

Design Documentation Guidelines

HVAC Services

Concept Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client brief and budget. <input type="checkbox"/> • Architectural sketch concept. <input type="checkbox"/> • Project time schedule. <input type="checkbox"/> • Preliminary fire safety report. <input type="checkbox"/> • Site survey information. <input type="checkbox"/> • Site and environmental condition constraints. <input type="checkbox"/> • Project delivery methodology. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Review of client requirements including reliability, redundancy, and efficiency. <input type="checkbox"/> • Establish design criteria and develop functional services brief. <input type="checkbox"/> • Investigate interface requirements with existing buildings and equipment. <input type="checkbox"/> • Review preliminary fire safety report – (prepared by others). <input type="checkbox"/> • Estimate total load using W/m². <input type="checkbox"/> • Review applicable authority codes and standards. <input type="checkbox"/> • Establish contacts with local authorities and utility companies. <input type="checkbox"/> • Review concepts for significant and unusual health and safety risks relevant to the design. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Sketch drawings (may comprise 'marked-up' architectural drawings) including preliminary plant room requirements and services routes. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Nil. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> • Concept services brief – to establish available system concepts and a broad report investigating available options and recommendations, and definition of system requirements and key assumptions. <input type="checkbox"/> • Design standards to be used. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. To ascertain client brief and to review/consider applicable options. 2. Agree roles and responsibilities. 3. Concept and preliminary design phases are often combined on smaller projects. 4. Tendering at this stage unlikely to result in 'like for like' bids. 5. No co-ordination completed at this stage. 6. Costing only on per m² basis.

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Preliminary Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client approval of concept services design and budgetary implications. <input type="checkbox"/> • Updated fire engineering report. <input type="checkbox"/> • Preliminary acoustics report. <input type="checkbox"/> • Design time schedule. <input type="checkbox"/> • Client approved architectural, structural, and other services concept designs. <input type="checkbox"/> • Assess supply utility requirements and liase with local authorities. <input type="checkbox"/> • Electrical lighting and power loads. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Develop preliminary load profiles. <input type="checkbox"/> • Develop system concepts and identify special requirements. <input type="checkbox"/> • Confirm plant room space/location requirements. <input type="checkbox"/> • Assess impact of the location of system and equipment intake and discharge. <input type="checkbox"/> • Develop services route requirements, both horizontal and vertical and space co-ordination with other Trades. <input type="checkbox"/> • Define interface requirements with other services. <input type="checkbox"/> • Review preliminary design for significant and unusual health and safety risks the design may present during construction and maintenance. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Schematic drawings outlining services concepts. <input type="checkbox"/> • Layout drawings locating plant rooms, risers, and primary services routes. <input type="checkbox"/> • Preliminary plant room layouts. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Outline services specifications. <input type="checkbox"/> • Preliminary equipment schedules for major plant. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> • Utility services reports. <input type="checkbox"/> • Design report including key design criteria, proposed system concepts, and features. <input type="checkbox"/> • Preliminary equipment weights. <input type="checkbox"/> • Energy efficiency analysis. <input type="checkbox"/> • Preliminary building services interface matrix. <input type="checkbox"/> • Highlight 'significant and unusual' buildability and health and safety issues. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Cost estimates at this stage generally cannot be on a full elemental basis, as final distribution is not well defined. 2. Systems could be priced by vendors at this stage but unlikely to get like for like comparison.

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Developed Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client approval of preliminary design and budgetary implications. <input type="checkbox"/> • Client approved architectural, structural and other services preliminary designs including building fabric details. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Services load calculations. <input type="checkbox"/> • Services co-ordination with structural, architectural, and other services. <input type="checkbox"/> • Incorporate requirements of the fire, acoustic, or other relevant report. <input type="checkbox"/> • Develop and expand the services concepts, selection of typical plant, review of plant room and services space requirements including sizing of duct and pipe work. <input type="checkbox"/> • Identify utility connections <input type="checkbox"/> • Co-ordination of plant, equipment, services routes, diffusers, etc. <input type="checkbox"/> • Verify significant and unusual health and safety issues have been addressed in the design. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Single line pipe work and duct work layouts. <input type="checkbox"/> • Major plant concepts and layouts. <input type="checkbox"/> • Sections as necessary. <input type="checkbox"/> • Piping and air flow schematics. <input type="checkbox"/> • Reflected ceiling plans, preliminary co-ordination. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Preliminary technical specifications. <input type="checkbox"/> • Equipment schedules. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> • Updated design features (options) report, including options selected. <input type="checkbox"/> • Electrical loadings report. <input type="checkbox"/> • Updated energy efficiency review. <input type="checkbox"/> • Approvals for utility connections. <input type="checkbox"/> • Building services interface matrix. <input type="checkbox"/> • Highlight 'significant and unusual' buildability and health and safety issues. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Cost estimates at this stage can be produced by quantity surveyor on elemental basis, with secondary elements estimated on typical details. 2. Developed design generally provides the minimum level of documentation to clearly define the scope of all HVAC elements.

Design Documentation Guidelines

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Detailed Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client approval of developed design and budgetary implications. <input type="checkbox"/> • Client-approved developed designs for architectural, structural and other services. <input type="checkbox"/> • Final Fire and Acoustic reports. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Detailed system design, including equipment, ductwork and pipework. <input type="checkbox"/> • Co-ordination in principle with Structure. <input type="checkbox"/> • Architecture and other Building Services. <input type="checkbox"/> • Finalise utility supplies. <input type="checkbox"/> • Fire authority approvals. <input type="checkbox"/> • Interface details with other trades. <input type="checkbox"/> • Highlight significant and unusual health and safety risks that were identified through the design process. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> Completed schematic and layout drawings defining requirements for services, including plans, elevations, and sections. <input type="checkbox"/> Detailed pipe work and duct work layouts for mechanical services. <input type="checkbox"/> Plant room layouts including detailed sections. <input type="checkbox"/> Piping and air flow schematics. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> Detailed specifications. <input type="checkbox"/> Detailed equipment schedules. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> Nil. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Detailed design generally provides a level of documentation to clearly define the design of HVAC services. Design details should be coordinated with other disciplines. However, the documents produced in this phase may not directly be able to be 'built' from. 2. Co-ordination. In ceiling zones identified with appropriate clearance from structure and other services. Major penetrations identified. Detailed co-ordination of critical areas. 3. Define in the specification the significant and unusual health and safety risks that were identified in the design. 4. Define in the specification the significant health and safety risks that were identified in the design.

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Construction Design Phase

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<p>Inputs:</p> <ul style="list-style-type: none"> • For construction design phase, drawings for architectural, structural, and other services. <input type="checkbox"/> • Construction time schedule. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Production of larger scale detailed shop drawings including seismic details. <input type="checkbox"/> • Co-ordination of all services, structure and architecture. <input type="checkbox"/> • Equipment selections and technical submissions. <input type="checkbox"/> • Control system programming. <input type="checkbox"/> • Detailed layouts of plant rooms. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Revise detailed design documentation to incorporate buildability changes suggested by contractor if they impact on the design intent. <input type="checkbox"/> • Equipment submissions as defined in detailed design. <input type="checkbox"/> • Compliance certificates. <input type="checkbox"/> • Detailed layouts of plant rooms and risers. <input type="checkbox"/> • Fabrication details of ductwork, pipework, switchboards, etc. <input type="checkbox"/> • Equipment plinth details, mounting, and isolation detailing. <input type="checkbox"/> • Wiring diagrams and points schedules for control systems. <input type="checkbox"/> • Seismic bracing details. <input type="checkbox"/> <p>Review:</p> <ul style="list-style-type: none"> • Review shop/fabrication and layout drawings for compliance with design. <input type="checkbox"/> • Review equipment submissions. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Normally prepared by the services sub-contractor to enable fabrication of the services design. 2. Deliverables contain sufficient details for elements to be manufactured/constructed without reference to other documents, i.e., 'the details have co-ordinated the relevant design information across all disciplines and can be built from'. 3. Equipment ordered. 4. At completion of design as built drawings, manuals and equipment details produced to indicate final installed systems. 5. The contractor is responsible for managing health and safety risks during the construction phase.