considerations and alternatives with respect to the building services

Environmental rating system

Depending on the appointment, brief and particular client requirements for the project, this section should outline the approach and key considerations with respect to the environmental rating system to be adopted.

This section may include:

- A brief description of the environmental rating system and the design team's approach to achieving compliance with it
- The approach to reducing energy demand
- The approach to reducing water consumption
- Key considerations for further development at the next stage

Some of these points may have been addressed in the Concept Design report (see Appendix A).

Energy strategy and approach

This section of the report may include:

- An outline of any energy strategy and approach together with any key systems proposed as part of that strategy
- Consideration of benchmarking of proposed systems, how much energy they are saving and why they are selected
- For any predicated energy demand and profiles, any risks and, importantly, all assumptions made
- For renewable energy technology, the advantages, disadvantages, risks, technical feasibility, cost considerations etc.
- An outline of the approach and strategy for metering

Building services design philosophy

The aim of this section is to outline the design philosophy for the proposed building services developed design solution. It may include:

Plant strategy

- An outline of the location strategy for plant and plant rooms
- Issues and considerations with respect to access, maintenance, plant replacement, health and safety etc.
- The principal locations for building services plant and any local authority requirements that need to be complied with
- Any limitations or considerations for future design development
- For plant areas, the following should be identified:
 - Spatial area requirements
 - Particular requirements such as access, ventilation, acoustic, plant removal and replacement
 - Necessary interrelationships with other particular spaces, service risers etc.
 - Plant weights and capacities of associated access facilities (for example lifts if used to move plant)

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Building services distribution philosophy

- Services distribution strategy including vertical services and service zones
- Particular requirements of utility authorities with respect to riser facilities etc.
- An outline of the zoning strategy and the relationship to the metering strategy

Utility services

These would include water, gas, electricity, drainage, telecommunications etc. This section of the report may include:

- Any particular requirements of the utility authority, possible effects on the design and considerations to be further developed at the next stage
- Planning issues or reserve matters that may require discharging or are applicable to the utilities
- Any onsite generation that is likely to be connected to the public utility network
- An indication of the initial assessment of utility loads. The basis for this assessment should be stated, including any assumptions and expected sensitivity figures at this stage of the design.
- Any requirement of incoming services to meet resilience requirements
- Requirements for utility services and where they terminate within the building
- Spatial and location requirements for utilities, where necessary including photographs and diagrams
- Identification of any offsite or onsite reinforcement

Building services health and safety philosophy

It is important to demonstrate that access for operation, maintenance and future replacement has been established and the design provides a safe means of achieving this end. This should include:

- The principles of access together with any assumptions and expectations and the routes to be taken to access particular plant areas and plant items
- Space provision for maintenance
- Means of escape associated with plant areas and maintenance/operation activities
- The replacement strategy for major plant/equipment
- Specific safety measures assumed
- Specific risks including risk assessment issues which affect space provision relating to the building services installations

Sketches could be used to illustrate plant access, maintenance and replacement strategies.

BSRIA BG 55^[4] provides guidance on designing for safety for both new build and refurbishment projects.

Fire strategy

A separate fire report may be produced by the fire consultant covering issues related to the whole building, depending on the reporting requirements of the project. However, as a minimum, those issues relating to the building services engineering design should be addressed in the developed design report and a technical description and explanation of the proposed fire strategy for the concept design solution outlined. This section of the report may include:

- A list of regulations and approvals
- The proposed legislation and guidance for the fire and life safety design
- An outline of the fire and life safety principles covering as necessary:
 - Evacuation philosophy
 - Means of egress
 - Fire detection & alarm system
 - Smoke control
 - Fire resistance and compartmentation strategy
 - Access and facilities for firefighting
 - Provisions for active safety