

Generic Design Manual

MUST BE EDITED !!!

Sample Only

OP 491	Design Planning	
Issue 1	Date: Issue Date!	Approved: Quality Officer

Purpose

The purpose is to describe the steps to be undertaken to plan a research, development or design project and to ensure that the work is undertaken by suitably qualified designers.

Responsible Officer

Designer

Procedure

DESIGN PLAN

The responsible officer shall create a Microsoft Excel worksheet in the Accounts file, completing the Contract Review and Risk Analysis sections and observing the following Design Plan checklist. For major projects the DRIVER Quality Plan facility may be used.

Working File and Correspondence File

Green manila folder - Prepare with Client, Description, Date on spine

Project Sheet - Complete client data

Project Summary Sheet - Complete Contract Review

Project Summary Sheet - Complete Risk Analysis

Project Summary Sheet - Print & place in green Working File

Quote - Copy & place in green Working File

Order - Place in green Working File

All incoming documents in green Working File

All calculations etc in green Working File

Outgoing documents - Establish Word (& Excel) Job folders on Computer 5

Outgoing documents - Obtain correspondence number from Word A-Export

Outgoing documents - File in Word A-Export folder & Word Job folder

Outgoing documents - File in Word Job folder

Outgoing documents - Print documents

Outgoing documents - Enter manually in hard copy Document Register

Outgoing documents - Use & complete Transmission Stamp on back of front page

Outgoing documents - Copy & place in red Correspondence File

Outgoing documents - Copy & place in green Working File

Timesheet - Complete all times and enter direct costs

Timesheet - Calculate and enter appropriate invoices, including description

Timesheet - Print invoice information

MYOB data - Enter job information in Jobs List, Create a Card File (if new client)

Invoice - Prepare & print MYOB Invoice

Invoice - Check and sign Invoice

Invoice - Copy, send copy to client, file original in red Invoice file

Remove unwanted information from green Working File

Copy technical data and place in the appropriate orange Technical Files

Complete this checklist

Archive the green Working File

Contract Review & Risk Analysis

Client

Job

Job description
Job No
Quotation
Order

Contract review

Clarity
Consistency
Capability
Price
Program
Conditions

Risk Analysis

Cost at risk
Likelihood of occurrence
Level of risk
Risk management procedure

Any supporting documents, shall be included in a job file. The design plan shall include record the appropriate priorities and carry out a risk analysis for each project.

ACTIVITY ASSIGNMENT

The responsible officer shall assign design, detailing and checking work to the design staff as required.

The required qualifications and experience of these personnel shall be maintained in the Training Records

If the design is to be performed by a Consultant who is not an employee of the Company, the Design Control Schedule, together with any supporting documentation shall be forwarded to the Consultant. Before commencement of the work, the responsible officer shall obtain from the Consultant a certification that the design work will be undertaken within a quality assurance system complying with AS/NZS ISO 9001. If the Consultant is unable to furnish a certification that the work will be carried out under an approved quality assurance system, then it shall be assessed under same controls as for an employee designer.

ORGANISATIONAL AND TECHNICAL INTERFACES

Ensure that the design staff liaises with other staff as required to ensure that all design information is supplied. The purpose is to describe the steps to be undertaken to plan a research, development or design project and to ensure that work is undertaken by suitably qualified designers.

OP 492	Design Input, Design Output and Design Changes	
Issue 1	Date: Issue Date!	Approved: Quality Officer

Purpose

The purpose is to ensure that all required design input is correctly obtained and assessed, all design output meets the contractual and statutory requirements and that all design changes, whether initiated by the company or the client are correctly processed.

Responsible Officer

Designer

Procedure

DESIGN INPUT

Design input information, such as purchaser's specification, shall be clearly stated in the Design Plan. Any relevant information shall be the design file as part of the permanent records.

- Create a job file in the DRIVER Management System spreadsheet
- Add client and project information.
- Record the receipt of all of the relevant design documents provided by the Customer, e.g. order, drawings, specifications etc

DESIGN OUTPUT

Design output information shall take the form of drawings, schedules, material lists etc. It shall be checked to ensure that it meets the input requirements and is functional and meets the regulatory requirements.

- All drawings shall be produced on CAD, using various layers to ensure dimensional consistency.
- Record the transmittal of all of the relevant design output documents e.g. drawings, specifications, cutting schedules, installation instructions etc

DESIGN CHANGES

Design changes, whether initiated by the Customer or internally shall be documented as set in Document Control. The purpose is to:

- Ensure that all design information and data are correctly documented and considered during the design
- Ensure that the design output accurately describes the requirements of the design.
- Ensure that the design changes are correctly documented and considered during the design process.

The implementation, monitoring and control of design changes, shall recorded in the DRIVER Management System spreadsheet. The data to be recorded, together with the approving person and relevant dates includes the following:

- Reason for the change,
- Area/function/process impacts by the proposed design change:
- Review and approval of the change:
- Conclusion: Proceed? Yes/No

- Design Plan for the change
- Change implemented and signed- off, comments, Closure: Yes or No

Sample Only

DESIGN INPUT

Design input information, such as purchaser's specification, shall be clearly stated in the Design Plan. Any relevant information shall be the design file as part of the permanent records.

Load the relevant Microsoft Word template file from the Design folder.

Add client and project information.

Load the electronic copy of the specification from the disk onto the computer.

Delete those trades (if any) that will not be used on the project.

Search the document for the hash symbol (#) which has been inserted in those locations most likely requiring amendment.

Make the appropriate changes and remove the hash symbol.

When all hash symbols have been removed (confirmed by a final search) read the whole document making any additional amendments which may be require.

File the changed specification on a new disk, with an appropriate (different) file name.

Print the new specification.

DESIGN OUTPUT

Design output information shall take the form of drawings, schedules, material lists etc. It shall be checked to ensure that it meets the input requirements and is functional and meets the regulatory requirements. All drawings shall be produced on CAD, using various layers to ensure dimensional consistency.

Documents to be sent to the client

The following documents shall be bound in a clear plastic binder for transmission to the client

- Front Page
- Specifications
- Plans and Sections
- Supporting documents

Master File

The following documents shall be retained in the master file (red).

- Original specifications and drawings

Job File (Green)

The following documents shall be retained in the job file (green).

- Check-prints
- Calculations
- Site measurements and surveys
- Client supplied information
- Design Plan Checklist
- Design Checklist

Drawing Numbering Convention

In order to ensure consistency of drawings, the following convention shall be adopted where practical.

Drawing numbers shall be Q0xxx.yyy

Where Q0xxxx is the main document number (ie same for each job)

yyy is the individual drawing number consisting of several pages as in the case of a specification, where each page marked Page 1, Page 2

yyy	Title
0.FP	Front page
0.GS	General Specification
0.DP	Design Plan
0.CP	Construction Plan
0.1	Confirmation of Structural Requirements
0.2	Control of Premixed Concrete
0.3	Certification of Structural Design
0.4	Certification of Structural Design Check
0.5	Certification of Structural Inspection
0.6	Record of Structural Inspection

00. - Planning & Design
01. - Site Establishment & Preliminaries
02. - Earthworks & Site Drainage
03. - Concrete
04. - Retaining Walls
05. - Drainage & Plumbing
06. - Windows, Doors & Glazing
07. - Structural Steel Work
08. - Wall, Roof & Floor Framing
09. - Carpentry & Joinery
10. - Roof Cladding
11. - Roof Plumbing
12. - Masonry
13. - Ceiling & Wall Lining
14. - Insulation
15. - Floor & Wall Tiling
16. - Electrical Installation
17. - Kitchen
18. - Vehicular Doors
19. - Painting
20. - Resilient Floor Coverings
21. - Carpets & Soft Furnishings
22. - Window & Door Shutters
23. - Mechanical Ventilation & Services
24. - Cleaning
25. - Landscaping
26. - Fencing
27. - Paving
28. - Metalwork & Balustrades
29. - Public Kerbs, Gutters, Footpaths & Crossovers
30. - Miscellaneous Details

Structural Drawing Conventions

Reinforcement Bar Mark Numbering Convention

In order to ensure consistency of drawings, the following convention shall be adopted where practical.

This will also enable standard drawings to be prepared.

Example 9 Y12 2316 S @ 400 crs

Where

9 is the number of bars used in the member

Y12 is the bar grade and diameter

2316 is the bar mark number

2 is the floor number (If ground floor, the 0 may be omitted. For retaining walls, use 9)

3 is the member number

16 is bar number

S is the bar shape

@ 400 crs is the bar spacing

Other examples of bar marks

2316 is the 16th bar in Second Floor Support Beams

0726 or 726 is the 26th bar in the top face of the Ground Floor Slab

9107 is the seventh bar in Retaining Wall No 1

DESIGN CHANGES

Design changes, whether initiated by the Purchaser or internally shall be documented as set in Document Control. The purpose is to:

- Ensure that all design information and data are correctly documented and considered during the design
- Ensure that the design output accurately describes the requirements of the design.
- Ensure that the design changes are correctly documented and considered during the design process.

The implementation and control of design changes, shall be implemented and monitored using the Design Change Request Reason, and recorded in the DRIVER Management System spreadsheet. The data to be recorded, together with the approving person and relevant dates includes the following:

- Reason for the change,
- Area/function/process impacts by the proposed design change:
- Review and approval of the change:
- Conclusion: Proceed? Yes/No
- Design Plan for the change
- Change implemented and signed-off, comments, Closure: Yes or No

Drawing Title Block

PURPOSE

The purpose of this Standard Operating Procedure is to define the information which must be recorded on the title blocks of drawings.

RESPONSIBLE OFFICER

Technical Services Manager

All drawings shall include a title blocks and shall be in the following format which meets the requirements of section 4.7.

An original copy of each drawing shall be kept in the Permanent Records and shall show the latest Issue, Date and Modification Number. This information which is recorded on the original drawing shall serve as the register of the last issue.

Sample Only

Drawing Modification Register

PURPOSE

The purpose of this Standard Operating Procedure is to define the information which must be recorded in the drawing register.

RESPONSIBLE OFFICER

Technical Services Manager

The responsible officer shall record in a register, as shown below, the following information

- * Modification Number (sequential number by which the modifications to drawings can be identified)
- * Requested by whom
- * Description of the modification

Note This register does not need to include a drawing number or a drawing issue number since it is simply an expanded description of information recorded on the original drawing which is easily accessible in the permanent records.

Sample ONLY

Disk Register

PURPOSE

The purpose of this Standard Operating Procedure is to define the information which must be recorded in the computer disk register.

RESPONSIBLE OFFICER

Technical Services Manager

This Standard Operating Procedure refers to drawing files generated by the drafting programs, Design Cad 2 or Design Cad 3.

While a file is being generated and for a period up to six months thereafter, the file may be retained on the hard disk of the computer. When this period has elapsed or when the file is no longer required for frequent use, it shall be transferred to an archive copy of a floppy disk.

When the floppy disk is created, it shall be recorded on a disk index using the format shown below.

Note The following control information is recorded on the disk and shall also be printed on the disk index bytes, date and time

In the absence of issue numbers on the files, the date and time shall serve the purpose of document control.

Control of Technical Manuals and Suppliers' Brochures

PURPOSE

The purpose of this Standard Operating Procedure is to define the to control technical manuals and suppliers' brochures.

RESPONSIBLE OFFICER

Technical Services Manager

On receipt of revised technical manuals from the suppliers, the responsible officer shall

1. Record the date and issue (where relevant) in a Register of Documents.
2. Mark one copy of each as "Controlled Document" and hold it in the Permanent Records, to be located in the Technical Service Manager's office.
3. Send additional copies to the other offices which require their use. The following guidelines should be observed.

If the other office uses the manual or brochure for fabrication or installation purposes, they should be issued with a Controlled Copy and this should be recorded in a Document Register.

If the other office uses the manual or brochure for sales purposes and not for fabrication or installation purposes, then they may be issued with an Uncontrolled Copy and this does not need to be recorded in a Document Register.

Suppliers' brochures shall **not** be treated as Controlled Documents.

OP 493	Design Review, Design Verification And Design Validation	
Issue 1	Date: Issue Date!	Approved: Quality Officer

Purpose

The purpose is to provide guidance for:

- Design Reviews to ensure that the proposed design are capable providing the necessary Design Outputs
- Design Verification, performed at the completion of appropriate stages of the design to ensure that the design output is complete, accurate and in accordance with the specified requirements
- Design Validation to determine that the assumed design inputs accurately model real behaviour and that the resulting design outputs provide realistic solutions the problem.
Design Validation is deemed to be met by the achievement of CodeMark Certification of the particular product under development.

Responsible Officer

Designer

Procedure

DESIGN REVIEWS

For each project, review the suitability of the design when work is 50% complete. If the work continues longer than one month, additional Design Reviews shall be carried out monthly. Record the results in the Design Plan.

DESIGN VERIFICATION

1. Obtain a full set of drawings, specifications and design calculations.
2. Check the calculations for accuracy by
Comparing the designs to similar designs (using designs charts etc), or
Performing alternative calculations or
Checking original calculations
3. Check all general information on drawings and specifications such as notes, title blocks, drawing numbers etc.
4. Check all dimensions and notations on the drawings against other plans. As each dimension or note is checked and found to be correct, it shall be marked off on a check print using a blue highlighter. If the dimension or note is incorrect, it shall be marked with red highlighter and the marked up check print is used to direct correction of the original drawing. When the corrections are complete, initial the appropriate red mark and pass it back to the Design Checker together with the original drawing (or a new print). When all corrections have been made, mark them off with a blue highlighter, sign and date the check print and commit it to the permanent records.
5. When checking is complete, Controlled Copy No 1 of the relevant document, specification or drawing shall be signed and dated and kept in the permanent records.

DESIGN VALIDATION

Option 1

On the completion of each design project, the design shall be validated, its effectiveness assessed and recorded on the Design Plan.

The design validation shall consider:

- any recorded nonconformance
- any design changes
- an assessment of the serviceability of the completed structure.

If no data is available, employ a means of simulating performance.

Option 2

Apply for and obtain CodeMark Certification (or other appropriate third-party product certification) for the particular product being developed. Refer to Project Plan PP1 Stage 2.

Sample Only

OP 494	Design Risk Analysis and Risk Management	
Issue 1	Date: Issue Date!	Approved: Quality Officer

Purpose

The purpose is to set out the means of carrying out risk analyses and subsequent risk management.

Responsible Officer

Designer

Procedure

RISK ANALYSIS

A formal Risk Analysis must be carried out when:

- The scope of work exceeds 10% of annual turnover, or
- The work differs significantly from the nature of the work normally carried out, or
- There is abnormal risk of failure or litigation.

Risk analysis and risk management shall be carried out in accordance the principals of AS/NZS 4360, modified as follows to suit the business. It may be qualitative and/or quantitative and may be based on the following matrix.

To carry out risk analysis, complete the following check list.

Insurance Is the operation covered by current insurance policies?....
Cover?

Event What event poses a risk to the business?.....

Consequence of occurrence

Catastrophic	20
Major	15
Moderate	5
Minor	2
Insignificant	1

Note:

As a guide, the following rule may be applied for small businesses.
 $C = E \cdot k / T$

Where

C = Consequence of occurrence of the failure event
k = Calibration factor depending on the business (use 10 initially)
T = Annual turnover

Likelihood of occurrence

What is the likelihood of the event occurring?

Almost certain	15
Likely	7
Moderate	3
Unlikely	2
Rare	1

Risk = Consequence of occurrence x Likelihood of occurrence

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Risk Analysis Matrix						
Likelihood	Consequences or Impact					
	Insignificant	Minor	Moderate	Major	Catastrophic	
	1	2	5	15	20	
Almost certain	15	S 15	S 30	H 75	H 225	H 300
Likely	7	M 7	S 14	S 35	H 105	H 140
Moderate	3	L 3	M 6	S 15	H 45	H 60
Unlikely	2	L 2	L 4	M 10	S 30	H 40
Rare	1	L 1	L 2	M 5	S 15	S 20

Notes:
40 + H = High risk, detailed research and management planning required at senior levels
14 to 40 S = Significant risk, senior management attention needed
5 to 13 M = Moderate risk, management responsibility must be specified
0 to 4 L = Low risk, manage by routine procedures

40 + H = High risk, detailed research and management planning required at senior levels

Recommended Action:

Do not undertake the project.

Preventive Action is required and a Nonconformance Report shall be used to control and monitor those actions used to reduce the level of risk.

14 to 40 S = Significant risk, senior management attention needed

Recommended Action:

Use additional quality control and check insurance cover

Preventive Action is required and a Nonconformance Report shall be used to control and monitor those actions used to reduce the level of risk.

5 to 13 M = Moderate risk, management responsibility must be specified

Recommended Action:

Nominated responsible officer must monitor quality closely

0 to 4 L = Low risk, manage by routine procedures

Recommended Action:

Use normal level of quality control.

Sample Only