Construction Skills Training Centre

We are here to improve your future

CPCCCM2001
Read and interpret plans and specifications

For information on the courses the CSTC offer, please contact:
Brisbane, PO Box 51, Moorooka QLD 4105
Phone: 07 3373 8888, Fax: 07 3373 8899 or Email: brisbane@cstc.org.au

Quality instruction, service, fairness and integrity - always

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CSTC's purpose is to ensure the building and construction industry's long term investment in the workforce through maintaining a commitment to the training and ongoing development of industry workers. CSTC encourages individuals to achieve the highest level of skill and knowledge possible in their chosen vocational area, therefore resulting in improved self esteem, personal growth, employment opportunities, safety into the workplace and quality of life.

Vision

CSTC strives to be recognised as a learning centre of excellence for vocational education and training. We are an organisation that continually strives to achieve the highest possible standards of education, training and consultancy services specific to the building, construction and other related industries.

CSTC provides training in the following areas:

- Occupational Health and Safety
- High Risk Work Licenses – Scaffolding, Dogging, Rigging, Crane operation
- Forklift operation
- Confined Spaces
- First Aid
- Asbestos Removal
- Concreting
- Steelfixing
- Road Construction
- Bridge Construction
- Tunnel Construction
- Pipe Laying
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- Bitumen Surfacing
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- And much more!

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This learning product could only be made possible because of the dedicated CSTC team.

CONTENTS

Element 1 – Identify types of drawings and their functions

In this chapter you will understand:

- ✓ The main types of plans used on a construction site
- ✓ The order of plan reading
- ✓ How to use project specifications
- ✓ The key features and functions of drawing
- ✓ How to consider quality requirements
- ✓ How to consider environmental requirements

INTRODUCTION

Plan reading is an essential part of the construction industry. No structure can be erected successfully without plans and specifications. Plans enable the various groups and stakeholders involved in a construction project to understand a common language. This may include:

- architects
- structural, electrical, mechanical or civil engineers
- surveyors
- project owner
- principal contractor
- subcontractors
- suppliers
- financial institutions
- construction workers
- Council town planning authority

The various groups will require the plans for different purposes and relate to the technical information contained in them at varying capacities. For example, whilst the engineer will be required to engage with the plans in a highly technical manner the financial institution may not require the same level of understanding in order to approve construction financing. This highlights the need for plans to reflect a common language which enables all groups to perform their role in the construction process.

It is likely that you will be engaged in the actual construction phase of a project and be interacting with a range of tradespersons and construction workers on site. During this phase of construction the various groups and individuals will also be using the plans to coordinate their own specialised activities. Certain trades will require specific plans which are designed for that particular trade; for example an electrical plan will provide information

on electrical installation. Whilst specialised plans will provide information about specific requirements, specifications and materials they still require the reader to understand and interpret general plan reading elements.

The elements common to all plans which simplify reading and understanding will include symbols, notes, sections abbreviations, legends and schedules. By understanding these different elements and how to apply them will greatly increase your ease in reading plans.

MAIN TYPES OF PLANS AND DRAWINGS

It is important that you have an understanding of the types of plans and drawings generally encountered on a construction site. You may not be required to interpret and understand the contents of all materials encountered however you should at least be familiar with them.

Following are summaries of the types of plans that you may encounter on a construction site.

WORKING DRAWINGS

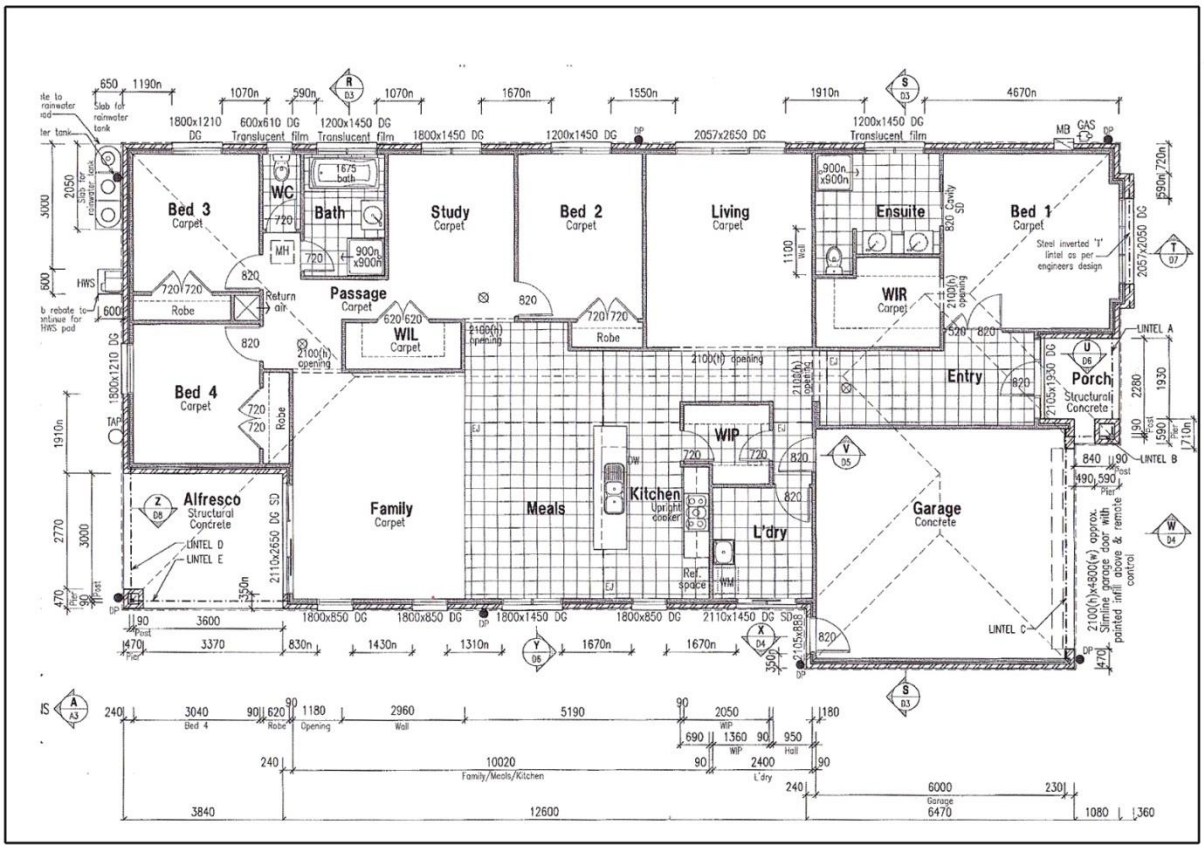
Working drawings are technical in nature and form part of the documentation necessary for designing a structure or engineering product. Generally in construction these drawings could include the following elements: site, structural, architectural, civil, mechanical, plumbing, electrical and any other necessary sub-sets of drawings. The drawings provide the plan reader with a visual representation of the information required to design the structure. This includes:

- *geometry* – the shape of the object; represented as views; how the object will look when it is viewed from various angles, such as front, top, side, etc.;
- *dimensions* – the size of the object is captured in accepted units;
- *tolerances* – the allowable variations for each dimension;
- *material* – represents what the item is made of;
- *finish* – specifies the surface quality of the item, functional or cosmetic; and
- *grading* – the interrelation between structures and grades of surface or contour.

Floor Plan

A floor plan consists of a view from above of a horizontal section of the building drawn to scale. The scale is usually 1:100 with the dimensions given in millimetres. A floor plan is often considered the most important plan of the construction project as it contains more information than any other part of the working drawings. Information may include:

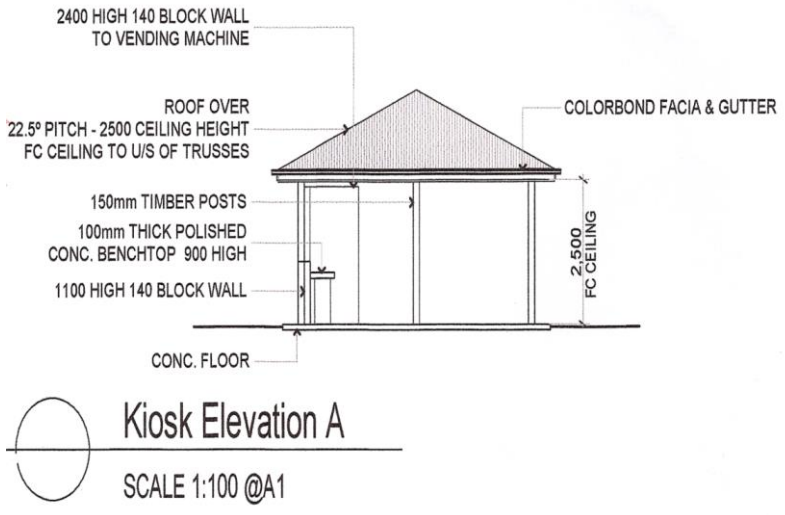
- overall shape and size of the structure, including overall dimensions;
- dimensions of individual rooms, and external areas e.g. decks, verandahs, etc.;
- thickness of walls, external and internal;
- position of openings, windows and doors;
- position of fitted building attributes, e.g. cabinetry, basins, fireplaces, etc.
- function of each room;
- roof outline; and
- position of hanging and strutting beams if applicable.



Elevation

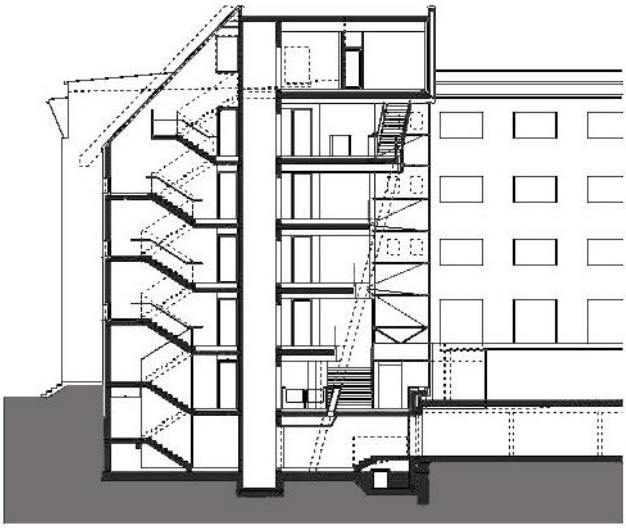
Elevations are the most commonly used view to understand the external appearance of a structure. These consist of a side view representing the façade of the structure as a flat surface view. In geometry it consists of a horizontal orthographic projection of a building on to a vertical plane.

Each elevation is labeled in relation to the compass direction it faces, e.g. the north elevation of a building is the side that most closely faces north. An elevation will show all surfaces of the building when viewed from a particular direction. Generally this will include front and side views of the building in order to correctly interpret the design.



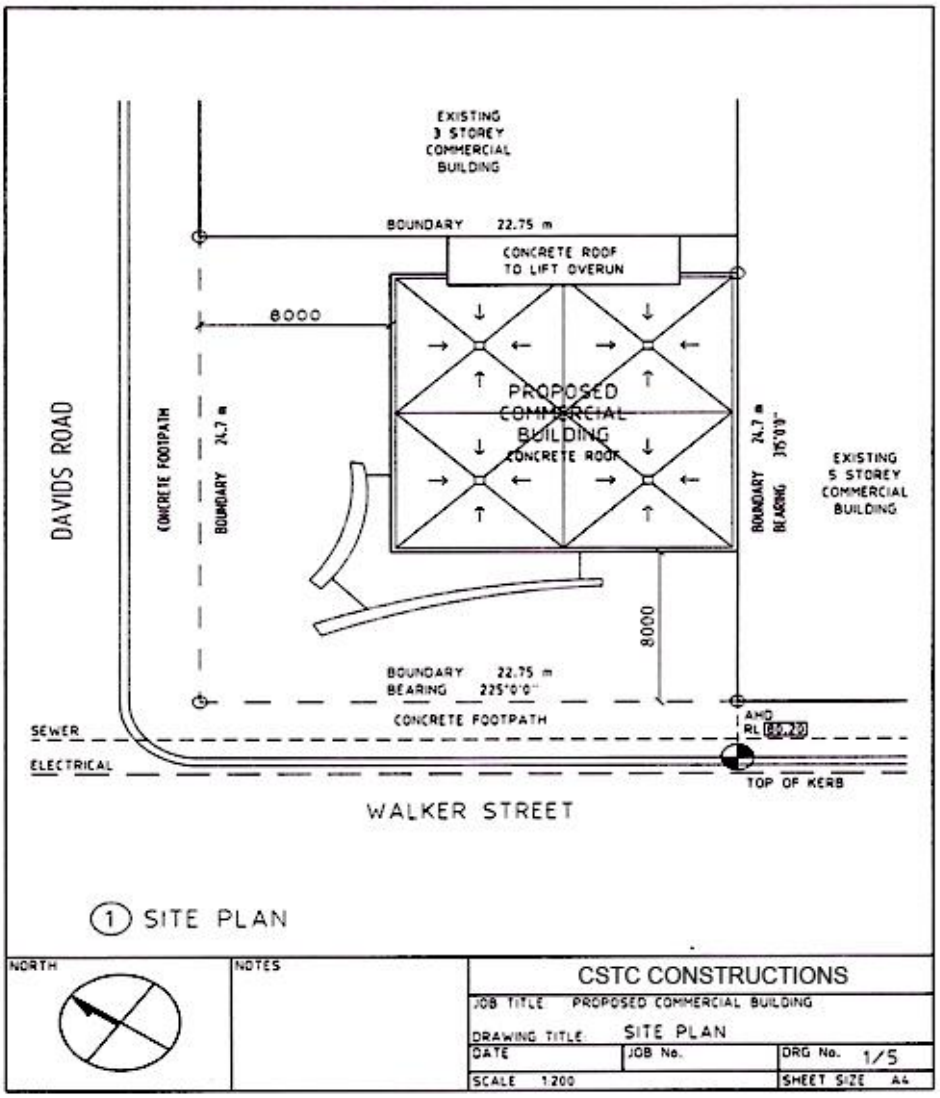
Cross Section

The position of cross section or section drawings will be indicated on the floor plan. These are similar to elevations in that they consist of a representation of a particular point or level of the structure as a flat surface view. The cross section will represent a vertical plane cut through the building; enabling the plan reader to identify information from the lowest to the highest point for that particular section of the building.



Site Plan

Site plans are usually the first plan that any builder or tradesperson will look at on a construction site. This type of plan will give an overall view of the site layout; showing building locations, entries and exits to the site, emergency evacuation points, crib hut locations, first aid room, site offices and amenities. This plan is used at the site induction and allows the workers on site to get a proper orientation of their surroundings.



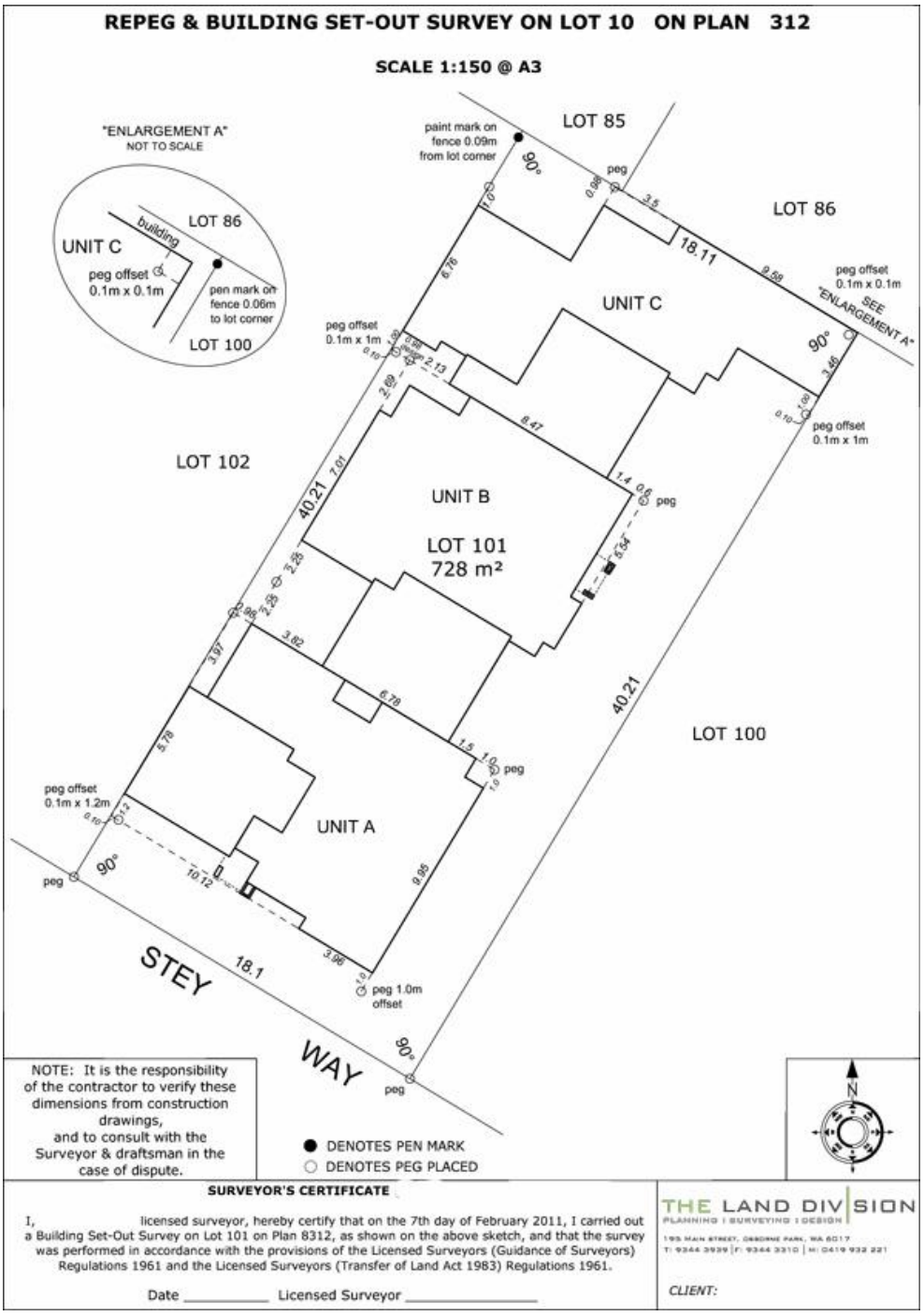
PROPOSED COMMERCIAL BUILDING—SITE PLAN

Set Out Plan

A set out plan contains surveyed information which enables the identification of stake out reference points and markers to guide the construction of new structures such as roads or buildings. These markers are usually staked out according to a suitable coordinate system selected for the project.

The set out plan will include the following:

- Surveyed conditions of the work site, including topography, existing buildings and infrastructure, and underground infrastructure whenever possible (for example, measuring invert elevations and diameters of sewers at manholes);
- Stake out reference points and markers that will guide the construction of new structures;
- Verify the location of structures during construction;



Civil Plan

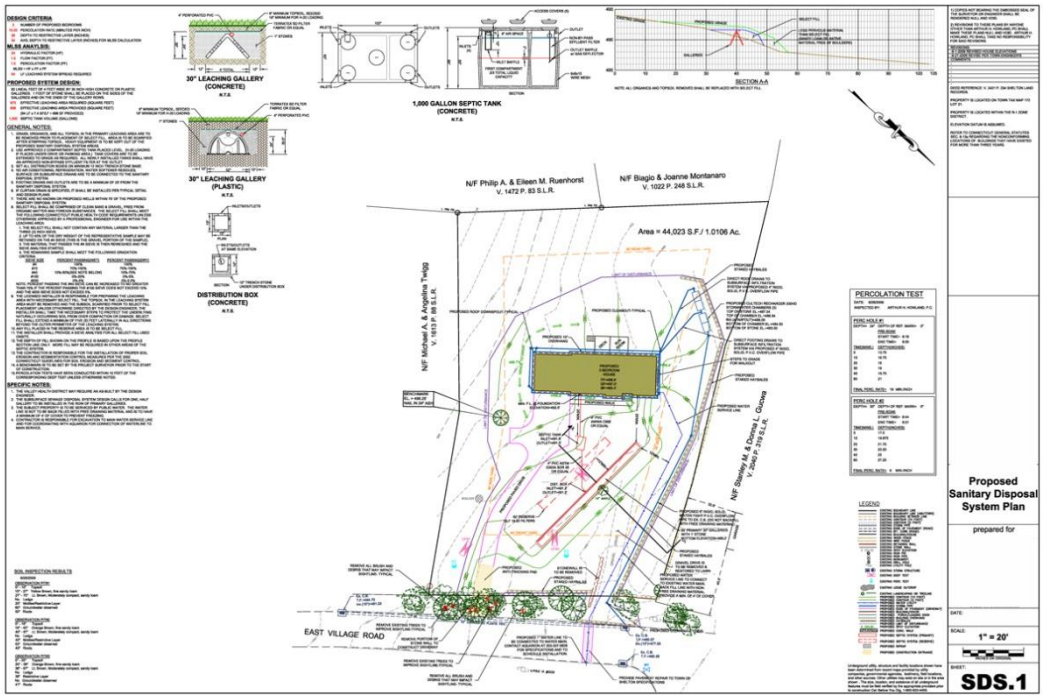
Civil drawings provide technical information for the construction of roads and highways, bridges, pipelines, flood control projects, and water and sewage systems. Civil drawings

show the interrelation between structures and grades. Grades designate the stages of construction:

- existing grade –ground surface before construction
- excavation/subgrade – ground surface during construction
- final grade – finished ground surface.

These plans may include:

- existing conditions, showing topography and surrounding features and structures;
- survey control, showing baselines, existing and new benchmarks, and coordinate grids
- location and final grading around new structures
- sections, profiles, and details of new structures showing existing ground surface, limits of excavation, locations of backfill, and final grades (Choi, Y K 2003, p.25).

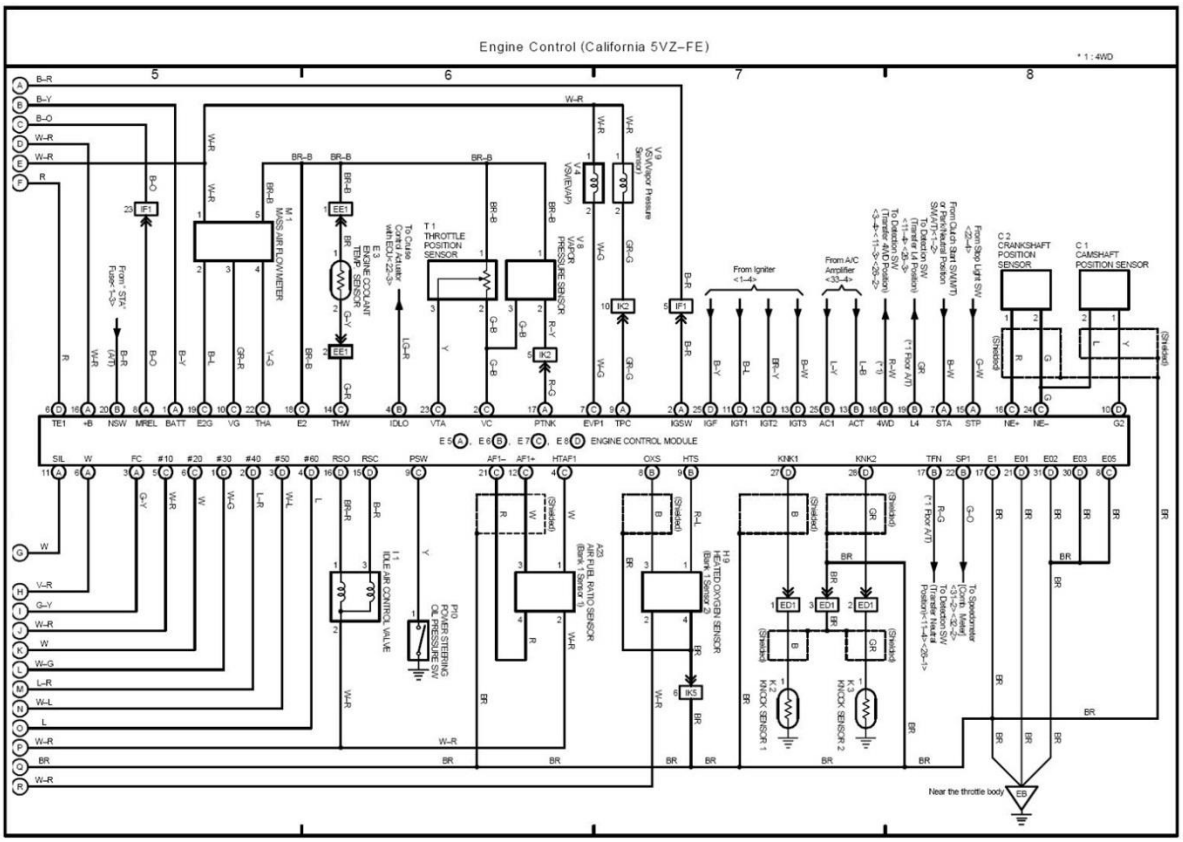


Electrical Plan

Electrical plans contain technical information on electrical installation requirements. This may include information about power, lighting and communication requirements for a given project. Electrical working drawings usually consist of the following for large projects:

- site plan showing the building's location and outside electrical wiring
- floor plan showing the location of electrical systems on every floor
- power-riser diagrams showing panel boards
- control wiring diagrams
- schedules and other information in combination with construction drawings.

Following is an example of a control wiring diagram:



ORDER OF PLAN READING

There is a general order to the reading of plans:

1) The site plan should be the first plan a builder will look at; after which individual plans will be read. Starting with the site plan allows the plan reader to familiarise themself with the entire project. This plan can show the areas where materials can be delivered and access points on the project. It should also contain the datum height set out point and boundary lines and measurements.
2) After looking at the site plan the next plan that will be read will be the general arrangement plan. This plan will show the outlay of a floor; from this plan slab thickness, step downs and sections can be found amongst other information.
3) Next the plan reader can be directed to sectional plans and elevations. These plans will give a different view of the project showing side views and detailed information.
4) Finally after reading these plans the plan reader can now read his individual plans for his trade.

PROJECT SPECIFICATIONS

Plans and drawings, discussed so far function as visual representations of the structure or engineering product to be built. Project specifications on the other hand function in combination with these visual representations by acting as a verbal method of communicating project requirements. They outline in logical order the sequence of instructions that a project must follow. Both visual and verbal representations of the structure are required in order to gain a complete understanding of the overall requirements of the project.

Rosen et. al. (2010, p. 7) notes that “specifications should general describe the following:

- type and quality of every product in the work, from the simplest material through the functioning system;
- quality of workmanship, including quality during manufacture, fabrication, application, installation, finishing, and adjusting;
- requirements for fabrication, erection, application, installation and finishing;
- applicable regulatory requirements, including codes and standards applicable to performance of the work;
- overall and component dimensional requirements for specified materials, manufactured products, and equipment;
- specific descriptions and procedures for allowances and unit prices in the contract;
- specific descriptions and procedures for product alternates and options;
- specific requirements for administration of the contract for construction”.

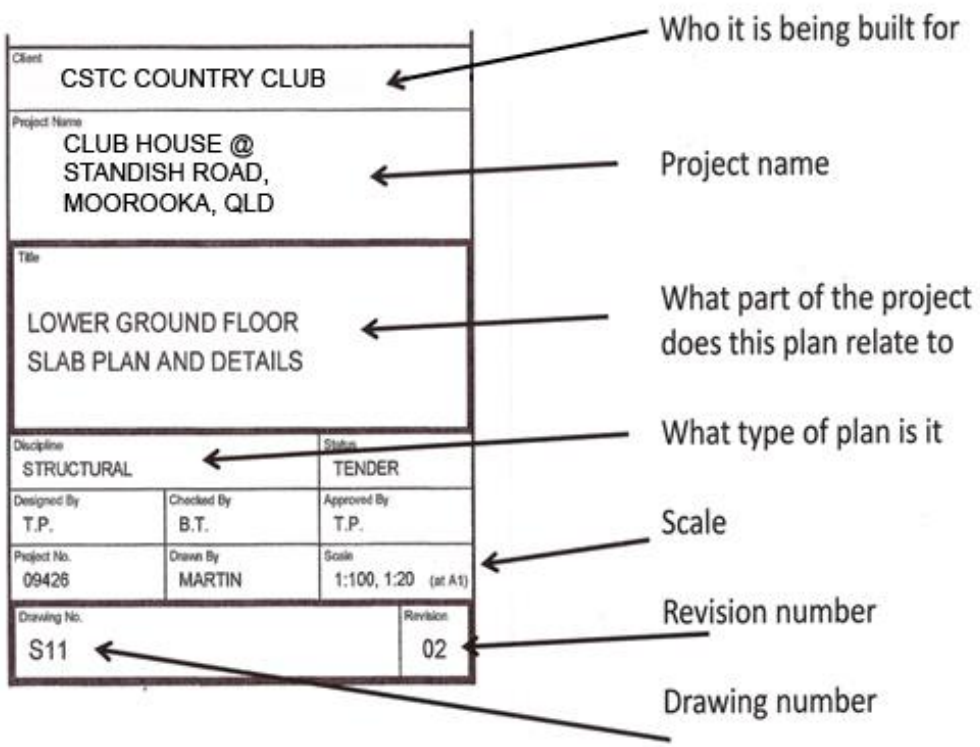
KEY FEATURES AND FUNCTIONS OF DRAWINGS

TITLE PANEL

Before construction begins, plans and specifications are supplied to the relevant trades to ensure they are well informed of what is to be built and how it is to be built along with material specifications. Each trade will have their own plans specific to the task they undertake but all trades will need to have a thorough understanding of general plans. This will allow all tradespeople have an overall understanding of the project.

When reading plans, a tradesperson will need to make sure that they have the correct plan for the project they are on and that the plans are current. The first place to determine this information will be the title box. It is normally situated on the bottom right of the plans; however it may also be placed across the bottom of the plans. The title box contains all the relevant information that is required:

- the project name (what is being built);
- who the project is being built for (customer or client);
- who the principal contractor is (the company controlling the project);
- who designed the project;
- the location of the project, plan numbers and revision notations.



Above is a typical title box; the various elements are explained below:

Client	Who the structure is being built for
Project Name	What is being built
Title	The part of the project that this particular plan relates to
Discipline	The type of plan e.g. structural, civil, electrical
Status	The stage of the project that the plan addresses. In the above example it is at the 'tender' stage and therefore would only be used for pricing the project.
Designed by	Individual responsible
Checked by	Individual responsible
Approved by	Individual responsible
Project No.	The project is assigned a number; enabling it to be identified historically and from within a portfolio of other managed contracts.
Drawn by	Individual responsible
Scale	The scale measurements to apply to the drawing.
Drawing No.	Identifies the drawing number as part of the overall portfolio of plan drawings.
Revision	Identifies the number of times the document has been altered.

SCALE

Scale is a term that is used for reduction of real measurements on site to measurements on a plan. Projects can vary from a normal house block to larger projects covering a full city block. In both of these instances real measurements need to be reduced to fit the project onto a plan. Scale measurements can be used to calculate lengths and dimensions on plans provided the correct scale is used. Using scale is a simple procedure that will allow the plan reader to work out placement of fittings etc.

The working drawings will state the scale or scales used on the drawing. These can be found within the title box; under sectional views, elevation views, plan views and detailed views (see the previous title box example). The most common scales used on construction plans are; 1:50, 1:100 and 1:200

The scale indicates the number of times the drawing has been reduced from its full size. Scales are generally expressed as ratios and the most commonly used scales are:

- 1:100 – one millimetre is equivalent to 100 millimetres
- 1:200 – one millimetre is equivalent to 200 millimetres
- 1:50 – one millimetre is equivalent to 50 millimetres
- 1:20 – one millimetre is equivalent to 20 millimetres

For example a scale of 1:100 indicates that the drawing has been reduced 100 times smaller than the full size. The size of the project will dictate the size of the scale used: a house plan may use a scale of 1:100; whilst for civil plans the scale can range from between 1:20 to 1:500 and larger.

The most effective way to convert scale measurements to real measurements is by using a scale ruler. A typical scale ruler has three sides with six sets of different scale measurements on the sides. Performing a scale calculation requires you to firstly identify the scale used on the plans from the title box and to then access a ruler with the corresponding scale.

Converting the scale measurements to real measurements is carried out as follows:

- a drawn scale of 1:100mm represents:
  - 1mm on the drawing relates to 100mm in real measurements
  - example: 40mm on the drawing is 40 x 100 = 4000mm (4 metres)
- a drawn scale of 1:50mm represents:
  - 1mm on the drawing relates to 50mm in real measurements
  - example: 40mm on the drawing is 40 x 50mm = 2000mm (2 metres)
- a drawn scale of 1:250 represents:
  - 1mm on the drawing relates to 250mm in real measurements
  - example: 40mm on the drawing is 40 x 2250 = 10,000mm (10 metres).

For any unusual scales used on a plan, or where a scale ruler cannot be accessed calculations can be performed by using a calculator and ruler with standard size millimetres or a scale of 1:1, which is full size. Following is an example of the calculation:

Scale required = 1:25
Measurement to be scaled = 5.200 m.
Step 1 Change the measurement from metres to millimetres, i.e. 5.200m, change to 5200mm
Step 2 Divide the millimetre measurement by the desired scale, i.e. 5200 ÷ 25 = 208 (full size mm).

If at any stage you are unsure of the scale plan ratio then find a given measurement on a plan and scale it to the scale given. If it matches the scale specifications then it will be suitable to scale the plan at this given scale

It also not uncommon to see small scales such as 1:50, 1:20, and 1:10 used on construction plans. These scales are generally used for the smaller parts of a structure and on detailed plans. When these small parts are shown on a plan the drawings may be magnified so that they have clarity.

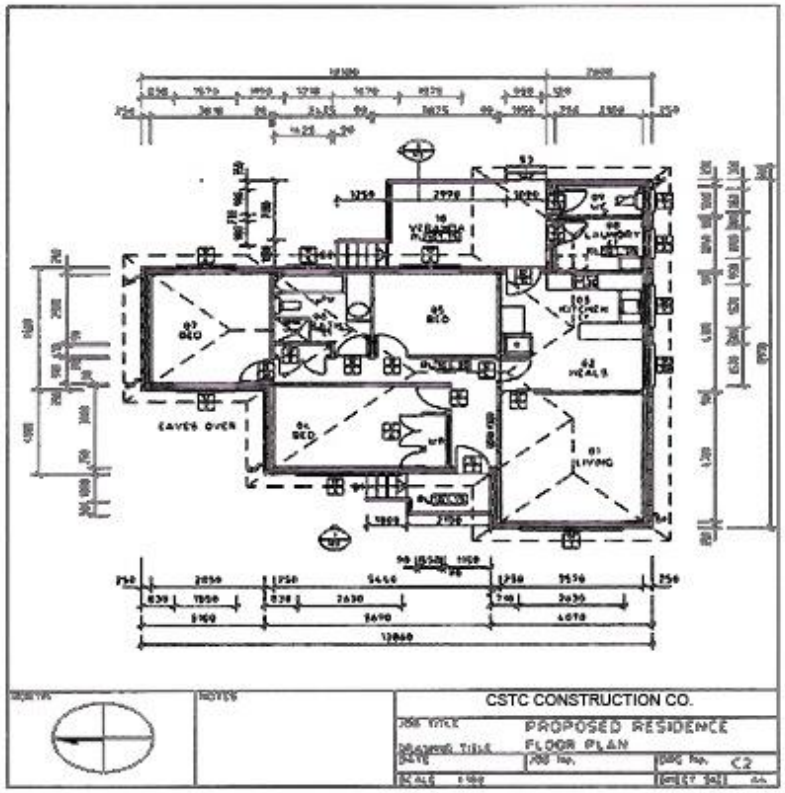
It is also important to take note that the scale dimensions are correctly used. In the following example scale is drawn at 1:100 and 1:20 on paper size A1 (note the brackets in the diagram – at A1). This indicates that these scales can only be used on plans drawn on A1 paper only. It is important to note that not all plans are given to the plan reader in a particular size paper; in this case it is A1, but it could also have been A4, A3 or some other. The scale measurement will only be correct if it is also calculated on the paper size indicated.

While scale measuring can be reasonably accurate, setting out a slab would require the plan reader to have true measurements written on the plans. Setting out a concrete slab with dimensions of 9.045m by 12.130m would be nearly impossible to gauge correctly at a scale of 1:100. All efforts should be made to find the correct measurements from the structural plan or the architectural plans

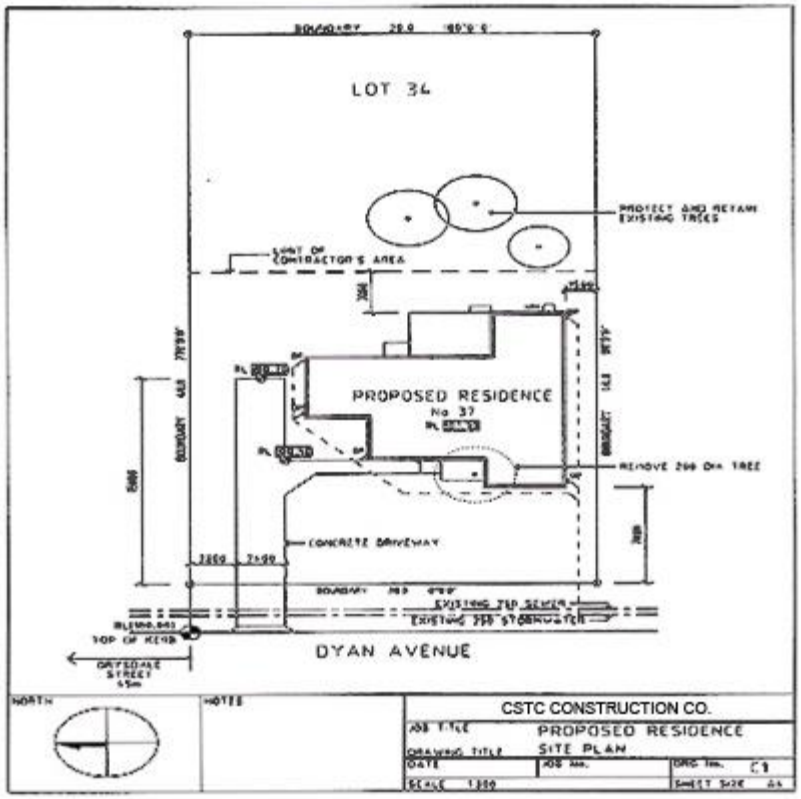
The abbreviation **NTS** stands for 'not to scale'. Whenever this abbreviation is placed upon a plan then the plan must never be scaled. The plan has been drawn without true measurement concerns and is only drawn for view.

Scale Example 1

Following are two plans that belong together, one shows the full site for a proposed residence and the other the structure by itself. The site plan has been scaled at 1:200 as this will allow the whole site to fit on the plan while the floor plan has been scaled at 1:100. When reading the scale measurements the plan reader must be sure that the scale fits the plan size: A:1, A-4 etc.

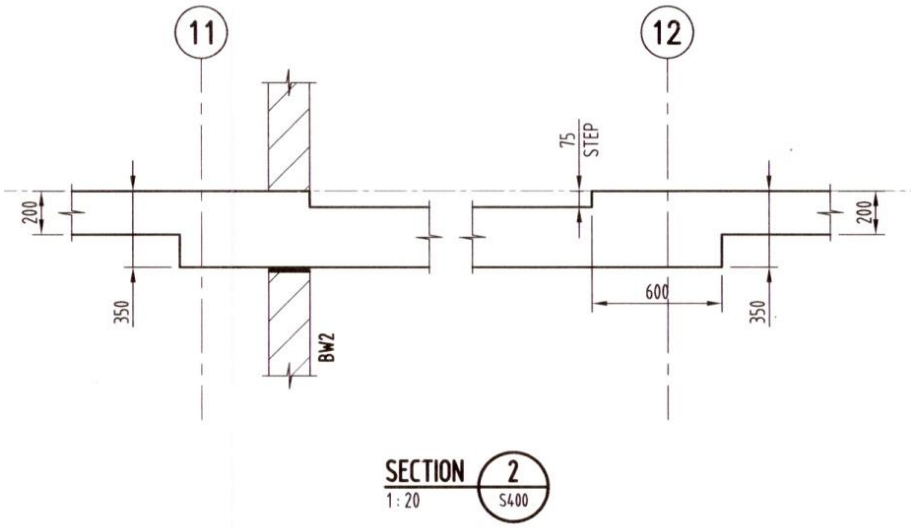


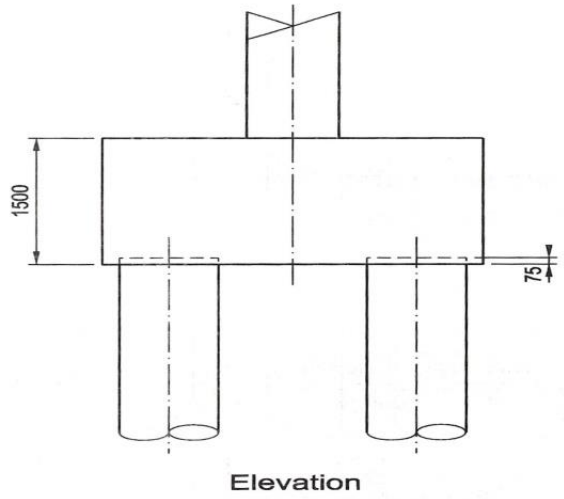
PROPOSED RESIDENCE—FLOOR PLAN



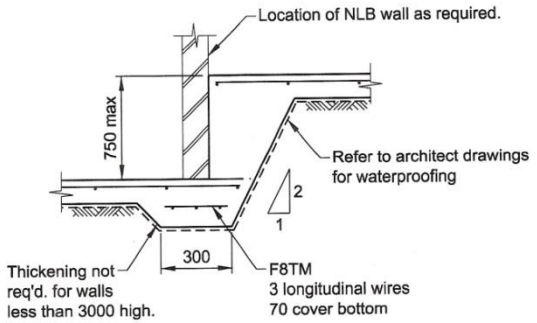
PROPOSED RESIDENCE—SITE PLAN

Scale Example 2





SECTION 1
SCALE: 1:100
–



Slab Step Down Detail - S.O.G. typ
Scale 1:20

NORTH POINT

The north point symbol can be found on plans in the top left hand corner pointing upwards. This symbol is used to orient the drawings onto the site. The drawings should be oriented by using the symbol in conjunction with a compass point/GPS, locating north on the site.

DATUM

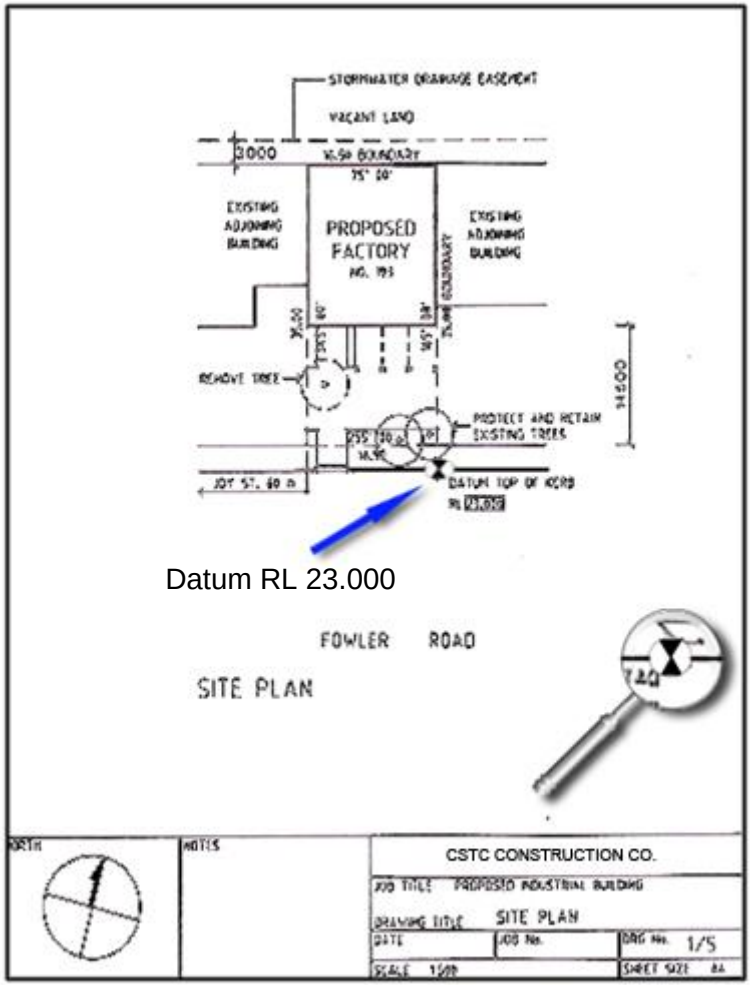
In surveying and geodesy, a datum is a set of reference points on the Earth's surface against which position measurements are made. On construction plans the datum level is the starting point from which all other measurements will be taken in regards to the height of the structure. Like a grid line the datum is a reference point. All floor heights, ceiling heights, and the like will be measured from this point.

The Datum Level originates from the mean sea level as 0. All other measurements come from this point. So if a datum height for a particular project was 5000 then it is assumed that the datum was 5 metres above sea level. Some projects may place their own Datum Point at any given height and work from there.

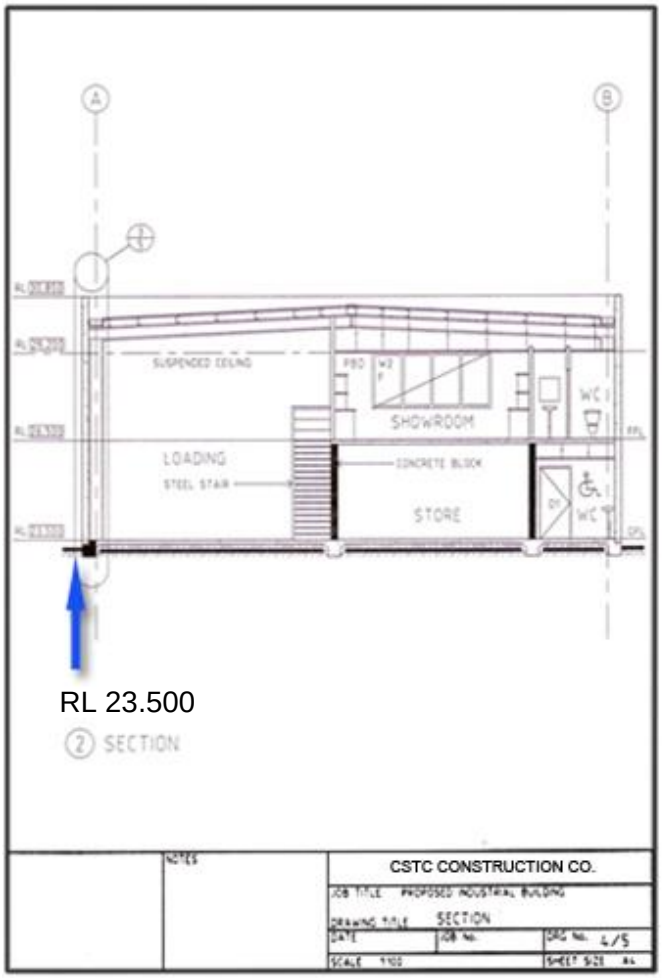
Typically the datum level will be indicated using the datum symbol (see above); this symbol indicates the location of the datum point. Not all datum set outs will have this symbol however, and the datum may just be indicated by the word datum or AHD (Australian Height Datum). The datum height will normally be found on the ground level plan or an elevation view, if the project has to be excavated below this level then the height levels below the datum will actually be a reduction.

Datum Example 1

When looking at these plans the site plan gives a datum height at 23.000 while in the elevation view of the same building the RL (Reduced Level) is 23.500. This indicates the difference between the two is .500mm. This is how measurements for floor levels are correctly calculated.



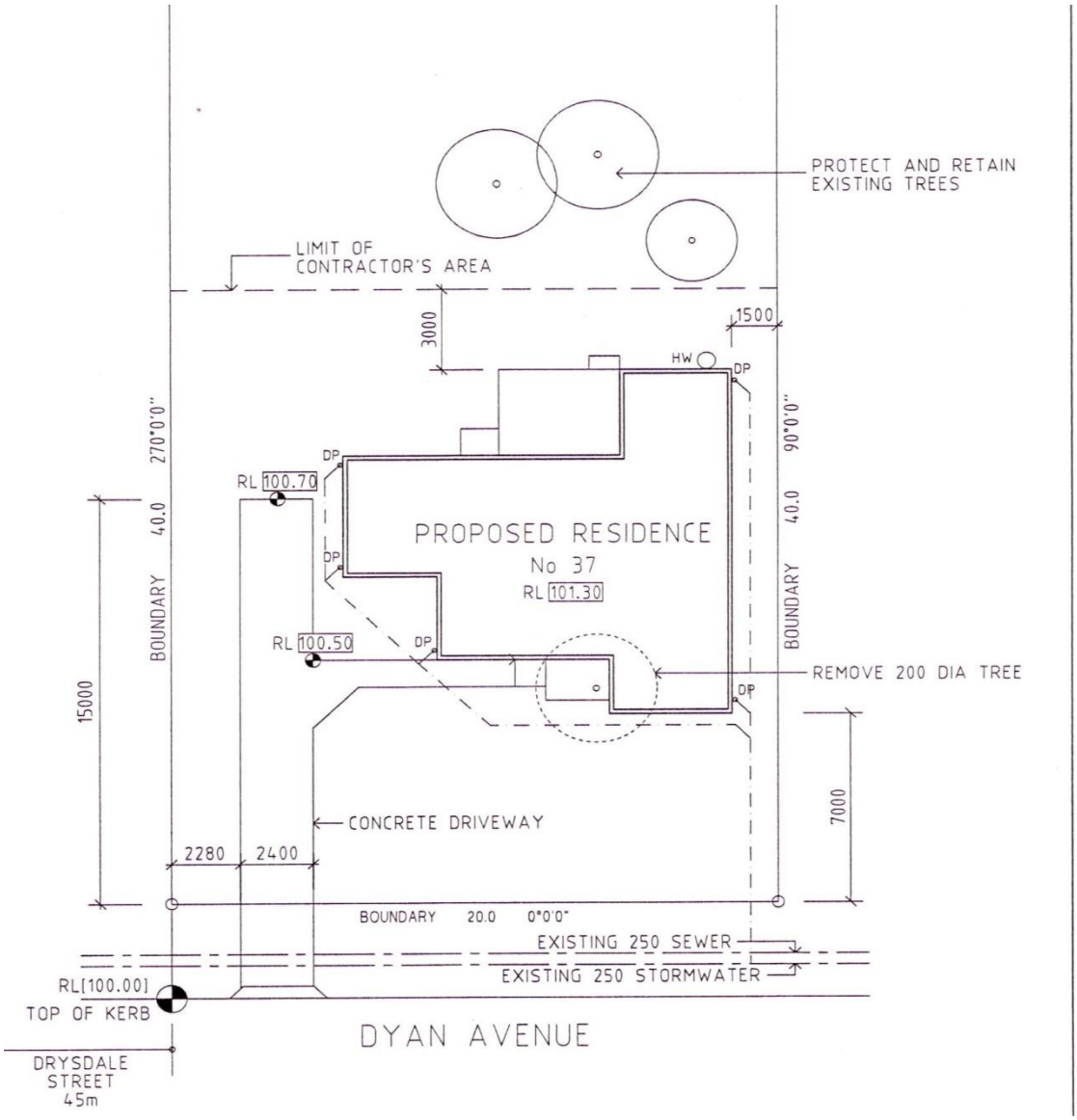
PROPOSED INDUSTRIAL BUILDING—SITE PLAN



PROPOSED INDUSTRIAL BUILDING—SECTION

Datum Example 2

The datum on this drawing is set at 100.00 and the RL on the slab is 101.30. From these two measurements the difference can be gauged and preparation for the ground can made to accommodate the slab.



QUALITY REQUIREMENTS

Conforming to project quality requirements requires you to act in accordance with all project documentation including drawings/plans, specifications and any other instructions. Quality also requires the maintenance of minimum standards of material and workmanship in order to ensure the performance of the facility according to the design. Ensure the following is adhered to:

- relevant Australian standards, codes of practice and/or other mandated or advisory materials;
- internal company quality policies and standards;
- manufacturer specifications, where specified;
- workplace operations and procedures;
- all applicable working drawings and specifications for the project.

Following are examples of how to incorporate quality controls into everyday construction practices:

- ensure compliance with minimum standards of material and workmanship;
- ensure the correct use and application of materials and products;
- ensure compliance with working drawings and specifications;
- communicate and seek guidance regarding discrepancies, misunderstandings and any other queries to senior personnel;
- communicate any information that could jeopardise project quality including defects, design faults and personal mistakes to senior personnel;
- use communication processes that are clear and precise when exchanging information;
- continually review the quality of work to ensure safe and effective construction procedures;
- make quality control suggestions at group meetings;
- take pride in your work and ensure you have the necessary skills and experience to perform the task;
- maintain schedules and timetables.

ENVIRONMENTAL REQUIREMENTS

Before commencing a new project the environmental requirements and controls must be identified from job plans, specifications and any environmental plan. Failure to do so could cost a construction company thousands of dollars in fines if it does not adhere to these requirements. Some of the common environmental considerations on a construction site include:

- How should the top of the soil and subsoil be stockpiled?
- What control measures are in place to prevent sediment and waste entering the stormwater system?
- Are there measures in place to limit contaminated water run-off?

- How will chemical spills be handled?
- How must disturbed areas be left at completion of construction?
- Who will determine the management of worksite tracks and pathways?
- What are the requirements for limiting dust emission from the site?
- What are the requirements for limiting noise at site?
- How is existing vegetation protected from disturbance?

These are just some environmental issues that may need to be addressed as part of the working drawings/plans and specifications. At project initiation the principal contractor has a responsibility to set up these protective systems which must be adhered to by all workers and project personnel.

Example: Environmental Notes

7. VEGETATION PROTECTION

7.1 Construction vehicle activity should be limited by fencing of undisturbed areas.

8. SOIL MANAGEMENT

8.1 Topsoil and subsoil should be stockpiled separately no net loss of sediment should occur from the work site. This will necessitate the use of appropriate erosion and sediment controls. These should be implemented at the site establishment phase and be maintained throughout the construction period.

8.2 Care should be taken to prevent sediment from entering the stormwater system. This may involve placing appropriate sediment controls around stockpiles and/or silt traps around gullies.

9. REHABILITATION

9.1 All disturbed areas are to be left in a stable condition. All plantings will need to be maintained throughout the establishment phase.

10. ENVIRONMENTAL NOTES

10.1 The location of siltation and erosion control devices may be varied on site by the superintendent. Details of these devices are shown on drawings.

10.2 Access tracks through the site will be limited to those determined by the superintendent and the contractor prior to commencement of any work.

10.3 The contractor shall at all times minimise the disturbance of the existing vegetation including grass cover and if requested shall rope off or similarly protect any areas directed by the superintendent.

10.4 The contractor is to ensure dust emission from the site is limited at all times.

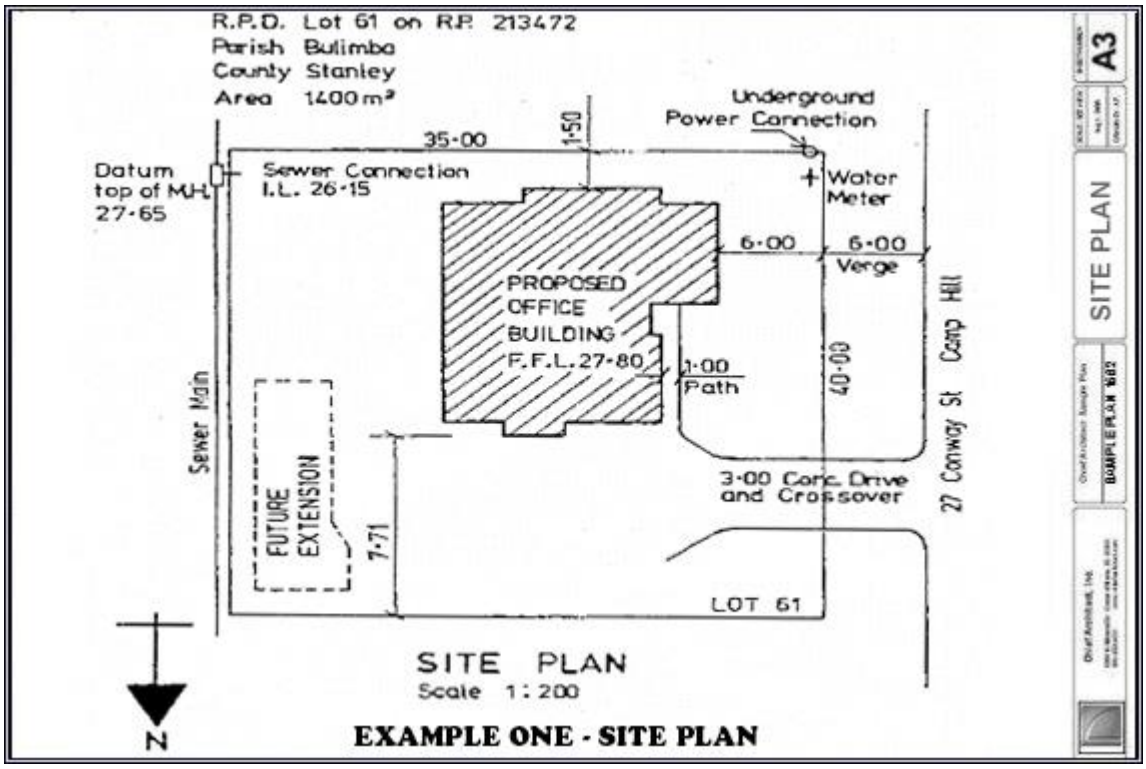
Suggested Dust Control Measures on a Construction Site

- Limit Cleared Areas
- Physical Barriers
- Site Traffic Control
- Earth Moving Management
- Watering Sprays
- Soil Compaction

- Vegetative Stabilisation
- Chemical Stabilisation
- Site Completion

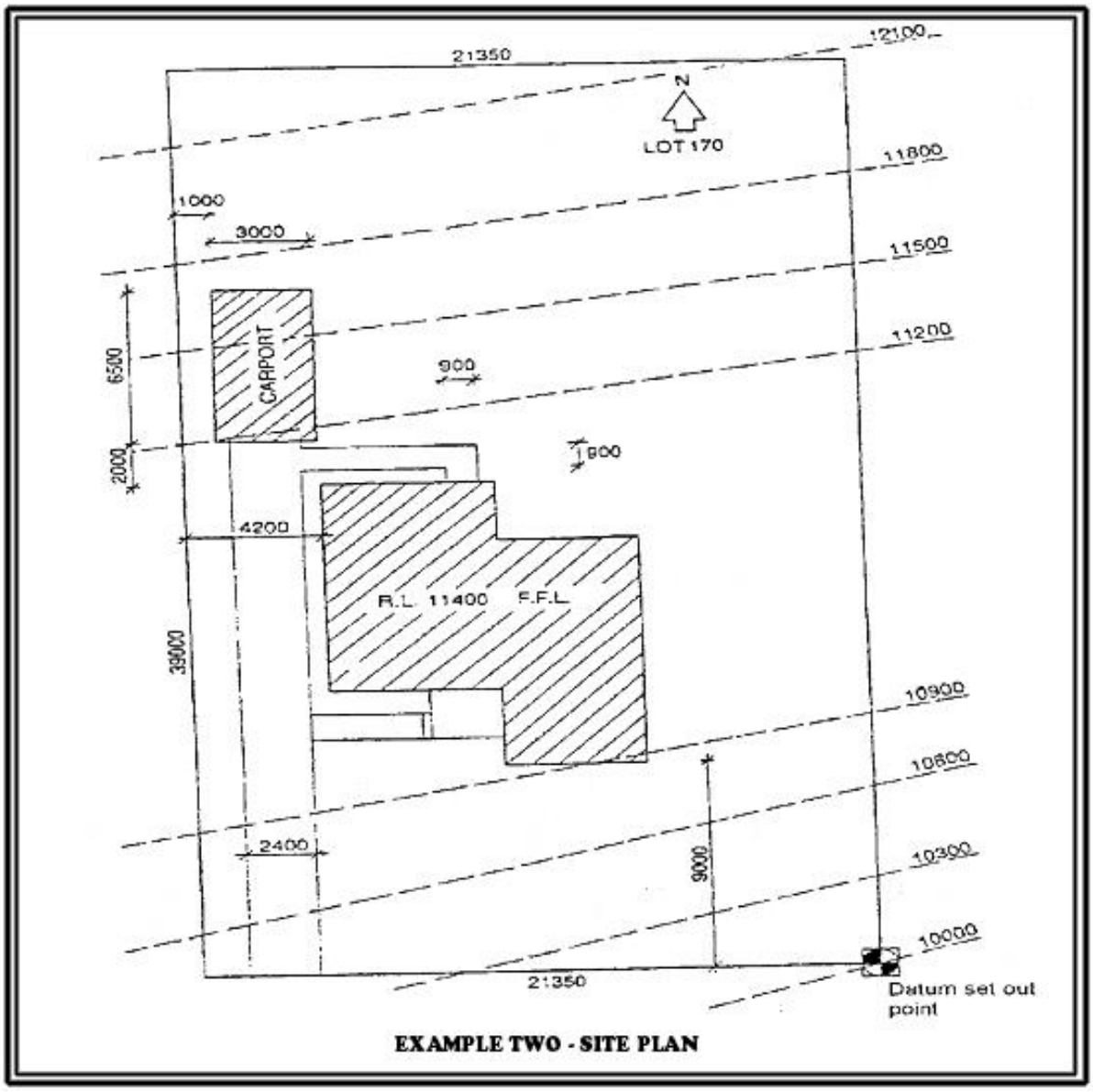
REVISION EXERCISES

REVISION EXERCISE 1



Q1	What is this drawing scaled at?	Q2	What is the FFL (finished floor level) set at?
Q3	How far is it from Conway Street to the proposed building?	Q4	How far is the proposed building from the southern boundary?

REVISION EXERCISE 2

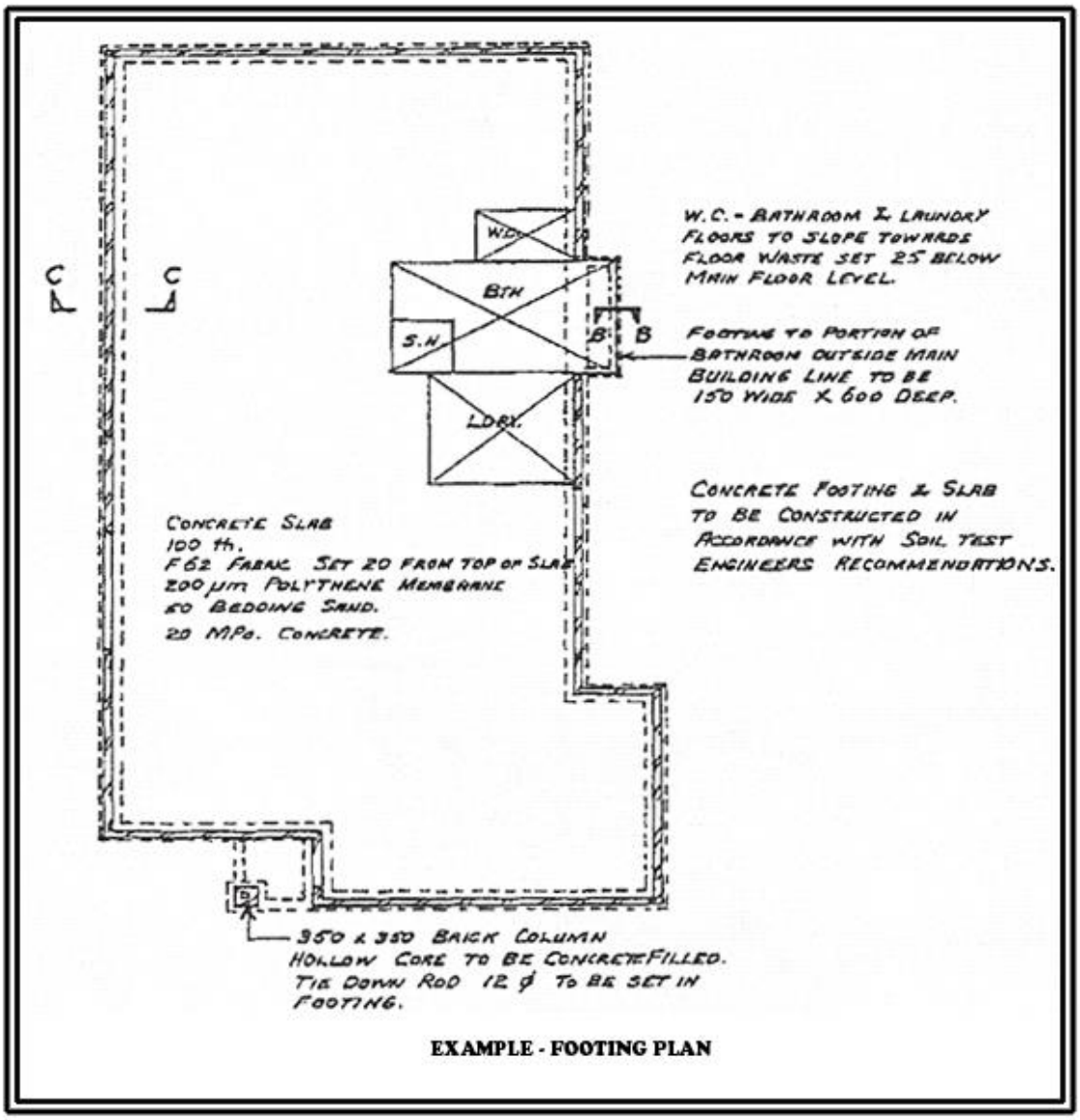


EXAMPLE TWO - SITE PLAN

The above site plan sets out the measurements of the building lot along with the direction of North shown at the top of the plan. The datum is set at 10,000 (10 metres) and the RL of the Finished Floor level is 11,400. The building is set 9 metres from the southern boundary and 4.2 metres from the western boundary. The overall dimension of the carport is 6.5x 3 metres

Q1 How wide is the driveway?	Q2 How far is the carport set from the Western boundary?
Q3 How wide is the footpath between the carport and the house?	Q4 What is the height of the natural surface at the North-East junction?
Q5 What is the lot number?	Q6 What do the dotted lines represent on this plan?

REVISION EXERCISE 3



EXAMPLE - FOOTING PLAN

Q1	What is the slab thickness?	Q2	How much bedding sand is required?
Q3	What is the dimension of the brick column?	Q4	How far below the bathroom floor is the floor waste to be set at?
Q5	What fabric is required for the slab and at what height is it to be set at?	Q6	What size fabric is required for slab?

Element 2 – Recognise amendments

In this chapter you will understand:

- ✓ How to identify the currency of information
- ✓ How to use cover sheets and notes pages

CURRENCY OF INFORMATION

On a construction project plans can be changed many times during the course of the project and it is vital that the plan is checked to ensure that it is the most current edition and has not been superseded. It is important to remember that the use of an incorrect plan can result in unnecessary and incorrect work being carried out. Most large construction projects will have a plan register in place enabling the tradespeople to be sure that the plan they have is up to date. However there are other clues besides relying on the register that enable the plan reader to ensure they have current information. It is critical that you understand how to ensure you have the accurate plan with the most current information.

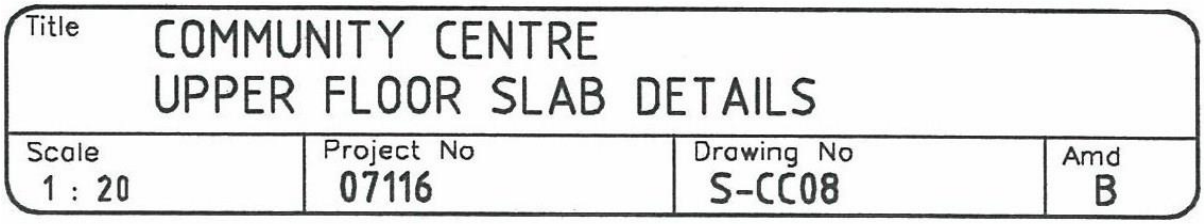
REVISIONS

When a plan has been updated it is commonly called a revision notation; however other names may include amendments and issues. These can be identified as numbers or letters, depending on the individual project and who has designed the plans.

The first indication that a change has been made to the plan will be shown at the bottom of the title box under the heading 'revision'. The revision box that will have the revision letter or number which identifies the number of times the plan has been changed. If there was no revision notation in the box it can be presumed that a set of plans started with an empty revision box.

Note the following regarding the following examples:

- In example 1 below; the revision box is instead called 'amd' for amendment; it has been changed at least once as it is noted according to order as 'B'; it may have started as a



blank box but it can be asserted that it has changed at least once.

In example 2 below, Drawing S11 started with no revision notation. It has been changed twice hence the 02 revision number

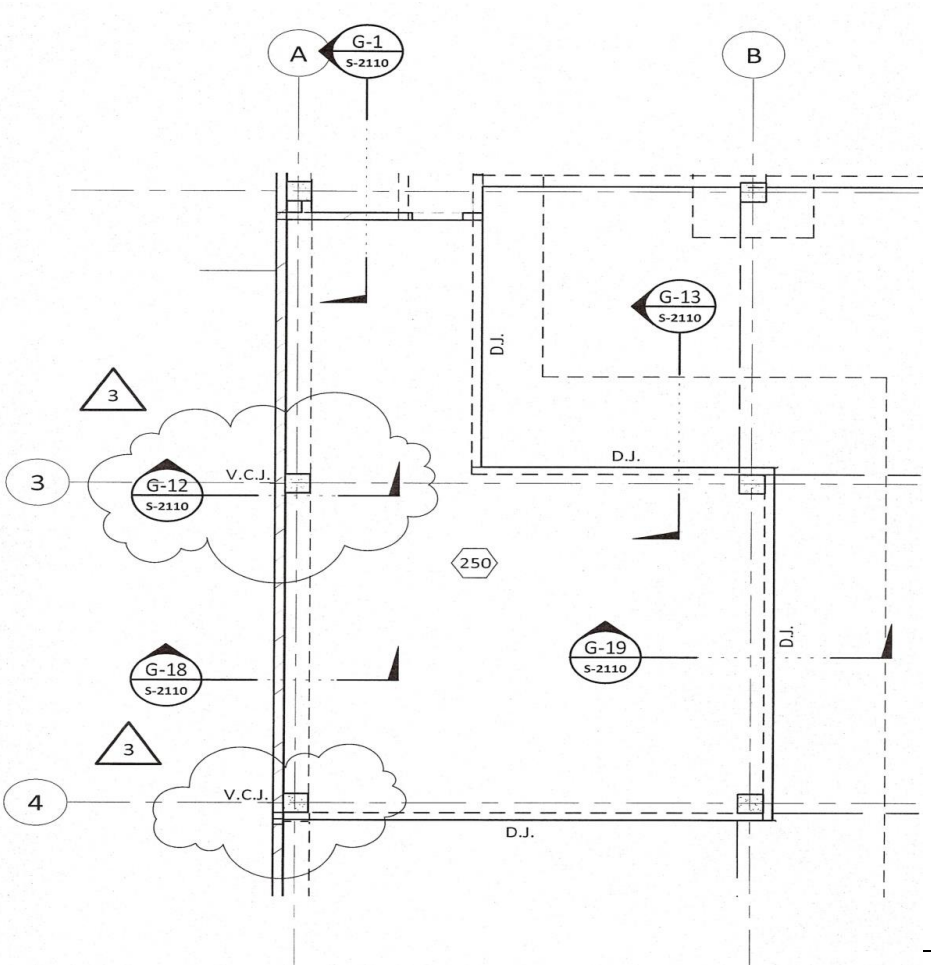
Client	CSTC COUNTRY CLUB
Project Name	CLUB HOUSE @ STANDISH ROAD, MOOROOKA, QLD
Title	LOWER GROUND FLOOR SLAB PLAN AND DETAILS
Discipline	STRUCTURAL
Status	TENDER
Designed By	T.P.
Checked By	B.T.
Approved By	T.P.
Project No.	09426
Drawn By	MARTIN
Scale	1:100, 1:20 (at A1)
Drawing No.	S11
Revision	

Client	CSTC COUNTRY CLUB
Project Name	CLUB HOUSE @ STANDISH ROAD, MOOROOKA, QLD
Title	LOWER GROUND FLOOR SLAB PLAN AND DETAILS
Discipline	STRUCTURAL
Status	TENDER
Designed By	T.P.
Checked By	B.T.
Approved By	T.P.
Project No.	09426
Drawn By	MARTIN
Scale	1:100, 1:20 (at A1)
Drawing No.	S11
Revision	02

Besides the revision notation box within the title box another indicator of a change in the plan will be a clouded area drawn around the part of the plan that has been changed. This consists of an actual representation of a cartoon like cloud drawing.

You will note in the following plan that there is a drawn clouded area around the area that has been changed. Both areas of change are at the top of columns. To understand how they have been changed would require comparison between the original plan and this updated revision.

Also note that just outside the clouded areas are small triangles with the number 3 inside. These indicate that this plan has been revised 3 times. Triangles are common on a revised plan but they may also be left of the plan altogether. If this is the case then the revision number or letter must be in the revision box.



Another area that a plan reader can check for accurate information and revisions is a plan register, commonly found on larger projects. A plan register documents all the plans that have been introduced onto a particular project and it keeps a record of any revisions that may have been issued. The plan register can be found in the project office on site, each company should have separate plans put aside for them if it is their plans that have been changed. Plan registers should be regularly be checked to ensure the most up to date plans are being used. Failure to do this may mean work which has been undertaken may need to be rectified at considerable time and cost to the contractor.

COVER SHEET / NOTES PAGE

Most plans should be supplied with a Cover sheet or Notes page. This will be the first or second sheet in a set of plans. The Cover sheet can be regarded as an index page which identifies specific plans using plan numbers. On large projects there can be up to a hundred individual plans that make up an overall set of plans. Trying to find an individual plan can be a tiresome exercise and it can be made easier using an index sheet.

STRUCTURAL DRAWING SCHEDULE

DRAWING No.	TITLE
7137-S001	STRUCTURAL ENGINEERING GENERAL NOTES AND DRAWING LIST
7137-S010	GROUND FLOOR PILE AND GROUND BEAM LAYOUT PLAN
7137-S011	GROUND FLOOR SLAB PLAN
7137-S012	GROUND FLOOR PILE CAP & GROUND BEAM DETAILS SHEET 1
7137-S013	GROUND FLOOR PILE CAP & GROUND BEAM DETAILS SHEET 2
7137-S014	GROUND FLOOR SLAB AND FOOTING DETAILS
7137-S020	CORE WALL ELEVATIONS SHEET 1
7137-S021	CORE WALL ELEVATIONS SHEET 2
7137-S022	CORE WALL ELEVATIONS SHEET 3
7137-S023	CORE WALL ELEVATIONS SHEET 4
7137-S024	CORE WALL ELEVATIONS SHEET 5
7137-S025	CORE WALL ELEVATIONS SHEET 6
7137-S026	WALL DETAILS
7137-S030	STAIR 1 & 2 ELEVATIONS AND DETAILS
7137-S031	STAIR 3 ELEVATIONS AND DETAILS
7137-S032	STAIR 4 ELEVATIONS AND DETAILS
7137-S033	STAIR 5 ELEVATIONS AND DETAILS

Using the example above; any work to be undertaken on the ground floor and footing details would be located on plan number S014. Similarly work to be carried out on Stair 5 would be referred to plan number S033. Using this index on the cover sheet saves time searching through countless plans.

The notes page can also hold a large array of other information for individual trades and is the building block for the rest of the plans. The amount of information conveyed is dictated by the space available; note that some plans may not include this information. The information supplied may include vital specifications which the plan reader must identify and apply throughout the accompanying plans. Information from this page will be specific for trades such as concrete, steel reinforcing, structural steel, earth works, block and brickwork and stressed decks among others. When unsure at any time of specifications it is a good idea to refer back to these pages.

Cover Sheet / Notes examples

2. MORTAR

GENERALLY, MORTAR SHALL BE FRESHLY PREPARED AND UNIFORMLY MECHANICALLY MIXED IN THE FOLLOWING RATIO:- 1 PART CEMENT; 1 PART LIME; 6 PARTS SAND, AND SHALL COMPLY WITH THE REQUIREMENTS OF AS 3700 FOR TYPE M3 MORTAR. REFER ALSO TO THE BLOCKWORK SPECIFICATION.

3. GROUT

ALL CORES, WHERE SPECIFIED , IN CONCRETE MASONRY UNITS ARE TO BE FILLED WITH GROUT OF f'c = 20MPa, WITH MAXIMUM AGGREGATE SIZE OF 10mm. AT THE TIME OF, PLACING, GROUT IS TO HAVE MAXIMUM SLUMP OF 250mm CORE GROUT IS TO BE COMPACTED (i.e. THOROUGHLY RODDED) TO ENSURE COMPLETE FILLING OF ALL CORES.

FILL ALL CORES TO MAXIMUM 3 METRES HIGH FREE DROP IN ANY ONE POUR. STOP POUR 50mm BELOW TOP OF BLOCK TO PROVIDE KEY FOR FOLLOWING POUR.

BOTTOM COURSE OF BLOCKS TO HAVE INSPECTION OPENINGS TO ALL CORES TO BE GROUTED. LAY BOTTOM COURSE OF BLOCKS ON MORTAR BED. CLEAN OUT MORTAR PROTRUSIONS FROM ALL CORES FOR FULL HEIGHT PRIOR TO PLACING REINFORCEMENT. TIE VERTICAL BARS TO STARTER BARS AT INSPECTION OPENINGS.

4. RETAINING WALLS

BACKFILL RETAINING WALLS, ON ENGINEERS APPROVAL. WITH CLEAN GRANULAR FILLING FREE FROM CLAY OR OTHER ORGANIC MATTER.

RETAINING WALLS SHOULD NOT BE BACKFILLED UNTIL A MINIMUM 14 DAYS AFTER GROUT FILLING. PROPPED RETAINING WALLS SHALL NOT BE BACKFILLED UNTIL THE SLAB OVER HAS BEEN CAST A MINIMUM OF 7 DAYS AND THE WALL HAS BEEN GROUT FILLED FOR A MINIMUM OF 14 DAYS.

PROVIDE AGRICULTURAL PIPES OR WEEPHOLES TO EARTH FACE OF ALL RETAINING WALLS AS NOTED IN THE DOCUMENTATION. ALL AGRICULTURAL PIPES OR WEEP HOLES TO BE PROTECTED FROM SILTRATION BY THE USE OF GEOTECHNICAL FABRIC. WATERPROOF MEMBRANE AND D.P.C. AS REQUIRED BY ARCHITECTURAL SPECIFICATION.

CONCRETE NOTES

1. GENERAL

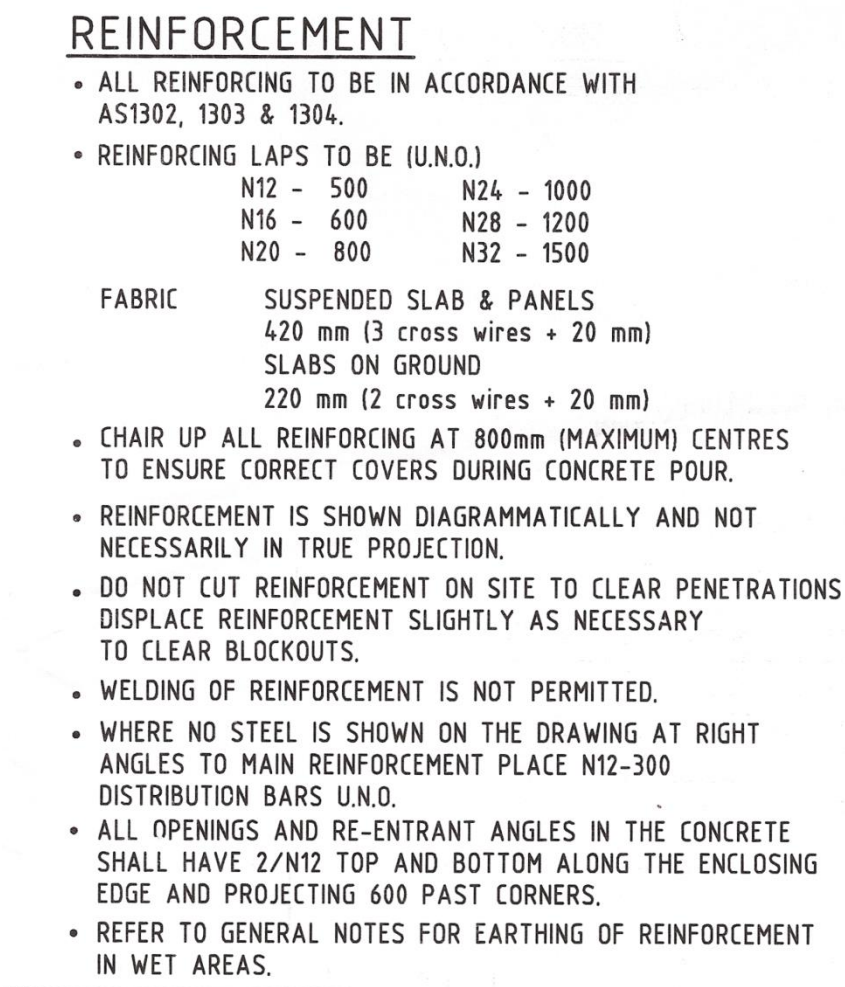
ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT EDITIONS OF AS 3600 "CONCRETE STRUCTURES" EXCEPT AS VARIED BY CONTRACT DOCUMENTS.
CONCRETE STRENGTH GRADE FOR PARTICULAR ELEMENTS SHALL BE AS NOTED ON THE DRAWINGS.
SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES. BEAM SIZES ARE SHOWN DEPTH FIRST AND INCLUDE SLAB THICKNESS. UNLESS NOTED OTHERWISE ALL FORMED EDGES AND CORNERS OF CONCRETE MEMBERS SHALL HAVE 20mm CHAMFERS.
THE FACE OF ALL CONCRETE AGAINST WHICH NEW CONCRETE IS TO BE CAST IS TO BE THOROUGHLY MECHANICALLY SCABBLED. FULLY EXPOSING THE AGGREGATE MATRIX, UNLESS OTHERWISE NOTED.
SLABS AND BEAMS SHALL BEAR ONLY ON THE COLUMNS, WALLS, ETC., SHOWN SHADED ON PLANS; ALL OTHER NON LOADBEARING WALLS ELEMENTS INCLUDING WINDOW MULLIONS, ARCHITECTURAL ATTACHMENTS NON LOAD BEARING WALLS ETC. SHALL BE KEPT 20mm CLEAR FROM SOFFIT OF STRUCTURE. ALLOWANCE TO BE MADE IN ANY CONNECTIONS TO SLAB OR BEAM SOFFIT FOR 20mm DEFLECTION.
WHERE SLABS OR BEAMS BEAR ON MASONRY THE TOP COURSE SHALL BE LEVEL, SMOOTH AND COVERED WITH APPROVED SLIDING JOINT MATERIAL UNLESS NOTED OTHERWISE.
NO MASONRY WALLS TO BE ERECTED ON SUSPENDED SLABS AND BEAMS UNTIL ALL PROPPING HAS BEEN REMOVED.
REFER GENERAL ARRANGEMENT PLAN FOR GENERAL NOTES AND DESIGN LOADS.

TIMBER NOTES

1. GENERAL

ALL WORKMANSHIP TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT EDITIONS OF A.S. CODES AS 1684 AND AS 1720.
ALL PROPRIETARY ITEMS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS DETAILS.
ALL OUTSTANDING TIMBER SECTIONS, HOLD DOWN DETAILS SHALL BE PROVIDED IN ACCORDANCE WITH CURRENT EDITIONS OF AS 1684 FOR N2 WIND.
PROVIDE ANY TEMPORARY BRACING REQUIRED TO MAINTAIN THE OVERALL STABILITY OF THE ROOF STRUCTURE DURING CONSTRUCTION.
ALL STRUCTURAL PLYWOOD SHALL BE AT LEAST D/D GRADE AND MARKED WITH THE FOLLOWING:-

A. MANUFACTURER'S NAME
B. THE WORD "STRUCTURAL"
C. TYPE OF BOND (A BOND)
D. STRESS GRADE, E.G. F27
E. THE TESTED "PAA STRUCTURAL" MARK.



REINFORCEMENT

- ALL REINFORCING TO BE IN ACCORDANCE WITH AS1302, 1303 & 1304.
- REINFORCING LAPS TO BE (U.N.O.)

N12 - 500	N24 - 1000
N16 - 600	N28 - 1200
N20 - 800	N32 - 1500

FABRIC SUSPENDED SLAB & PANELS
420 mm (3 cross wires + 20 mm)
SLABS ON GROUND
220 mm (2 cross wires + 20 mm)

- CHAIR UP ALL REINFORCING AT 800mm (MAXIMUM) CENTRES TO ENSURE CORRECT COVERS DURING CONCRETE POUR.
- REINFORCEMENT IS SHOWN DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
- DO NOT CUT REINFORCEMENT ON SITE TO CLEAR PENETRATIONS DISPLACE REINFORCEMENT SLIGHTLY AS NECESSARY TO CLEAR BLOCKOUTS.
- WELDING OF REINFORCEMENT IS NOT PERMITTED.
- WHERE NO STEEL IS SHOWN ON THE DRAWING AT RIGHT ANGLES TO MAIN REINFORCEMENT PLACE N12-300 DISTRIBUTION BARS U.N.O.
- ALL OPENINGS AND RE-ENTRANT ANGLES IN THE CONCRETE SHALL HAVE 2/N12 TOP AND BOTTOM ALONG THE ENCLOSING EDGE AND PROJECTING 600 PAST CORNERS.
- REFER TO GENERAL NOTES FOR EARTHING OF REINFORCEMENT IN WET AREAS.

The notes page is the building block for the rest of the plans. Individual plans may or may not have this type of information on them. This is dictated by the space that is available on each plan. As can be seen there is a considerable amount of information and it may not be possible to fit all the relevant information on individual plans. The plan reader must refer to these note pages to ensure that all relevant information is obtained.

Element 3 – Recognise commonly used symbols and abbreviations

In this chapter you will understand:

- ✓ How to recognize construction symbols and abbreviations
- ✓ How to read legends and schedules

CONSTRUCTION SYMBOLS AND ABBREVIATIONS

SYMBOLS

Symbols can be found on all plans and will provide vital information. Symbols can indicate all types of information such as:

- types of material
- location and direction
- types of fittings
- types of finish
- amendments
- levels
- revisions
- removal indicators
- reference points

Symbols are an easy way of identifying different components of a plan and they reduce the amount of information needed to be conveyed in a written format. When reading a plan the reader is required to identify the symbol on the plan and to then identify what the symbol refers to (its meaning). Each plan will include a legend box or schedule box that will show the symbol diagram and supporting meaning.

The following tables offer common examples of symbols used in the construction industry. A more comprehensive list of symbols can be obtained from Australian Standards:

- AS 1100.101-1992, Technical drawing – General principles
- AS 1100.301 – 2008, Technical drawing – Architectural drawing

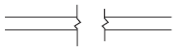
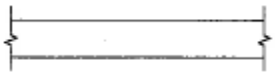
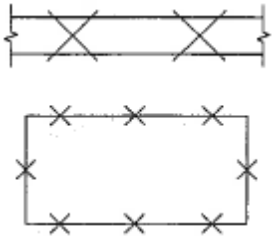
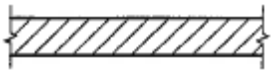
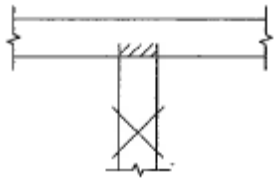
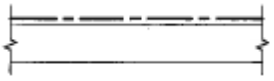
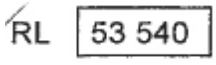
Description	Drawing	Description	Drawing
Wall section No. 2 can be seen on drawing No. A-4		Building section A-A can be seen on drawing No. A-6.	
Main object line		Hidden or invisible line	
Indicates centre line		Centre Line	
Indicates north direction		Revision marker	
Break in a continuous line		Datum/Elevation marker	
Existing part to be retained		Existing part to be removed	
New part		Closing of an opening part in existing construction	
New opening in existing construction		Making good of existing construction after demolition of connected construction	
Work requiring modification of the surface layer		Expression of levels: RL (reduced level); FL (finished level).	
Job datum level		Elevation/section reference	
Window or door reference			

Table: Building symbols

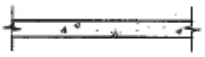
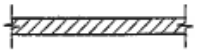
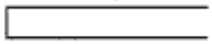
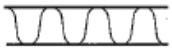
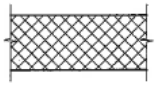
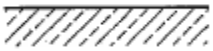
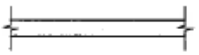
Description	Drawing	Description	Drawing
Brickwork		Cement render	
Concrete		Concrete block	
Cut stone and masonry		Earth	
Fill		Glass	
Hardcore		Insulation	
Particle board		Rock	
Structural steel		Stud walls	

Table: Material symbols

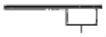
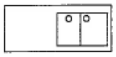
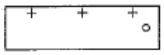
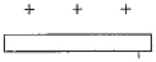
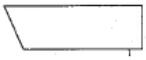
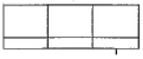
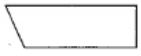
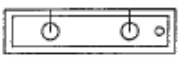
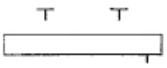
Description	Plan	Elevation
Single sink, left hand drainer		
Double sink, left hand drainer		
Cleaner's sink		
Laundry sink		
Washbasin		
Industrial washing trough		
Bath A shower bath is indicated by the bath symbol with letters SHR superimposed		
Shower tray		
Bidet		
WC		
Urinal bowl		
Urinal stalls		
Vanity basin (locate bowl as required)		
Spa bath (indicate spa jets with marks on shape of bath)		
Drinking trough (show number of fountains)		
Drinking fountain		
Cook top (example configuration)		

Table: General Symbols

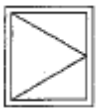
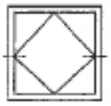
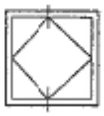
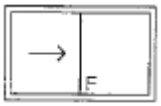
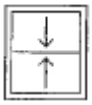
Description	Drawing	Description	Drawing
Right-side hinged window		Pivoted – pivots at sides	
Pivoted – pivots top and bottom		Top hinged (Aust) Bottom hinged (NZ)	
Bottom hinged (Aust) Top hinged (NZ)		Casement type – projected out	
Awning type – projected out		Horizontal sliding & fixed sash	
Vertical sliding sashes		Adjustable louvres	
Fixed louvres		Fixed window	
Window in plan view (sill shown)		Window in cross section	

Table: Window symbols

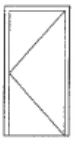
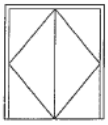
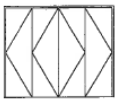
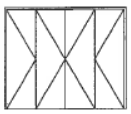
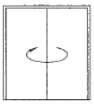
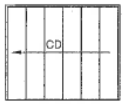
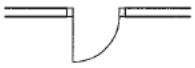
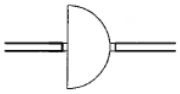
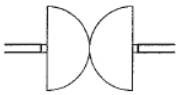
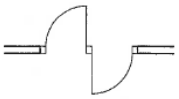
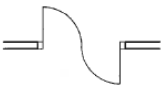
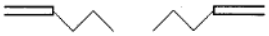
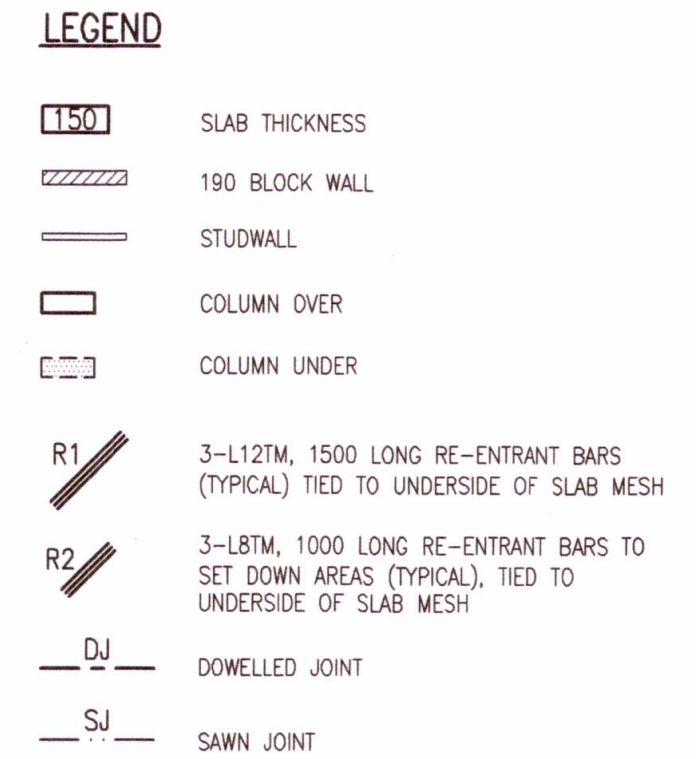
Description	Drawing	Description	Drawing
Single door, hinged at left hand jam (Aust); Single door, hinged at right hand jam (NZ)		Pair of doors, hinged at jambs (Aust)	
Two-way sliding door		One-way sliding door	
Bifold door (Aust)		Bifold door (NZ)	
Revolving door		Concertina door	
Single swing door – 90º swing		Single swing door – 180º swing	
Single double-acting door		Pair of double-acting doors	
In-and-out door with mullion		In-and-out door without mullion	
Folding or partition centred on track		Folding door or partition to one side of track	
Concertina doors		Shower curtain, draperies, and the like	

Table: Door symbols

Reading and understanding what symbols mean allows the plan reader to fully understand what is being placed and where it is being located. Whilst there are common symbols it is important to remember that some plans may have many different symbols depending on what is being built. The critical point to remember is to find the symbol and cross reference it with the symbol legend and it will be relatively easy to identify what that symbol stands for.

Symbol interpretation example 1

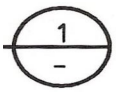


Above are some typical symbols found on a legend box; an interpretation is as follows:

- The **dashed rectangular** box indicates that there is a column beneath the plan the reader is looking at, it finishes at this level and will not continue above this level.
- The **plain rectangular box** indicates a column that will go from this level to the level above.
- The **box with the 150 inside** will indicate that the floor thicknesses at this point will be 150 mm. This thickness can change anywhere and will be indicated with another such box with the new thickness within it.
- The **Dowel joint** is shown as a long dash followed by a shorter dash, while this indicates where the dowel joint is placed, the plan reader will need to check the detail for the dowel joint to see exactly how it is to be constructed.
- This also applies to the **block wall** symbol; the plan reader will to check for details about the as to whether it is a load bearing wall and what steel is to be placed in it.

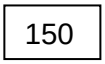
Symbol interpretation example 2

This symbol is designed for sections

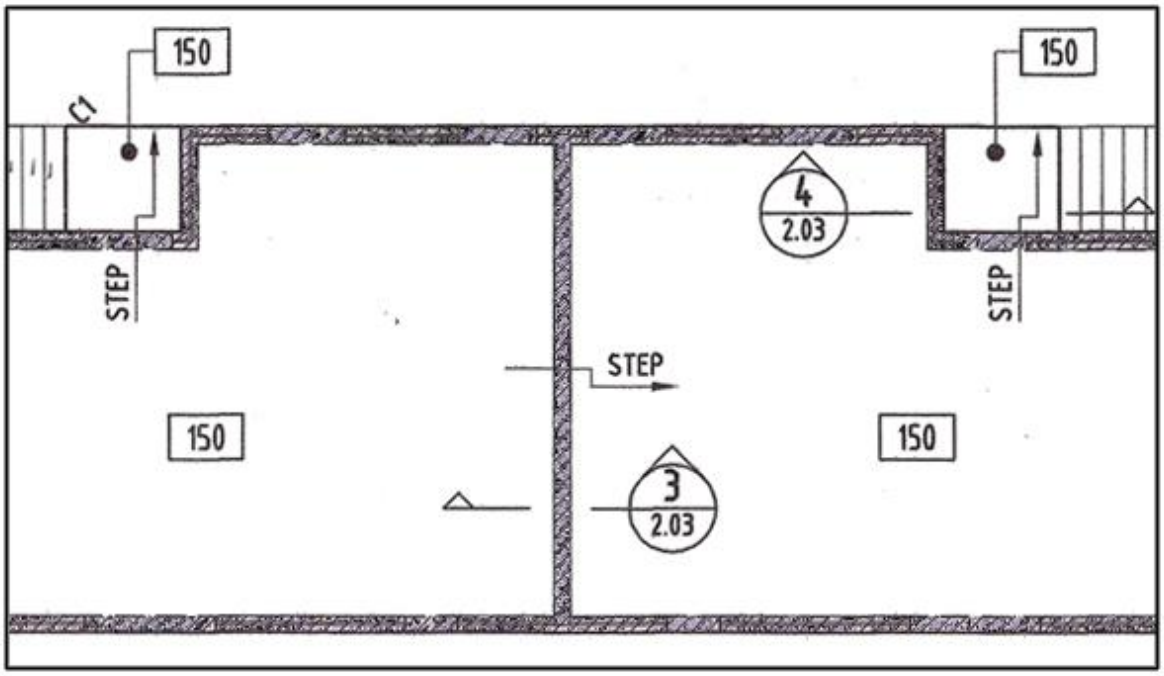


The arrow will indicate a step down in a slab

The rectangle box with a number inside indicates the thickness of the slab



Using the three symbols above on the plan below, we can see the slab thickness notation (150) as well as sections and a step in the slab. To identify how the step is built the plan reader will need to cross reference section 3 on plan number 2.03



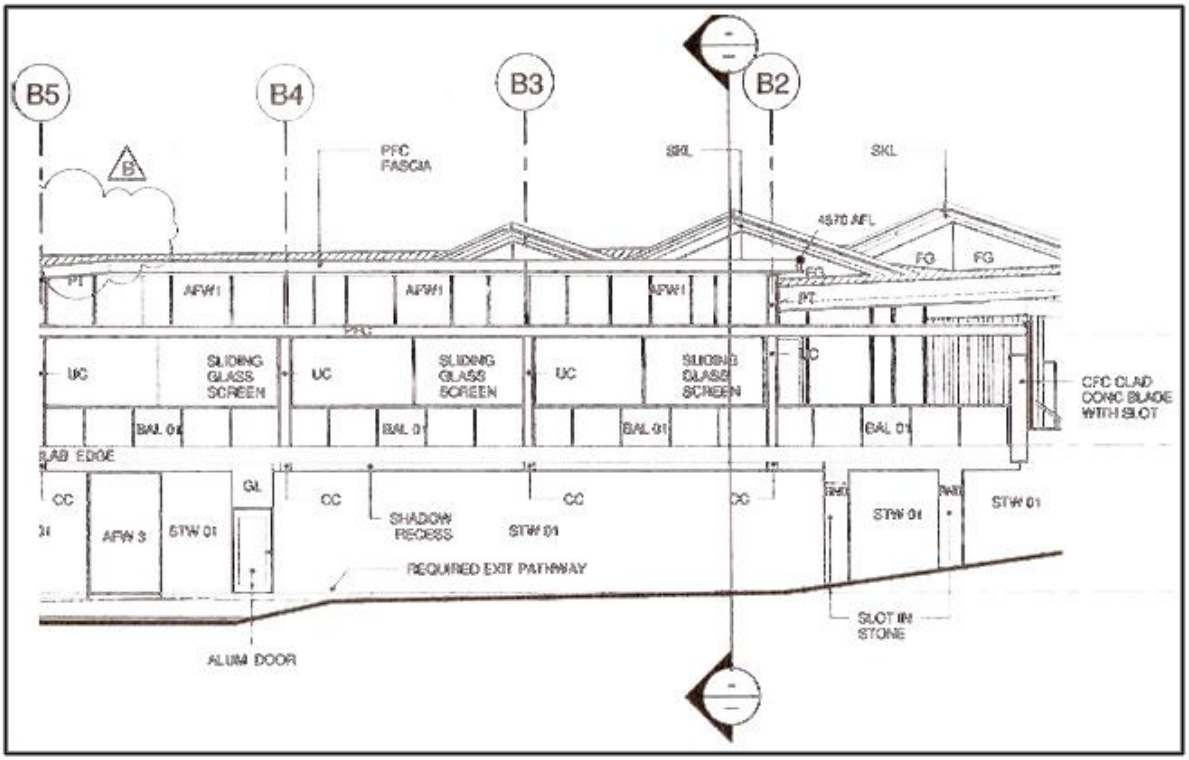
ABBREVIATIONS

Like symbols abbreviations reduce the amount of information conveyed on the plans in a written format. Throughout the plans abbreviations will be placed at the appropriate area; the type of plan will determine what abbreviations are shown.

As with symbols the legend box will include the abbreviation and the supporting meaning; if however it is not on the plan it will more than likely be on the notes page.

Following are some common abbreviations:

aggregate	aggr
airconditioning	AIRCOND
aluminimum	AL
angle	L
approximate	APPROX
asphalt	ASPH
at	@
average	AV, AVG
ballustrade	BAL
bench mark	BM
block wall	BW
bored pier	BP
bottom	BOT
brickwork	BWK
building	BLDG
cavity wall	CW
ceiling joist	CJ
ceiling level	CL
cement render	CR
centre line	LC or C
column	Col
concrete	CONC
concrete reinforced	RC
corrugated	CORR
countersink	CSK
damp-proof course	DPC
damp-proof membrane	DPM
detail	DET
diagonal	DIAG
diameter	DIA
dimension	DIM
distance	DISt
door	D
dowel joint	DJ
downpipe	DP
each way	EW
equal to	EQ
existing	EXST
expansion	EXP
external	EXT
fibrous cement	FC
finished ceiling level	FCL
finished floor level	FFL
fixed	F
fixed glazing	FG
floor level	FL
floor waste	FW
ground floor	GF
ground level	GL
ground floor level	GFL
hand left	LH
height	HT or HGT
horizontal	HORIZ
hot water supply	HWS
include	INCL
isolated joint	IJ
joist	J
keyed joint	KJ
kitchen sink	KS
level	LEV
longitudinal	LONG
main switchboard	MSB
minimum	MIN
north	N (NTH)
not shown on plan	NSOP
not to scale	NTS
off-form concrete	OFC
out of	O/O, ex
over-all	OA
pad footing	F
precast concrete	PC
prefabricate	PREFAB
quantity	QTY
rainwater pipe	RWP
reduced level	RL
reinforced concrete	Rc
retaining wall	RW
saw joint	SF
sewer	SEW
shower	SHR
similar	Sim
sliding door	SD
stainless steel	SS
strip footing	SF
structure finished level	SFL
temporary bench mark	TBM
tongue and groove	T&G
typical	Typ
universal beam	UB
universal column	UC
unless noted otherwise	UNO
vertical	VERT
volume	VOL
waste pipe	WP
weatherboard	WB
window (number)	W

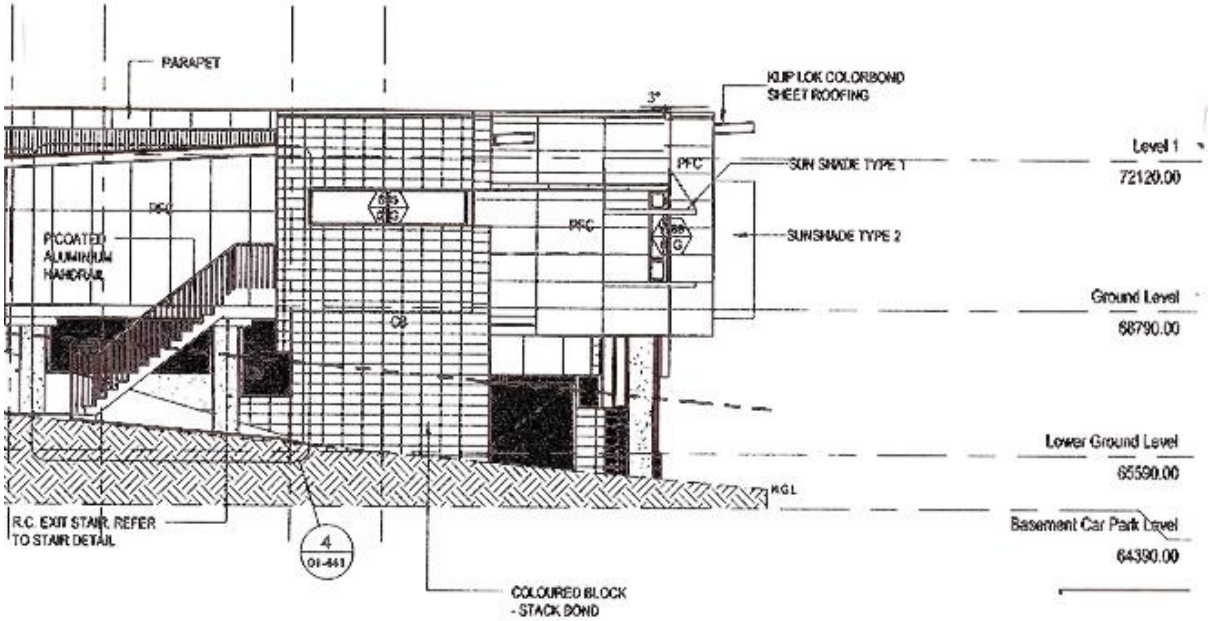


Abbreviation example 1

LEGEND

Abbrev.	Description
AFW 1	Aluminium frame window wall
AFW 2	Frameless Glazing Assembly
AFW 3	Aluminium frame window
BAL 01	Glass balustrade type 01
BAL 02	Off form concrete balustrade
CFC 1	Compressed fibrous cement board painted with expressed shadowline joints
CFC 2	Compressed fibrous cement board painted set into alum glazing frame
COF 2	Concrete off-form. Class 2 finish
CC	Concrete Corbel off-form Class 2 finish
RND	Render Finish
STL 1	Stone tile finish. Type 1
STW 01	Stone wall Type 1
ME-F	Metal frame
ML 1	Aluminium horizontal louvres
ML 2	Aluminium horizontal acoustic louvres
EML1	Exhaust louvre grille
MR 1	Metal roof sheeting type01
MR 2	Metal roof sheeting type 02
SKR	Skirt roof overhang with MR 02
SKL	Skylight
TS 1	Timber screen. Type 1
TS 2	Timber screen. Type 2
TC 1	Timber cladding type01
TC 2	Timber cladding type 02
PFC	PFC Fascia
EA	200 Equal angle fascia
AFLG	Apron flashing
RFLG	Ridge flashing
FC	Flush fibre cement soffit
FG	Fixed Glass
UC	Universal column
RHS	Rolled hollow section column
AFL	Level taken above structural floor level

Abbreviation example 2



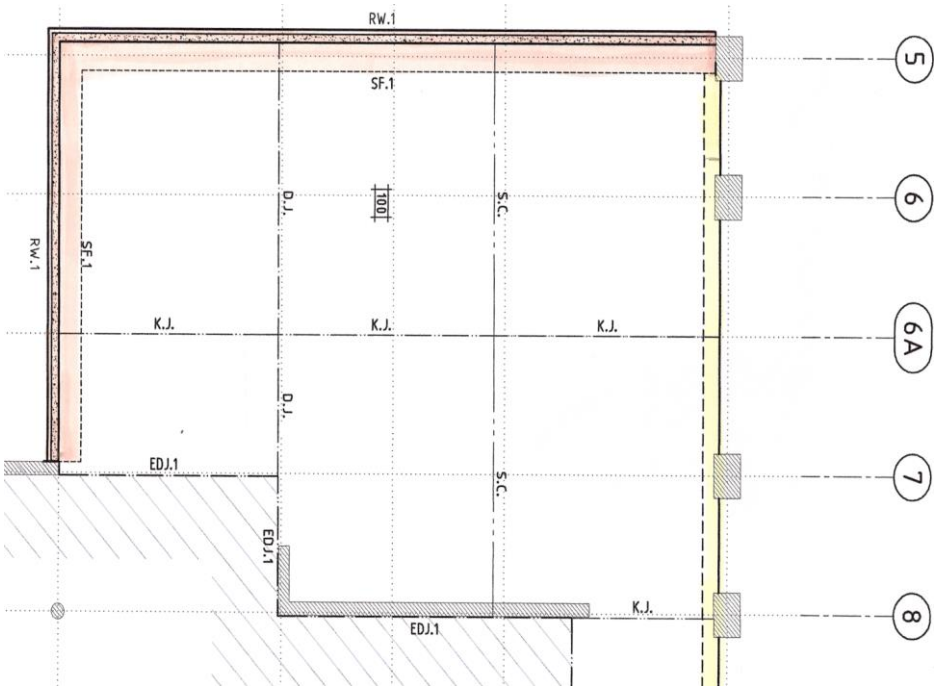
LEGEND:

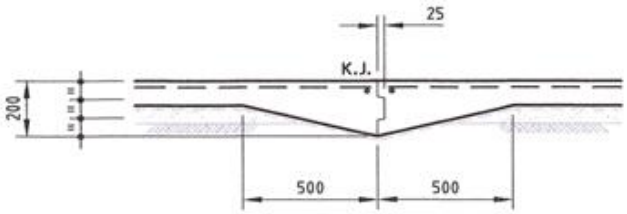
CB	COLOURED BLOCKWORK
DB	DAMPALON SHEET
MS	COLORBOND METAL SHEETING
NGL	NATURAL GROUND LINE
PFC	PAINTED F.C. SHEETING
PTF	PAINTED TEXTURED FINISH
TFB	TEXTURE COATED BLOCK FINISH
TFC	TEXTURE COATED FC

Other abbreviations that can be found on plans are common abbreviations such as **UNO** and **NTS.** It is important that both of these abbreviations are not missed as the information they convey is extremely important.

- **UNO** stands for Unless Noted Otherwise. That means that if certain information is placed on the plan such as concrete thickness for a slab is 200mm UNO then it would be presumed that most of the slab was 200mm thick but that there would be an area where the thickness has changed and the plan reader must find this area and ensure it is correctly identified.
- **NTS** represents Not to Scale. Plans are usually built to a scale measurement and this allows the plan reader to convert these measurements to real measurements of the plan, however some plans are drawn without scale measurements and are only drawn to show detail without any converting measurements. Plans that have **NTS must never be scaled.**

Certain abbreviations will need to be investigated to understand how something is being formed. For example in the following plan the plan reader can identify where a keyed joint or dowel joint may be placed but they will need to check and see exactly how to make it.

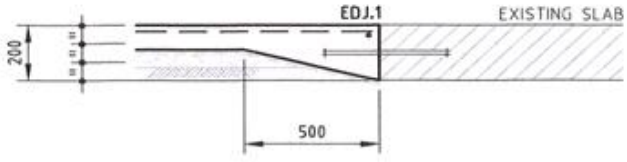




KEYED JOINT - K.J.
TYPICAL - U.N.O.

REINFORCEMENT DISCONTINUOUS THROUGH JOINT.
BITUMEN PAINT FACE OF JOINT.
PROVIDE N12 EDGE TRIMMERS EACH SIDE OF JOINT.

DRILL AND EPOXY GROUT N12.400 x 600 LONG
300mm EMBEDMENT INTO EXISTING SLAB.



DOWEL JOINT TO EXISTING - EDJ.1
TYPICAL - U.N.O.

BITUMEN PAINT FACE OF JOINT.
PROVIDE N12 EDGE TRIMMERS TO SIDE OF JOINT.

LEGENDS AND SCHEDULES

We have already touched on the importance of legends and schedules in our discussion about symbols and abbreviations. It is impossible to discuss one without the other as they support each other on plans.

Legends and schedules are designed to be placed upon plans to allow the plan reader to cross reference symbols, abbreviations and other vital information. The legend and schedule boxes may give information in regards to abbreviations, wall types, column types and dimensions, beam dimensions, steel requirements (structural and reinforcing) door and window types and dimensions, footing information, finishing trades requirements etc.

The important point to remember is that whenever symbols and abbreviations appear on a plan the plan reader must cross reference them to correctly identify their meaning.

MEMBER SCHEDULE

SC1 ..... 200 UC 46 SUPPORT COLUMN

SC2 ..... 100 SHS 5.0 SUPPORT COLUMN

BLOCK WALL SCHEDULE

MARK	TYPE	REINFORCMENT VERTICAL	REINFORCMENT HORIZONTAL
BW1	190 BLOCK	N12 - 400 N16 - 400 STARTERS	N12 - 400

NOTE : ALL BLOCKS TO BE 'H' BLOCKS UNLESS NOTED OTHERWISE.

LEGEND

ET1 ..... DENOTES 300 wd x 200 dp EDGE THICKENING - L11 TRENCH MESH, BOTTOM

STAIR 1 ..... 175 thk WAIST - 8 N12 LONGITUDINAL, N12 - 250 DISTRIBUTION

STAIR 2 ..... 175 thk WAIST - 8 N12 LONGITUDINAL, N12 - 250 DISTRIBUTION

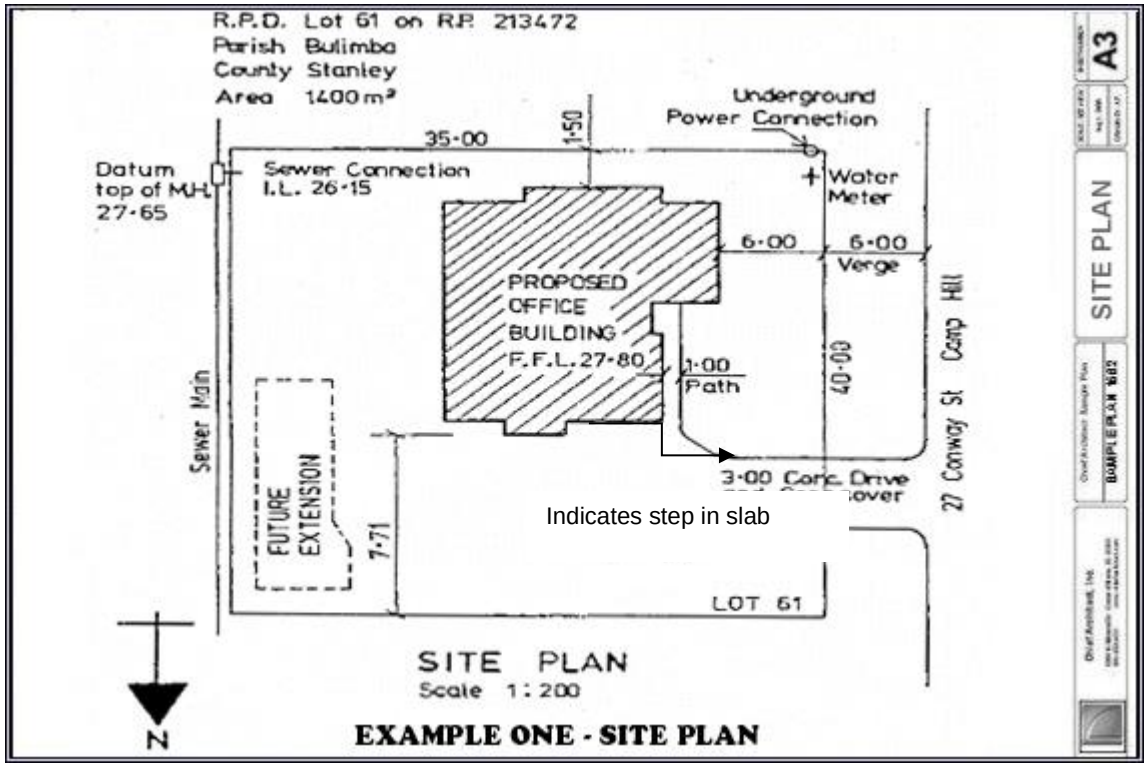
RW *..... DENOTES TYPE OF BLOCKWORK RETAINING WALL + FOOTING - REFER DETAIL

BW *..... DENOTES TYPE OF BLOCKWORK WALL - REFER SCHEDULE

Legend/Schedule interpretation example

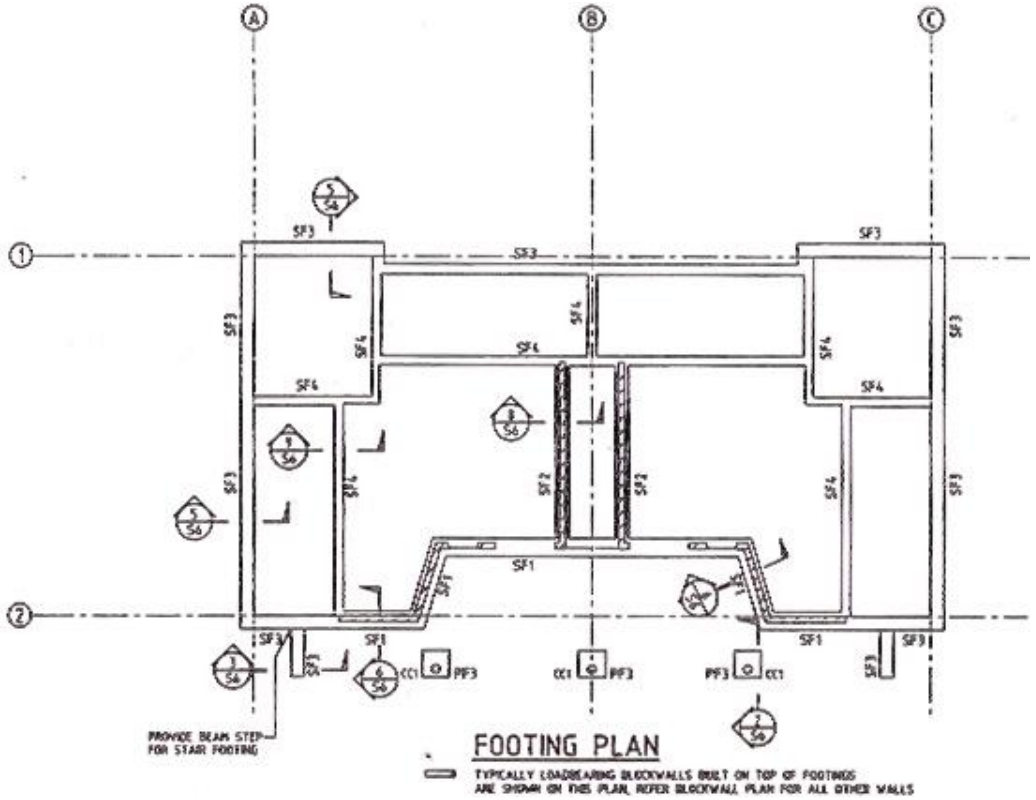
In the following simple slab plan we can see a few different symbols. By looking at these symbols and comparing those to the Symbols legend the plan reader can identify how thick the slab is and what type of walls are to be constructed.

Also in the notes for this plan is the concrete strength and cover requirements for the steel reinforcing.



REVISION EXERCISES

REVISION EXERCISE 1

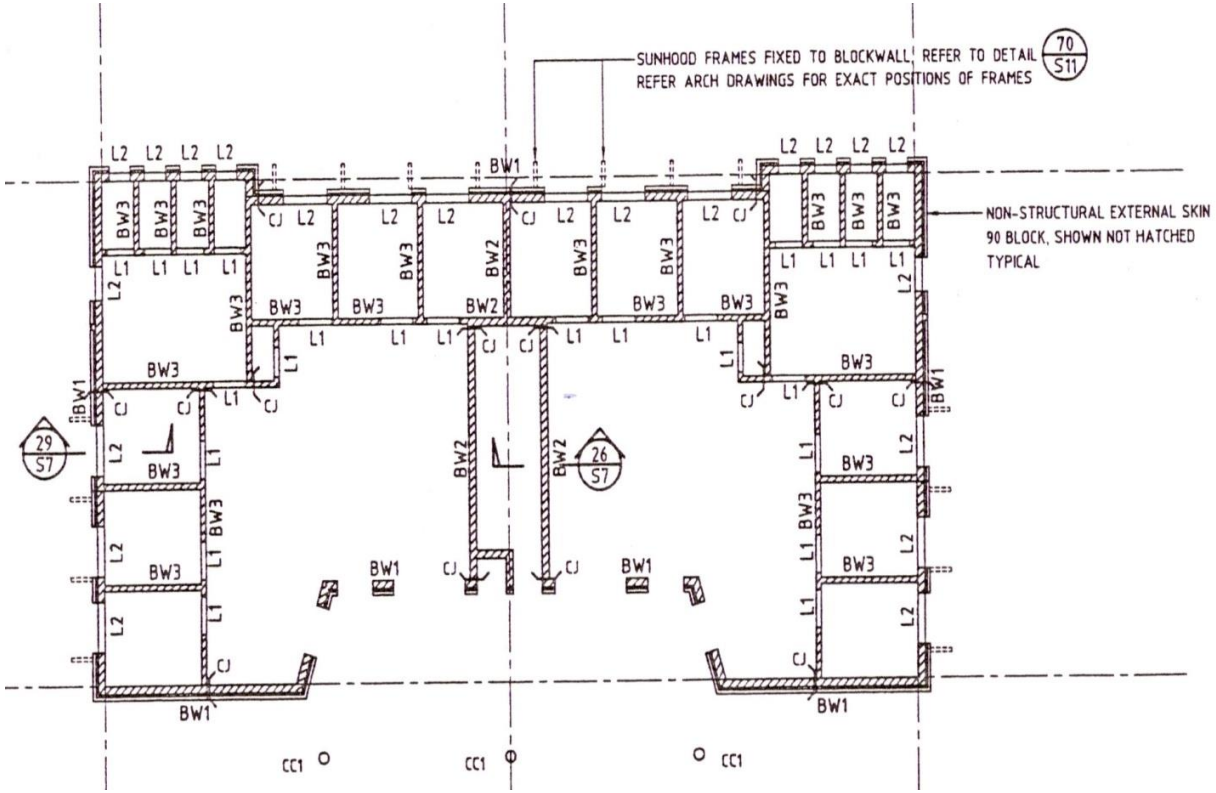


FOOTING SCHEDULE		
MARK	DESCRIPTION	REINFORCEMENT
SF1	400Dx600W STRIP FOOTING	3Y12 TOP & BOT R10 LIGS AT 400 CRS
SF2	400Dx450W STRIP FOOTING	3Y12 TOP & BOT R10 LIGS AT 400 CRS
SF3	400Dx450W STRIP FOOTING	3Y12 TOP & BOT R10 LIGS AT 400 CRS
SF4	400Dx300W STRIP FOOTING	2Y12 TOP & BOT R10 LIGS AT 400 CRS
TH1	300Dx300W SLAB THICKENING	2Y12 TOP & BOT R10 LIGS AT 600 CRS
PF3	900SQx300D PAD FOOTING	4Y12 EACH WAY BOT

COLUMN SCHEDULE		
MARK	DESCRIPTION	SIZE
CC1	260Ø O.D. FRC COLUMN	4Y16 VERT BARS R6 SPIRAL, 200 PITCH
C1	STEEL COLUMN ABOVE CEILING	65x65x3 RHS IP1
C2	EXT STEEL COLUMN	65x65x3 RHS GALV

Q1 What are the dimensions of SF3?	Q2 What does TH1 represent?
Q3 What is a C2?	Q4 What are the dimensions of PF3 (pad footing)?
Q5 How many sectional views are there on this plan?	Q5 How many sectional views are there on this plan?
Q6 What Strip footing runs along grid C?	Q7 What section cuts through SF2?

REVISION EXERCISE 2



BLOCKWALL SCHEDULE			
MARK	DESCRIPTION	VERTICAL REINFORCEMENT	HORIZONTAL REINFORCEMENT
BW1	200 BLOCK WALL +90 EXTERNAL SKIN	Y12 @ 400 (TO 200 WALL ONLY)	Y12 @ 400 (TO 200 WALL ONLY)
BW2	200 BLOCK WALL	Y12 @ 400	Y12 @ 400
BW3	150 BLOCK WALL	Y12@ 800	BOND BEAM AT TOP

NOTE: FOR ALL WALL TYPES
ADDITIONAL Y12 VERTICAL BARS TO BE INSTALLED BESIDE ALL OPENINGS, AT ENDS OF WALLS AND AT CORNERS

- Above is a block wall set out plan.
- There are three different types of block walls; block wall, 1, 2, and 3.
- Checking the schedule we can see what type they are and what size block plus the steel requirements for each wall

Q1 What size skin is added to BW1?	Q2 What vertical bar is placed into BW3 and at what spacing?
Q3 What is placed upon the top of BW3?	

Element 4 – Locate and identify key features on a site plan

In this chapter you will understand:

- ✓ How to determine the orientation of the plan with site
- ✓ How to identify services on a construction site

IDENTIFYING SERVICES ON A CONSTRUCTION SITE

In preparation for construction, the following services need to be located and plotted on the site plan.
This information is also available from Dial Before You Dig (dial 1100), a national association for protection of underground networks. You can get a full set of location drawings for all of the following services.

WATER TAPPING

Locate the connection point for the site and reference its depth as this may determine the involvement of the WHS Act. Note that the existing sewer pie inlet must always be capped before construction begins. Check the land title and take note of whether an easement has been constructed on the site for these purposes. Record any location of pits. Check with the local authority for the connection point. It is also important to take note of the location of any existing septic tank to determine if it needs to be removed from the site.

ELECTRICAL SUPPLY

In a newer suburb, look for the power pit at the front of the property. In an older suburb, look for the supply box and/or the overhead supply. If it is an overhead supply, refer to the requirements of the OHS Act with respect to working near overhead lines

SEWER CONNECTION

Locate the connection point for the site and reference its depth as this may determine the involvement of the OHS Act. Check the land title and take note of whether an easement has been constructed on the site for these purposes. Record any location of pits. Check with the local authority for the connection point.

GAS CONNECTION

Locate the tapping point. Check with the local authority

TELECOMMUNICATION

Locate the Telstra pit (if the cable is underground). In an older suburb the supply will probably be overhead. If this is the case, you need to check the overhead lines above roads, driveways and gardens then log any cracks or dangers.

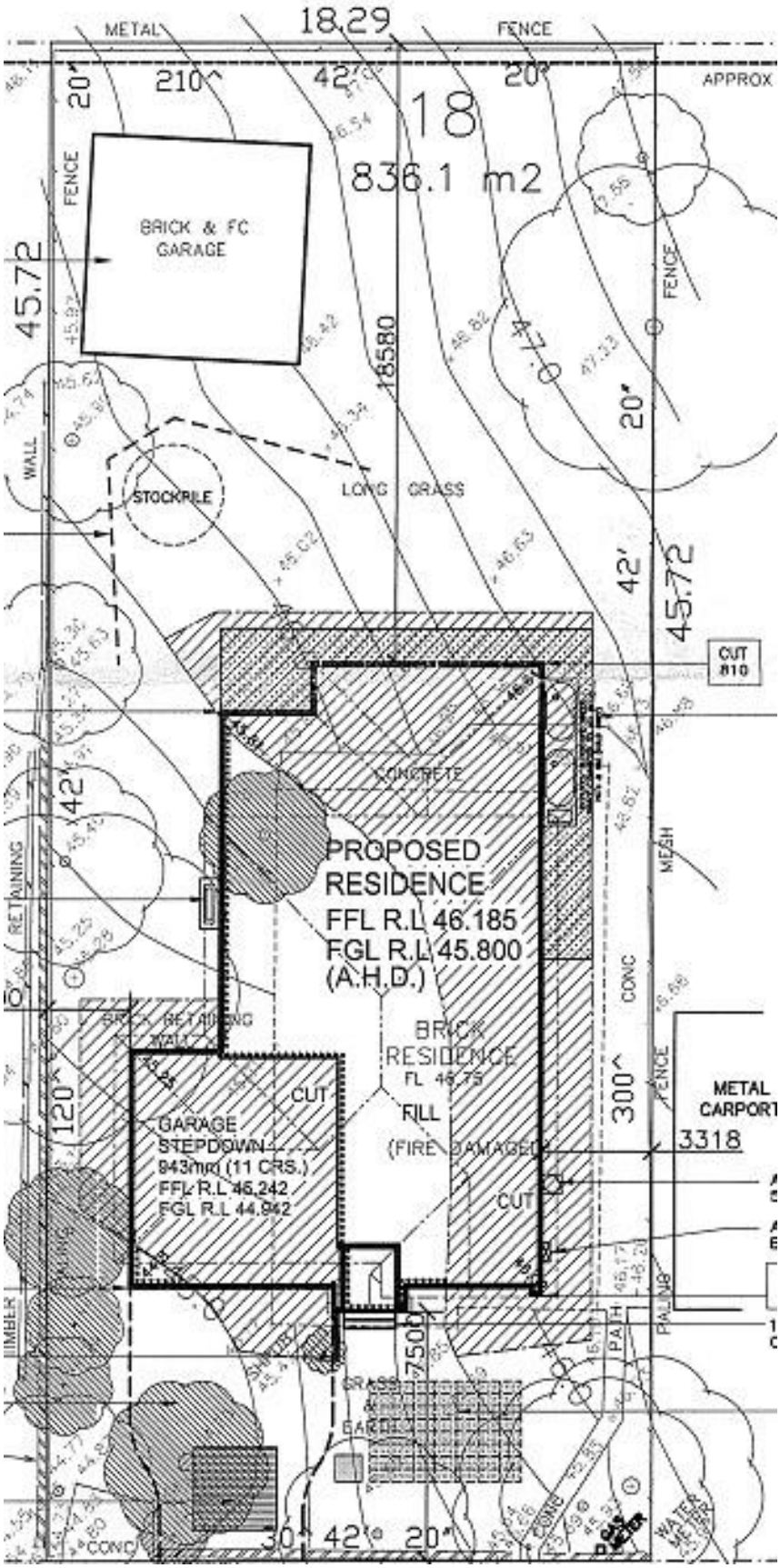
STORMWATER

Locate the connection point for the stormwater which may be to the street line or a pipe or pit located within the property. Locate any pits and refer to the local authority for the possible location of any easements for this purpose

Contour drawings for construction drawings are used so as the designers can determine the best position of the proposed building horizontally and vertically.

They are usually prepared by surveyors on drawings called detail surveys. As the name implies the purpose of the drawing is to detail the features of the site such as,

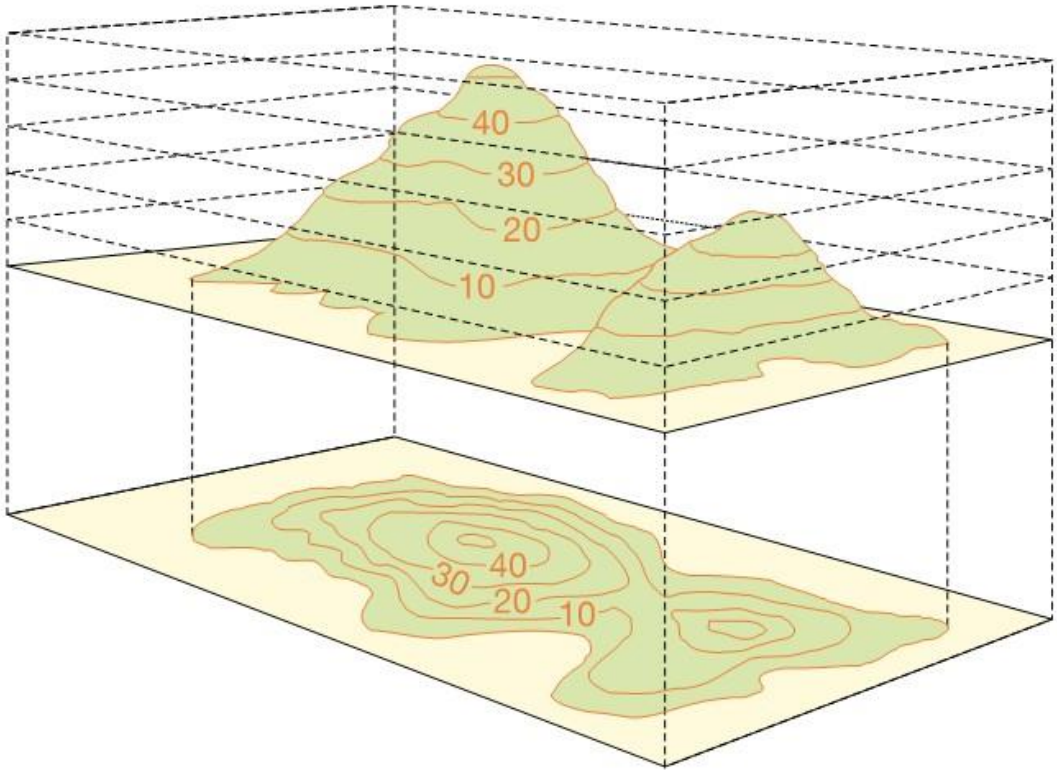
- Direction of fall of the land
- Location of Trees
- Location of existing structures
- Location of services
- Location of any other features that may affect the design & placement of the building.


METAL
18.29
FENCE
APPROX
20'
210^
42'
20'
10
836.1 m2
FENCE
BRICK & FC
GARAGE
45.72
18580
WALL
STOCKPILE
LONG GRASS
20'
FENCE
42'
45.72
CUT
#10
CONCRETE
42'
PROPOSED
RESIDENCE
FFL R.L 46.185
FGL R.L 45.800
(A.H.D.)
MESH
RETAINING
BRICK
RESIDENCE
FL 46.75
CONC
FENCE
METAL
CARPORT
3318
120^
CUT
GARAGE
STEPDOWN
843mm (11 CRS.)
FFL R.L 46.242
FGL R.L 44.942
FILL
(FIRE DAMAGED)
300^
CUT
7500
PATH
PALING
GRASS
GARDEN
30'
42'
20'
CONC
WATER
METER

UNDERSTANDING CONTOURS

Contours Lines - are imaginary lines that joint points of the same height above the **datum** (points of equal elevation). They allow a person viewing the plan which is 2 dimensional to form an impression of its 3 dimensional shape.

It is important that the contours refer to a datum so as construction based on the design will be built at the appropriate height.

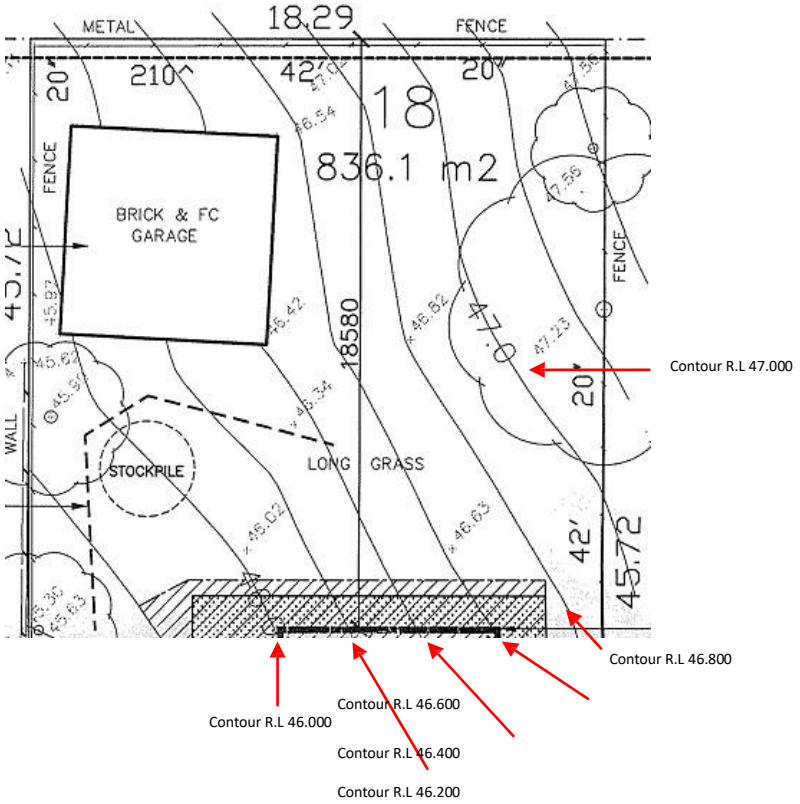


This photo of a terraced rice farm in Indonesia give a good physical indication of what contour lines are.

As we all know water will always settle to level. So as the farmers can dam the water they terrace the land in level lines. Each terrace traces a level line around the land feature.

Contour Interval – the contour lines represent the height of the land in the form of a Reduced Level above the datum. Each contour will represent a different Reduced Level, so an impression of the shape of the land can be formed the contours must be determined at a regular intervals. This is the Contour Interval.

The excerpt from a site plan gives an example of the contour interval; in this case it is 200mm



A physical example of contour intervals can be seen on the Terraced Rice Farm.
The vertical height difference between the terraces would represent the contour interval.
When preparing a detail survey it is important that the contour interval is constant throughout the whole drawing.

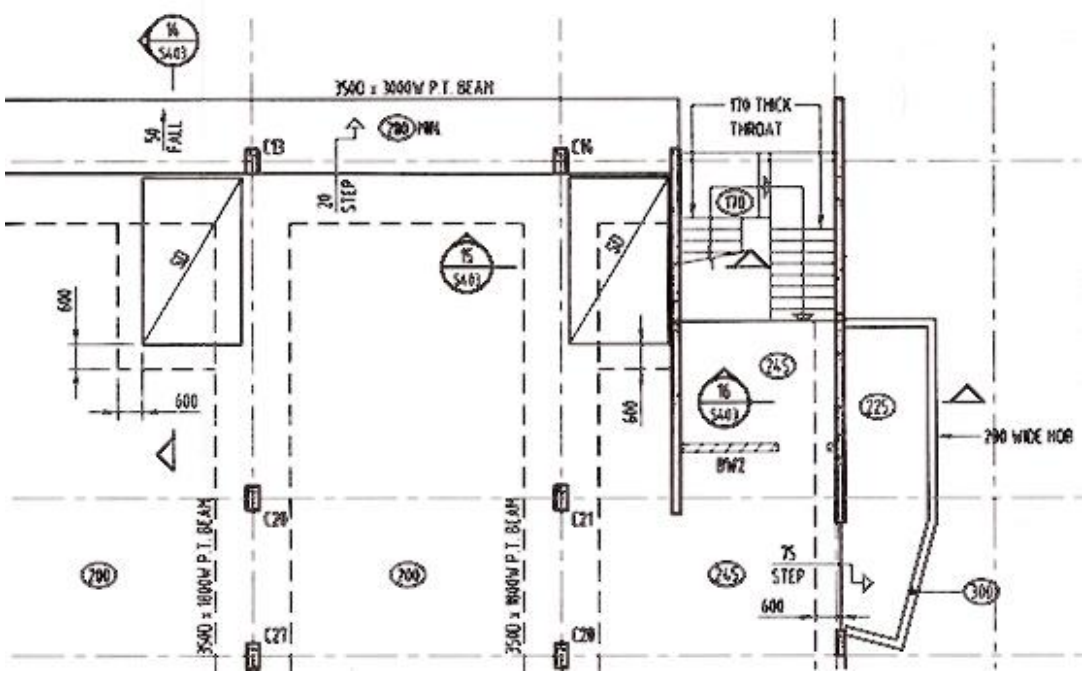
ORIENTATION OF THE PLAN WITH SITE

PLAN VIEWS

Although they are all called plans, the term plan view or bird's eye view is applied to any plan that is read from above. The types of plans that can be read from above can include floor; plans, site plans, general arrangement plans, slab framing plans. After reading these plans the plan reader can then view elevations, sectional plans and detail plans which allows the plan reader to gain an overall view of the project from many different aspects.

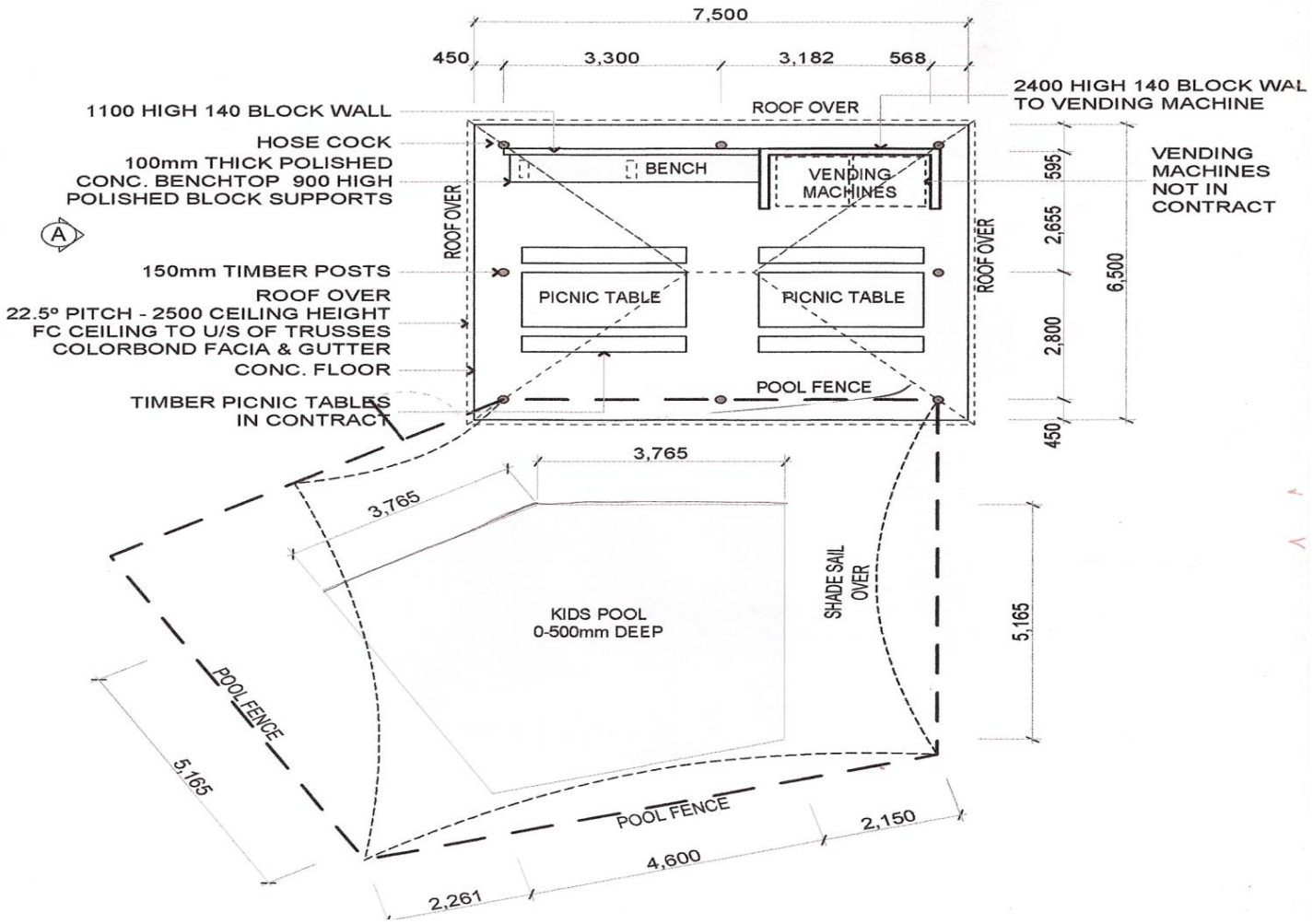
Plan View Example 1

This plan view shows just a small section of a large project. It shows general arrangements of slab thickness, column position and numbers, step downs, stair location, beams and sectional notations.



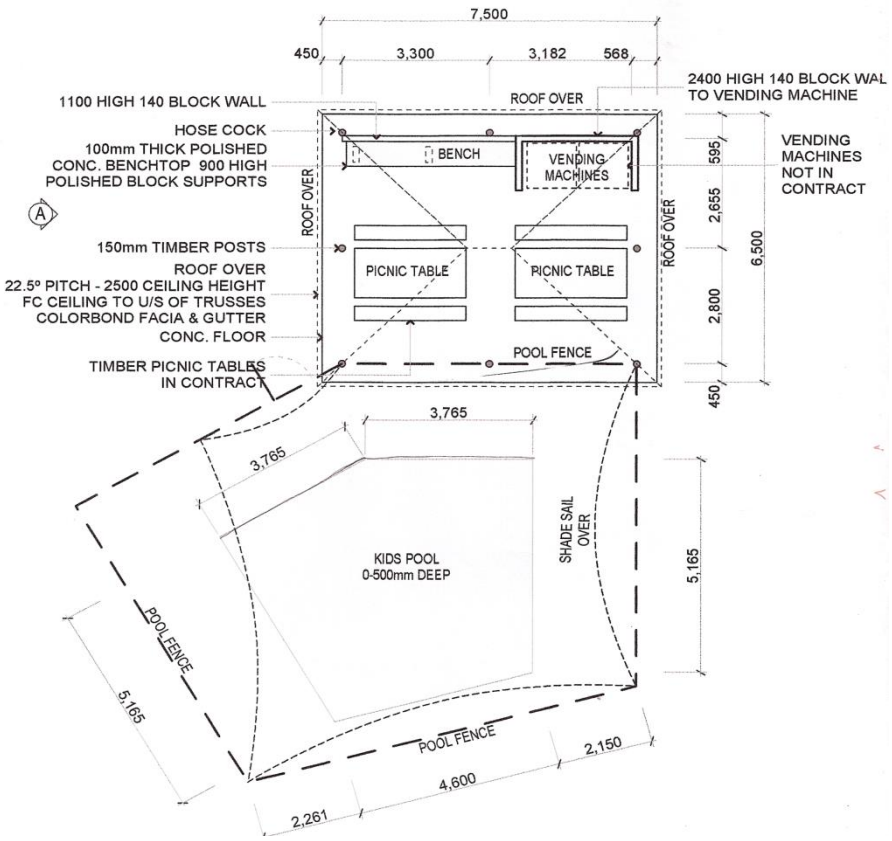
Plan View Example 2

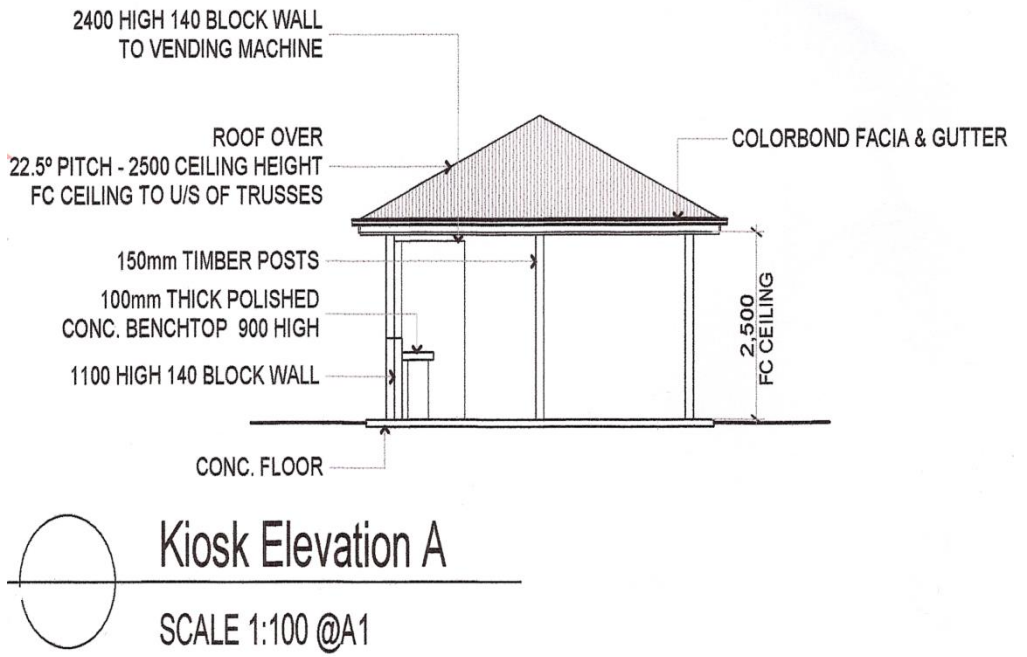
This is a layout plan of a recreational area; it includes an eating area as well as the location of a swimming pool. The plan includes measurements signifying where tables and benches are placed in relation to the actual structure and notations to the roof which can be crossed referenced to another plan called an elevation.



Plan View Example 3

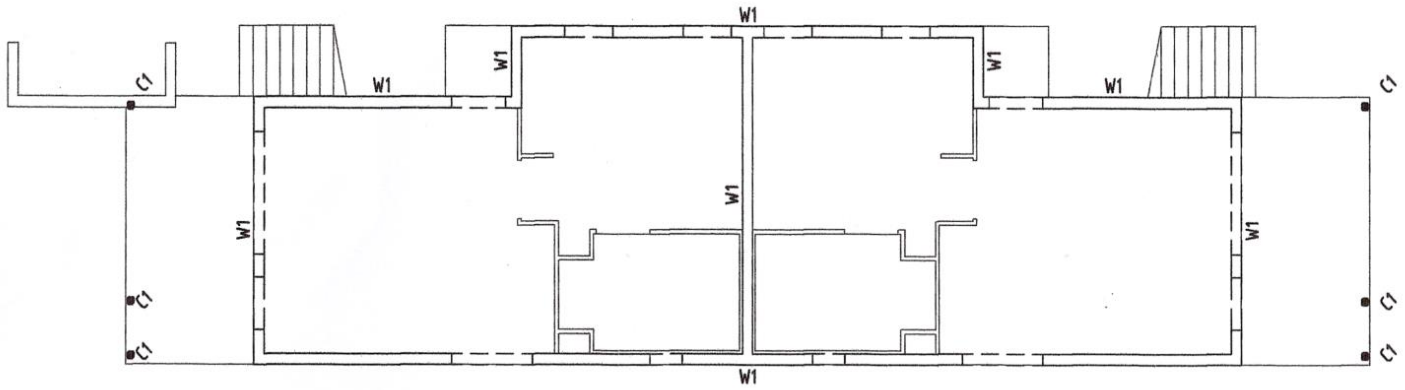
In this example it becomes apparent that by using two plans together a clearer overall view of the structure can be gained. Both plans include information about heights, for example ceiling height and bench height, however by also viewing the elevation plan, height becomes more apparent in relation to other parts of the structure.





Plan View Example 4

This example includes a straight forward plan view showing the wall layout and the location of the columns. The plan reader will need to make checks against the wall and column schedules or legends to identify what type of walls and columns they are.



GROUND FLOOR - WALL FRAMING PLAN

BUILDING 1, 2 & 3 1:100

WALL SCHEDULE/ LEGEND

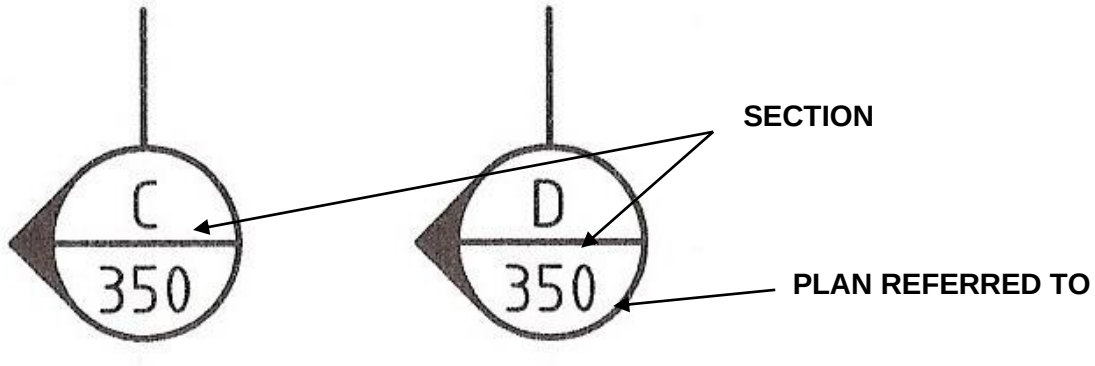
W1 - 200CM WALL, REFER NOTES

CJ1 - 200CM WALL CONTROL JOINT, REFER DETAIL.

SECTIONS

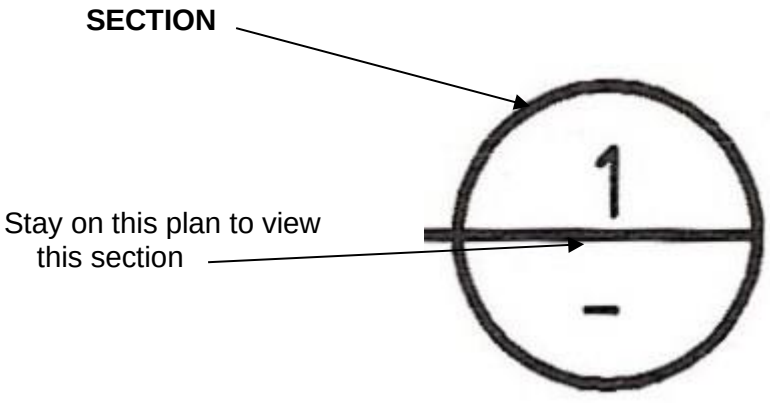
Sections are used throughout plans to show a different perspective of a plan. Cross referencing these sections to the main plan can reveal an enormous amount of relevant information that may not be seen on the main plan. Understanding how these sections are identified and how to read them can provide the plan reader with the complete picture of a structure.

When a plan is viewed there will be sections placed upon that plan that will direct the plan reader elsewhere to obtain this information, this is done in the form of a section symbol



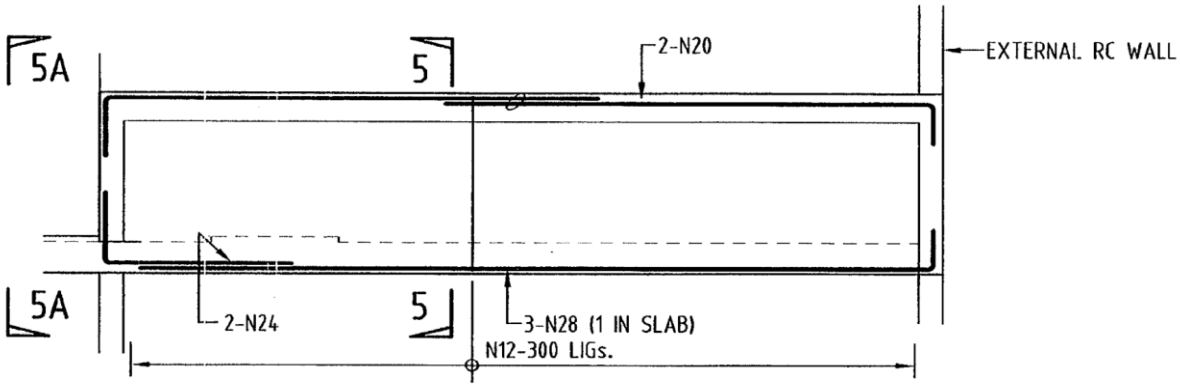
These symbols will be found throughout the plans. Sections can either be a letter or number value. Above are the section notations for section C and D. The section number or letter will be in the top half of the circle and the plan number we are referred to is plan number 350. The direction of the arrow head will indicate which way to view the section.

When there is a number below the section notation then that is the plan that must be cross referenced to find the section.



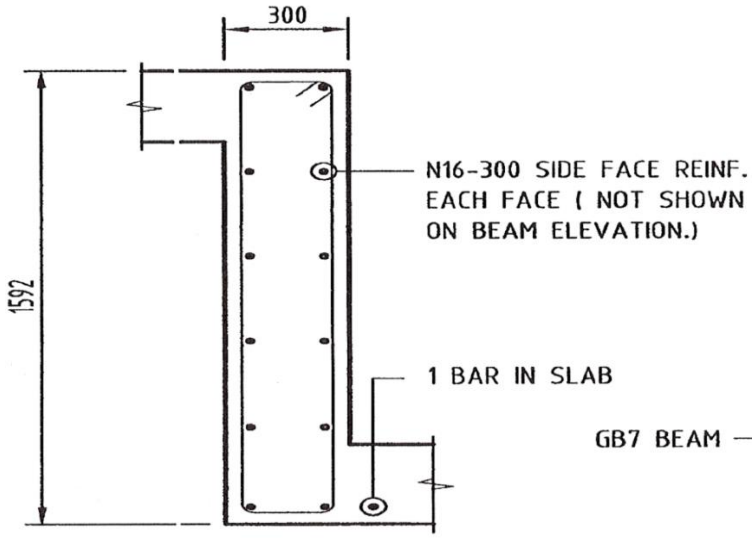
When it is vacant below the section notation then the section will be on the plan that is being read.

Following is a ground beam elevation with a section notation of 5. This has no circle around it or any other plan notation so it would be taken that the section was on the same plan as this drawing.



GB7

When viewing the above plan (steel drawing) there is a distinct lack of information that may be found on the sectional view.

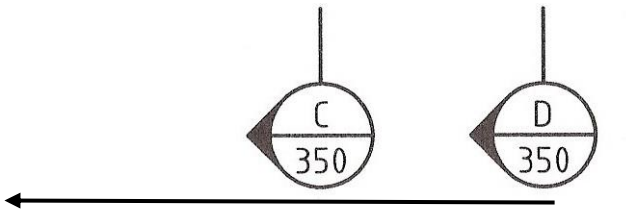


5-5

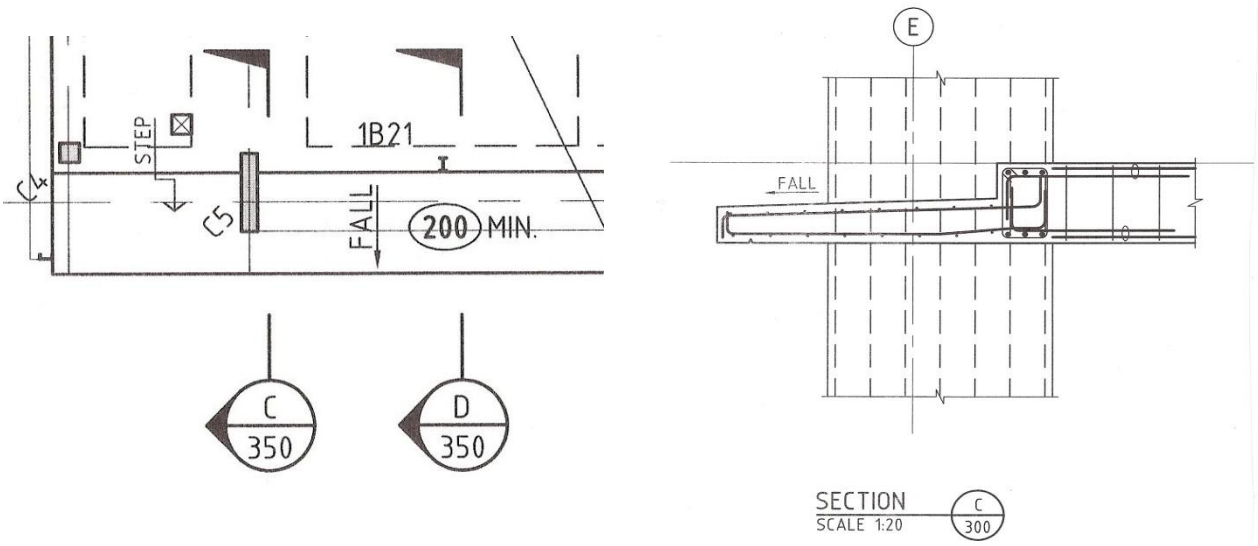
Now on the sectional view above it can be seen that the width and height of the beam is shown. Also visible is the steel formation within the beam. Combining the main plan and the sectional view will now allow a full understanding of the beam that is being built.

How do we determine which way to look at a section?

When looking at a section drawn on a plan the first thing to note is the arrow direction. The arrow will point one way and that is the view the plan reader will take



In the example above the arrows are pointing to the left, so when the section is viewed the plan reader will be looking towards the left on the main plan



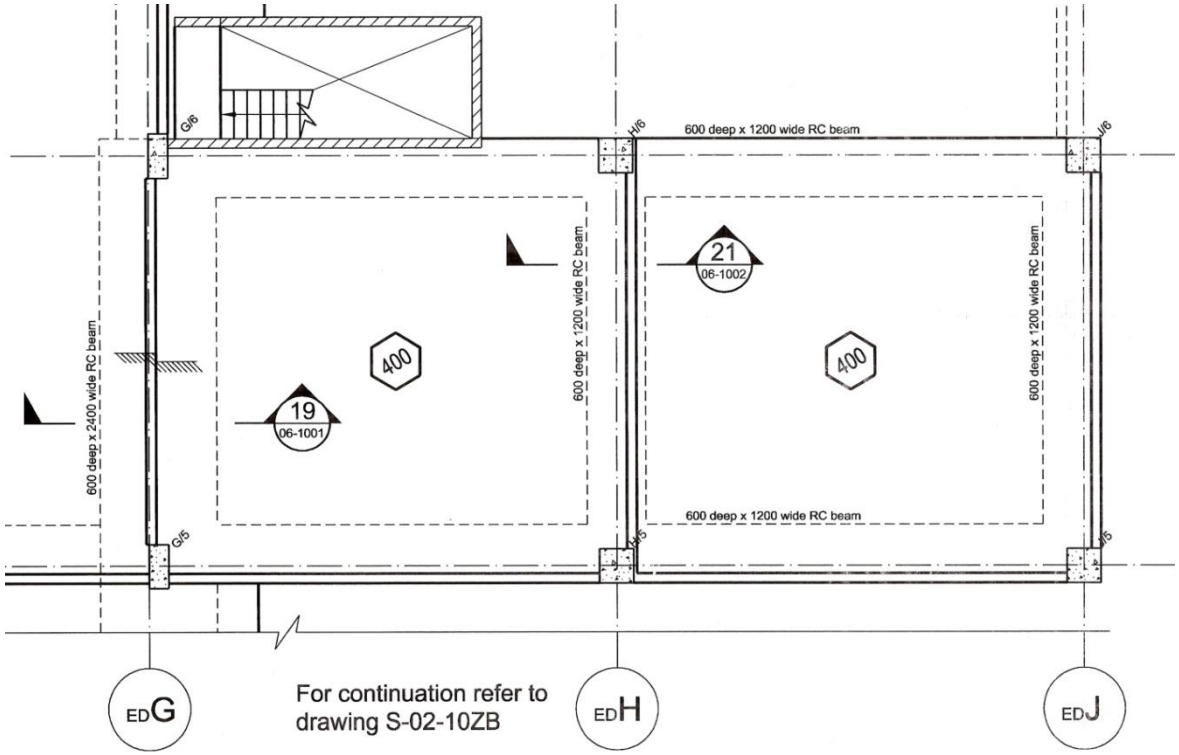
Looking at section C above, the arrows are pointed to the left of the main plan; that is how it must be read. The dotted lines on the actual section will indicate the column to the left of the section

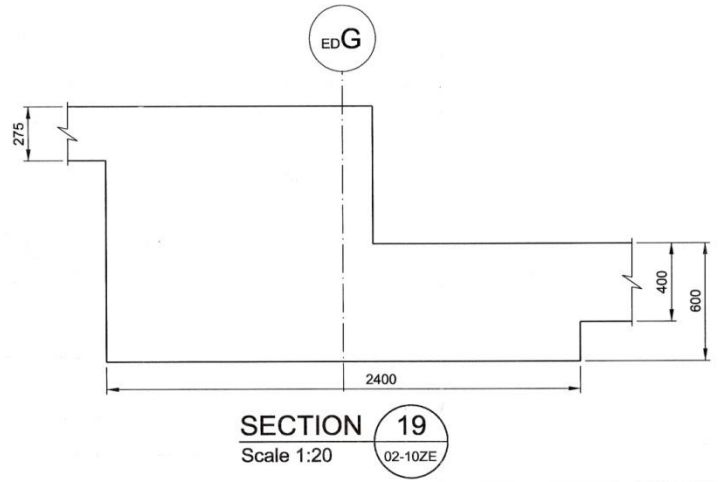
How far does the section go?

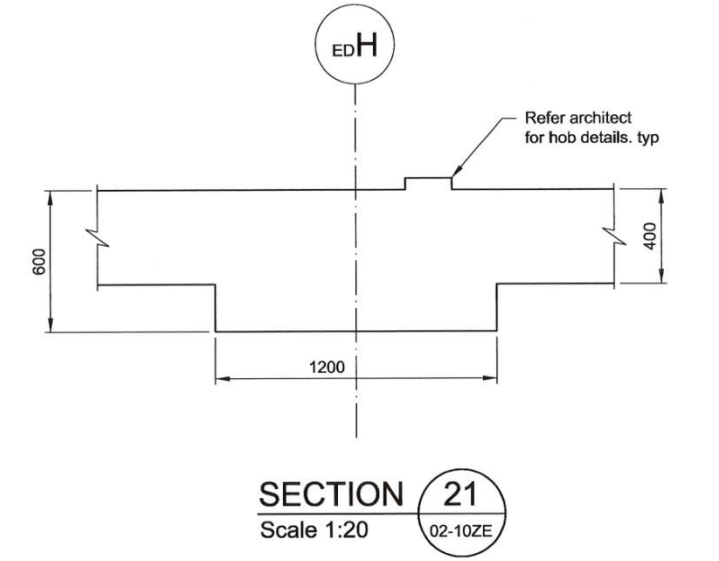
The sectional view will only go as far as the two arrows are apart; so where the circle spans across to the arrow above will be the limit of the view.

Section Example 1

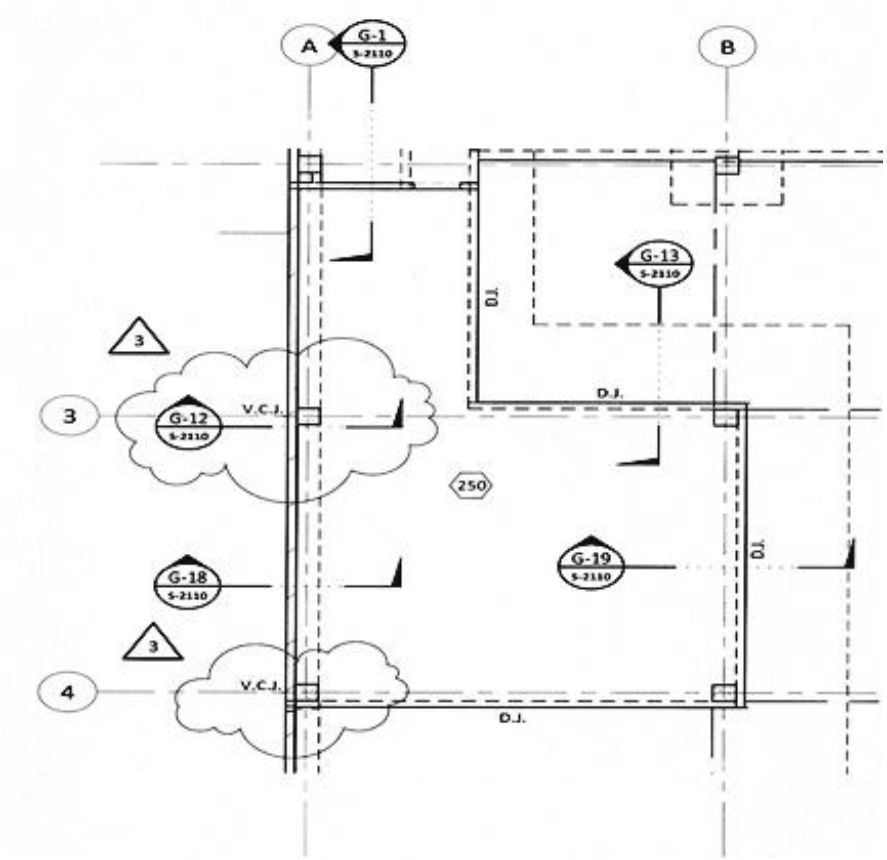
Following is a general arrangement plan showing sections 19 and 21; to the right are these two sections showing the formation of the beams.

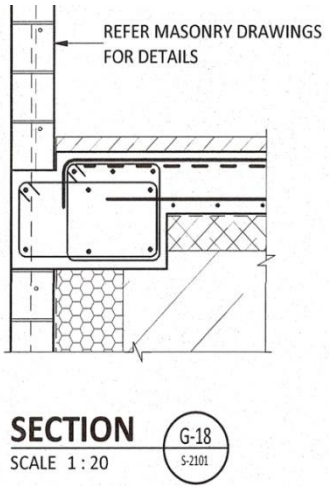




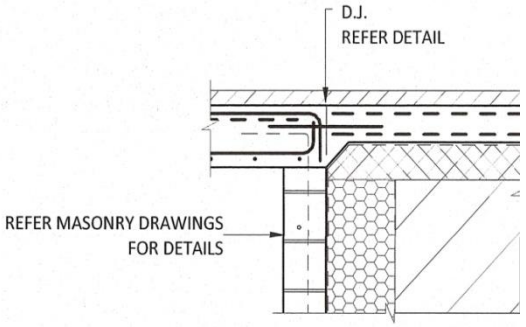


Section Example 2





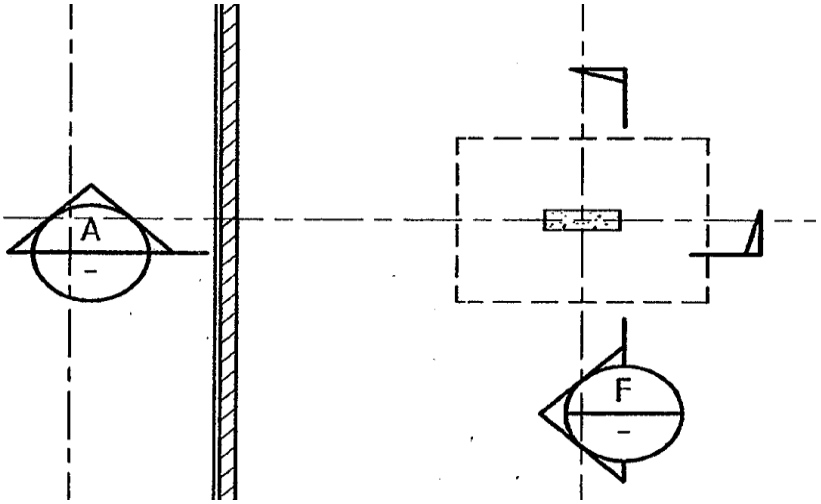
SECTION G-18
SCALE 1 : 20
S-2101



SECTION G-19
SCALE 1 : 20
S-2101

HIDDEN DETAIL

Hidden Detail is used to indicate parts on a plan that may not be fully visible at all times. That means that a part of the structure that is hidden in some shape or form and will require the plan to be looked at from a different aspect. Hidden detail is closely related to sectional views.



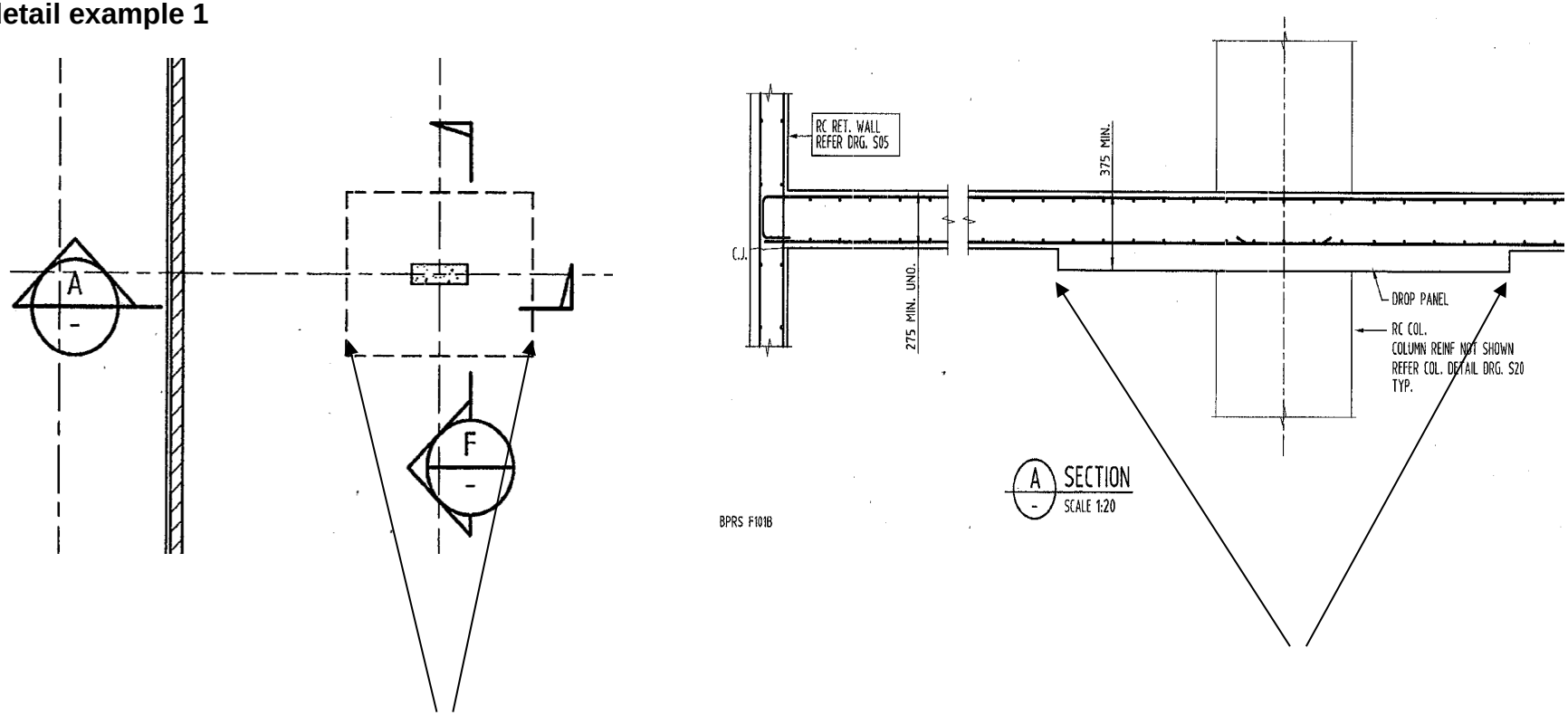
The strongest indicator of hidden detail is a dotted line. In the above plan view there are two sections running through the plan with dotted lines indicating hidden details. To understand what the dotted lines show sections A and F will need to be checked.

It must be noted that there are two different types of lines running through this plan; one type is indicating hidden detail and the other indicating grid lines.

— — — — — Hidden detail line

The line above is connected to hidden detail. These are straight forward dash lines while a grid line will normally be a dash-dot line. In the drawing above the grid lines can be seen running through the centre of the column outline. Grid lines are a system of point indicators giving a reference starting point as well as intermediate reference points.

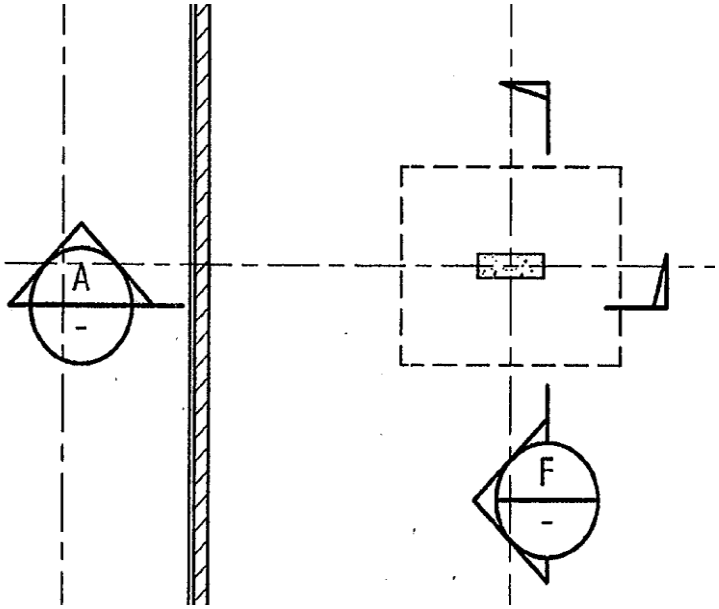
Hidden detail example 1



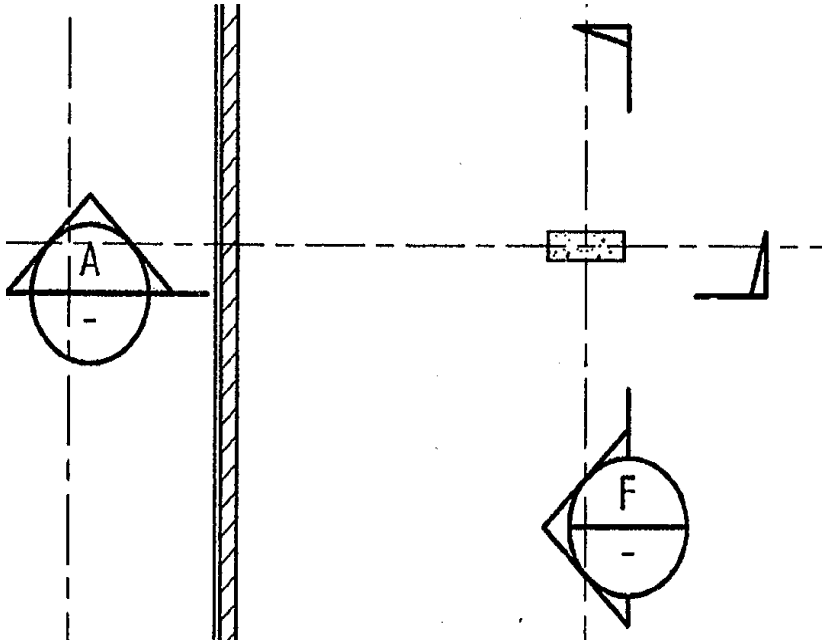
The dotted line in the plan view above indicates a drop pane that is beneath the slab. When the slab is poured the bottom of the drop panel will not be visible from above, hence the term hidden detail.

Although the plan reader can see that there is hidden detail on the plan they will need to cross reference sectional views to form the whole picture of this area.

Hidden detail example 2



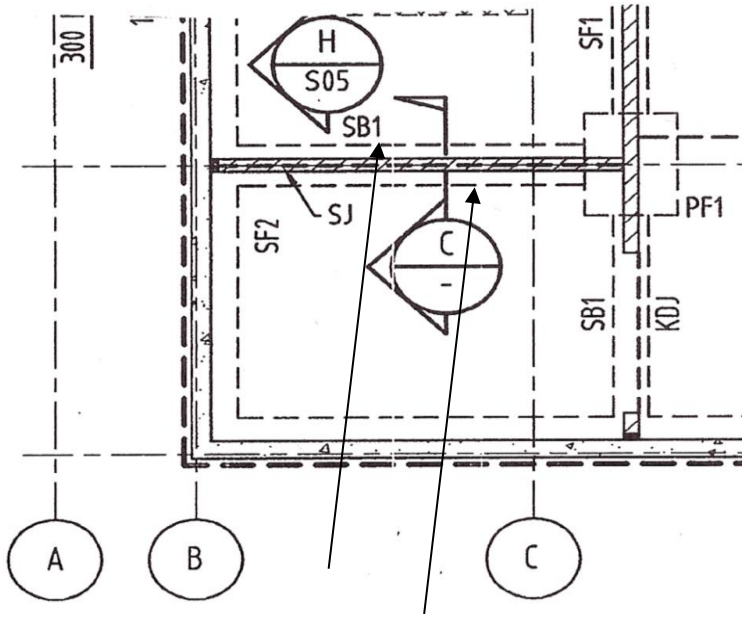
Before the slab is poured

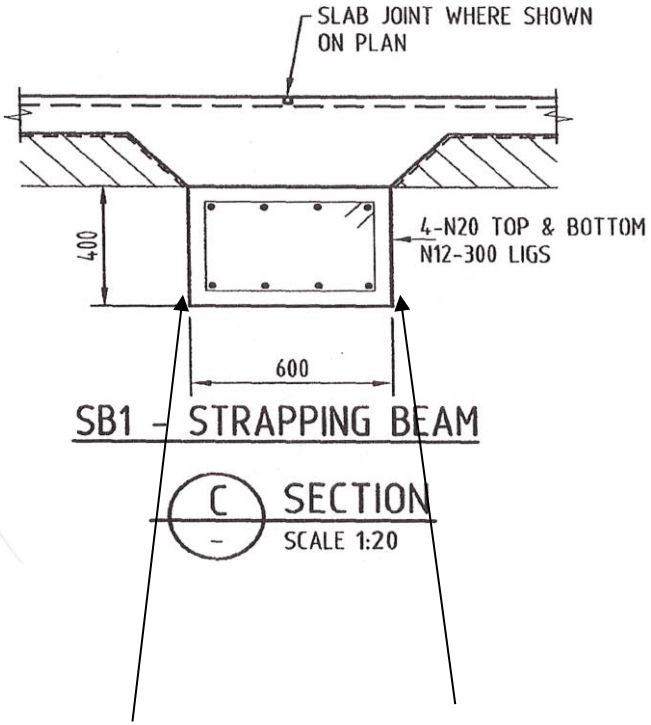


After the pour

The drawing on the left shows the drop panel hidden detail and on the right the same area as it would appear after concrete has been poured. The only thing that would be visible from above would be column starters that are in place for the column to be built above this floor.

Hidden detail example 3

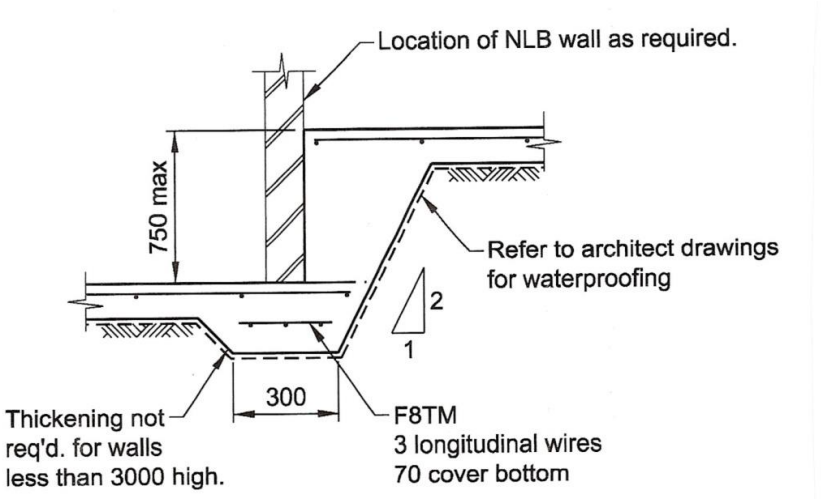




To the left on the above general arrangement plan hidden detail lines are shown through section C. The highlighted dotted lines are shown in the plan on the left (section C). While the plan reader can see and understand that there is more than likely a beam beneath the slab they will need to investigate the sectional view to see how the actual beam is shaped; how deep and wide it is plus the steel arrangement.

DETAILS

Details are very similar to sectional views; they may be used to show areas of note in larger detail making it easier to read. Detailed plans can give a view much like sections do; they may be typical views of certain areas and therefore are not called up as sections.

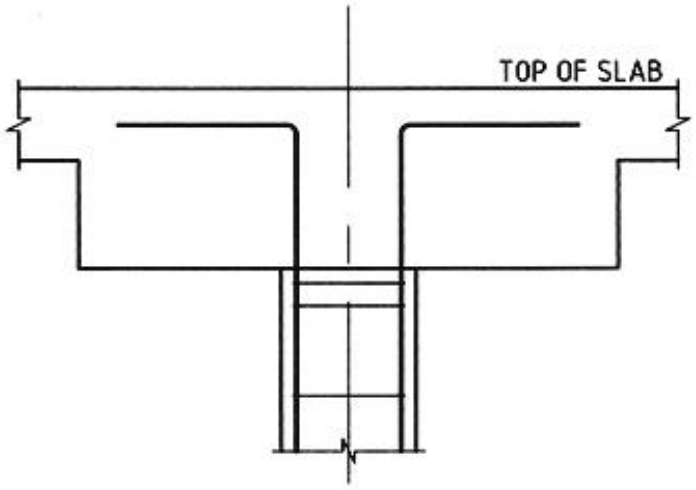


Slab Step Down Detail - S.O.G. typ

Scale 1:20

The above detailed plan shows how a step down area is to be formed. It is noted as a typical detail so it would be expected that any area of a step down would be built as such. If there were to be any change to this detail then the area of change should be noted.

Detailed drawings are usually drawn at a scale of 1-20 or 1-50; this allows for a small area to be enlarged; allowing for clarity.



COLUMN TERMINATION DETAIL AT LEVEL 1

SCALE 1:20

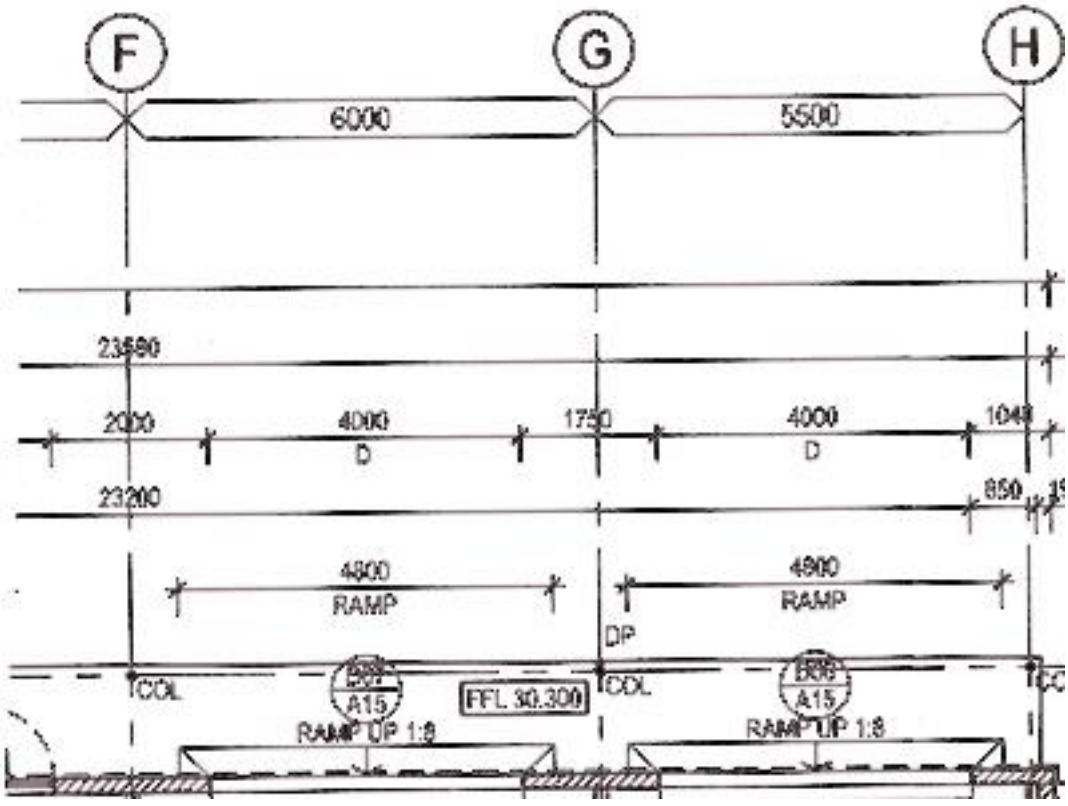
Details will normally be called up on their own plan numbers making it easier to locate them.

7137-S030	STAIR 1 & 2 ELEVATIONS AND DETAILS
7137-S031	STAIR 3 ELEVATIONS AND DETAILS
7137-S032	STAIR 4 ELEVATIONS AND DETAILS
7137-S033	STAIR 5 ELEVATIONS AND DETAILS

GRID LINES

Grid lines are placed upon plans to give points of reference in the horizontal plane. They are used to give measurements for particular elements such as walls, columns step downs and other features. Grid lines are normally used as centre lines for columns however this may not always be the case.

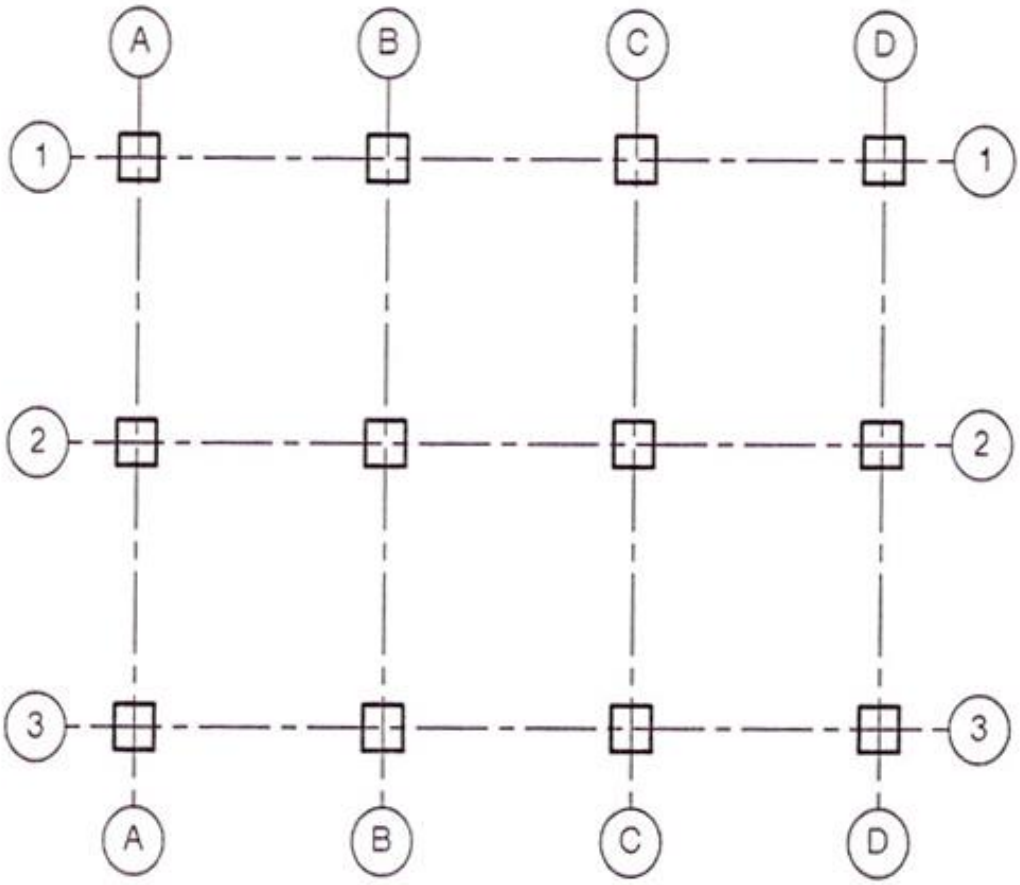
Projects rely heavily on correct measurements and grid lines will give accurate points to take measurements from. Before a project begins surveyors will mark out the site and set up profiles with grids that will correspond with a letter-number system. Down one side of a project a grid will be represented by letters and the grids that run at right angles to these letters will be designated by numbers.



One row of grid lines is shown above with letter notations. Between grid F and G the distance is 6 metres and between grid G and H the distance is 5.5 metres. By using these grids other points of interest are measured, such as the ramp placement and columns location. All placements of fixtures are reliant on grid lines. Items that are not placed directly on grid will have measurements from grid to give proper location.

Grids are set out by site surveyors prior to the project starting, and are placed upon profiles that will allow every worker on site to measure from. String lines are placed between the set out point of grids and then the measurements can be taken.

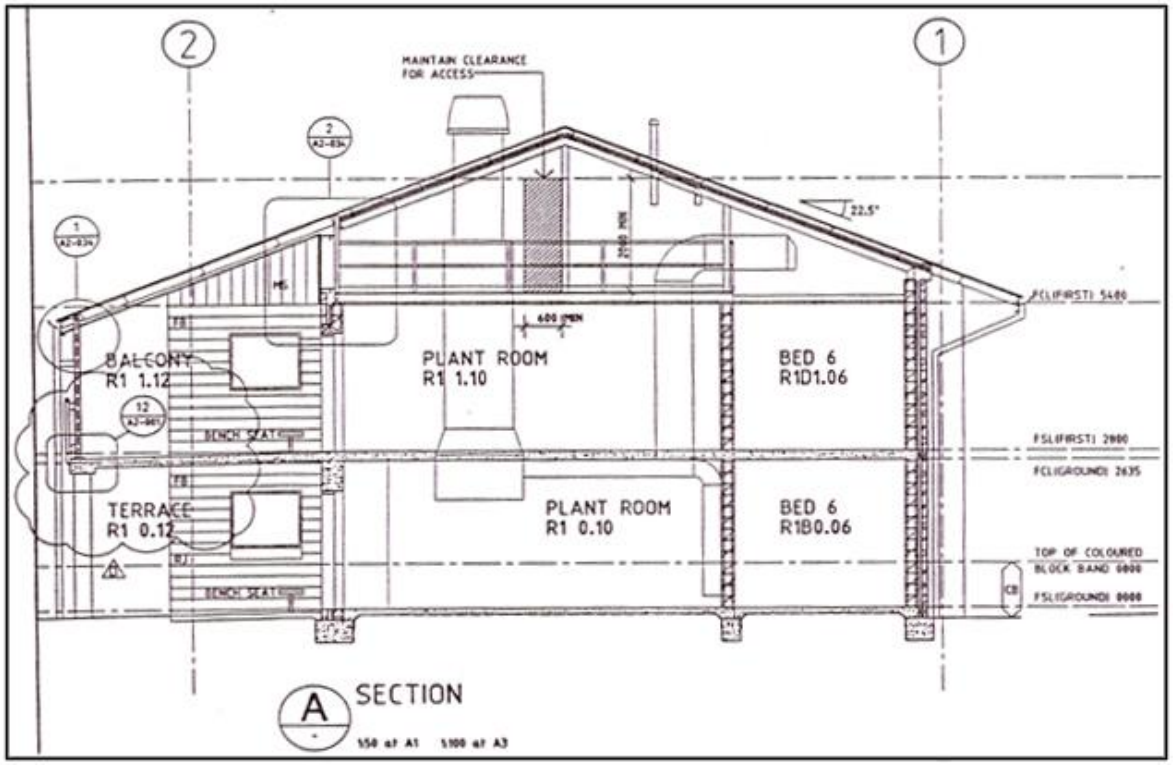
When columns or walls are built they may interfere with these grids so it may require off set grids to be set up. That is the grids may be placed to one side of the actual grid to allow string lines to be placed freely without conflict with such structures. While this is a common practice there should be a denotation stating how far the off sets are placed from grid.



Above is a basic set of grid lines. This is just a plain view showing both sets of grids. Grids should have the letter notation above and the side grids denoted by numbers. The columns on this plan are all central on grid so it is easy to set the columns correctly. If however the columns are not central to grid then there should be a measurement giving either centre of column or face of column in relation to grid.

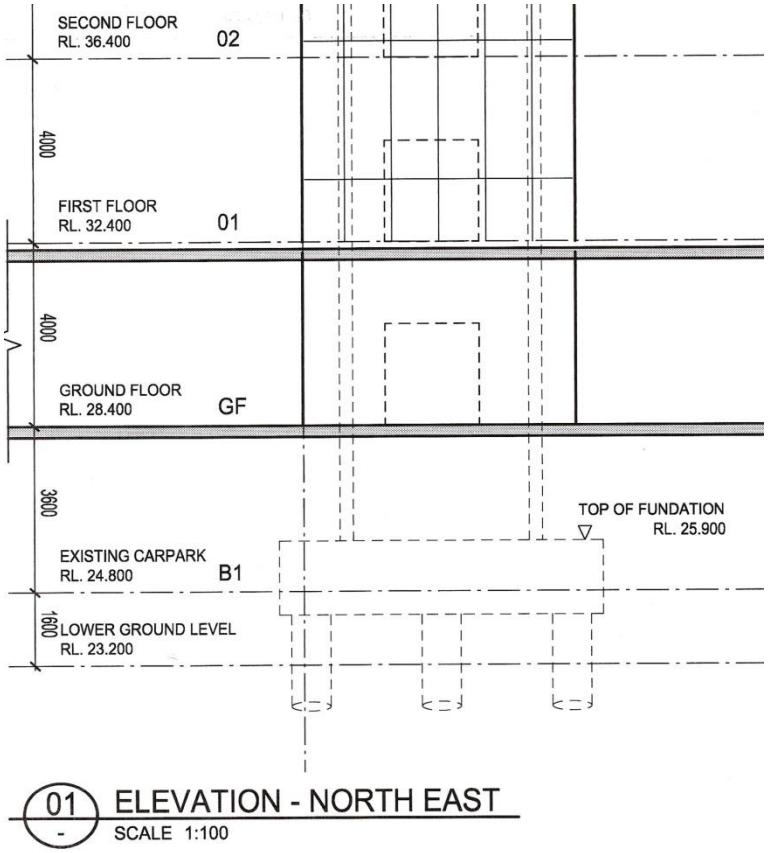
ELEVATIONS

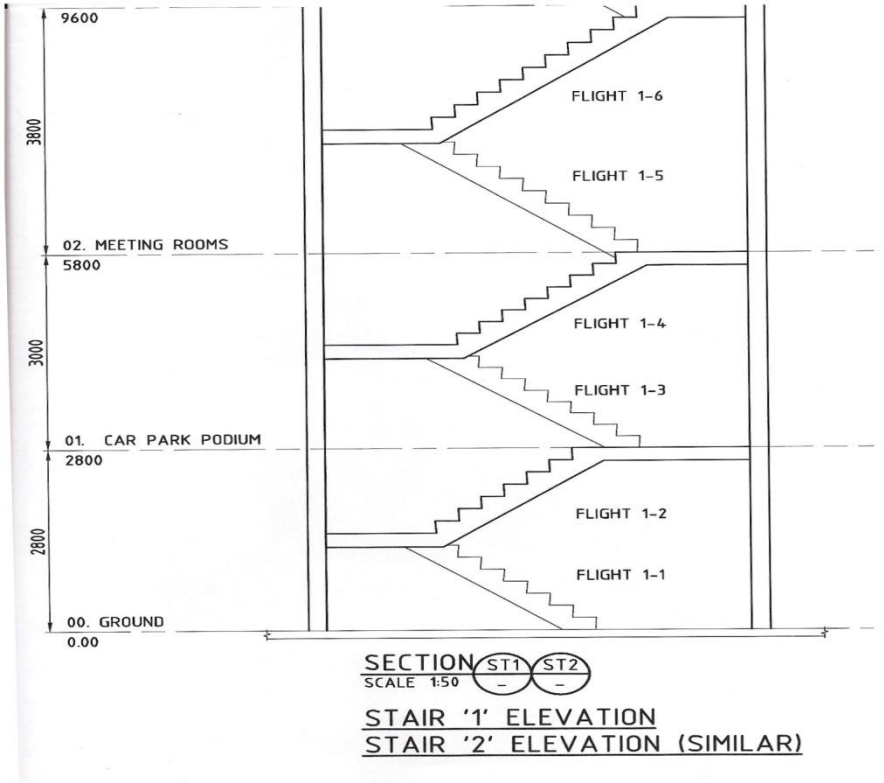
Elevation is the term given to a plan that is viewed from the side. Elevations can be the side of buildings, the side of a beam, the sides of stairs etc. Like a sectional view it is designed to give a different perspective of a structure.



Looking at the elevation above the plan reader can determine; heights of floor levels, the pitch of the roof, and the height of the ceilings, etc. The plan also gives an overall view of the building from each side.

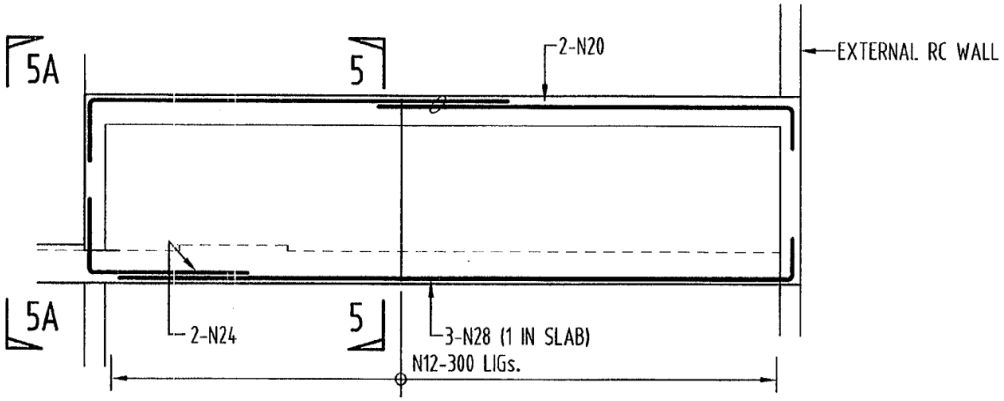
Elevation Example 1



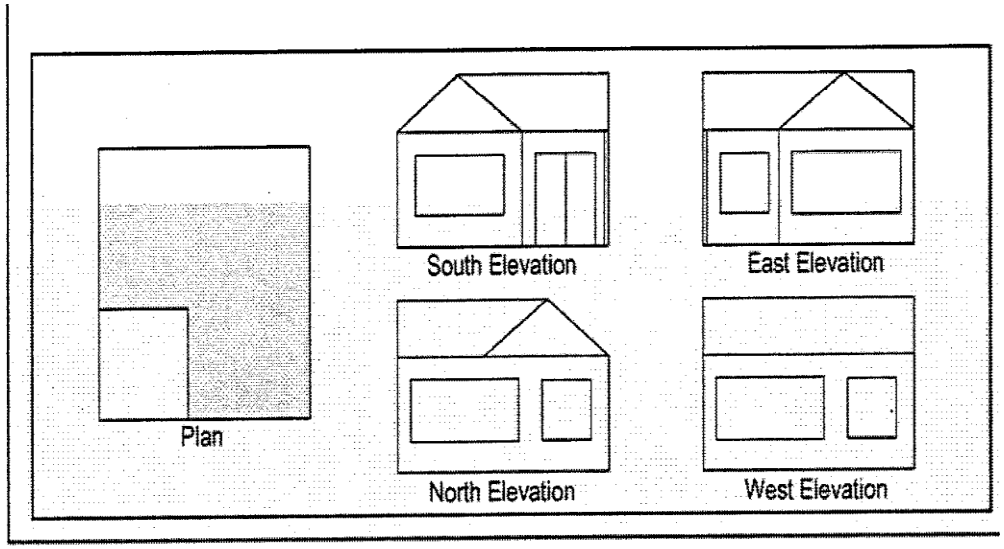


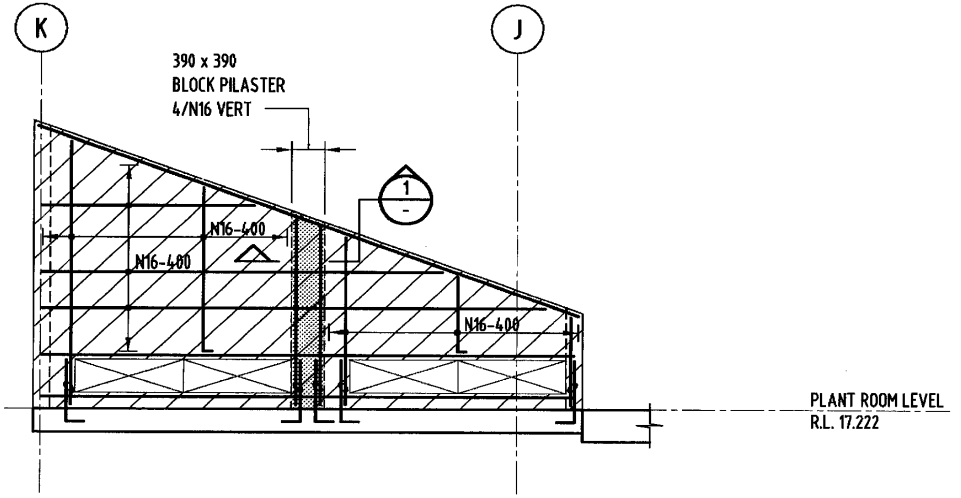
In the above example there are two different elevations; one being an elevation of floors and walls and the other an elevation of a set of stairs. Both set of elevations show the floor heights.

Elevation Example 2



GB7





190 BLOCK WALL ELEVATION

1:50

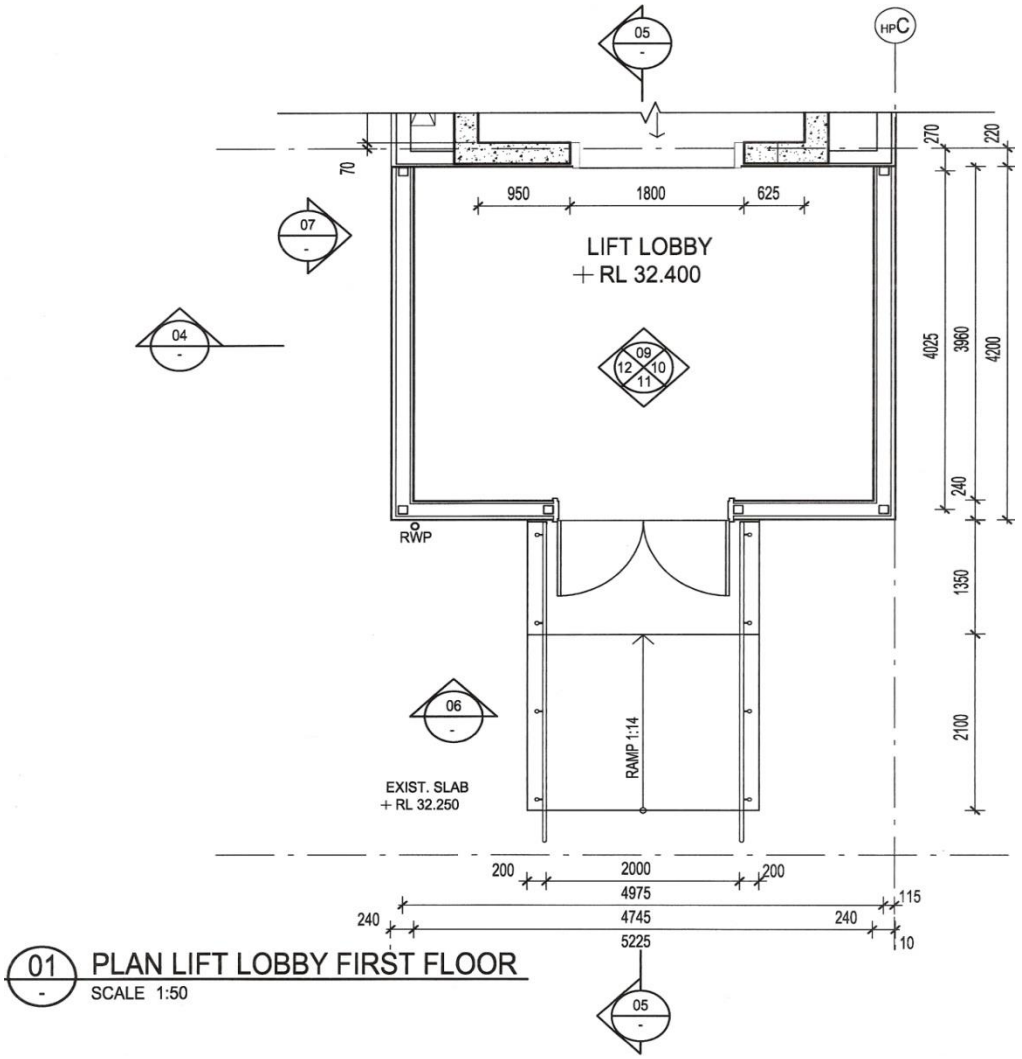
All the above plans show elevations; a ground beam, a block wall and house elevations.

ARCHITECTURAL PLANS

Architectural plans work in conjunction with structural plans. Architectural plans will show the outline of structures like structural plans but will show dimensions of fitments, walls, windows, door and other points of interest that may not fit on the structural plans. If measurements are missing from the structural plans then the architectural plans will need to be examined.

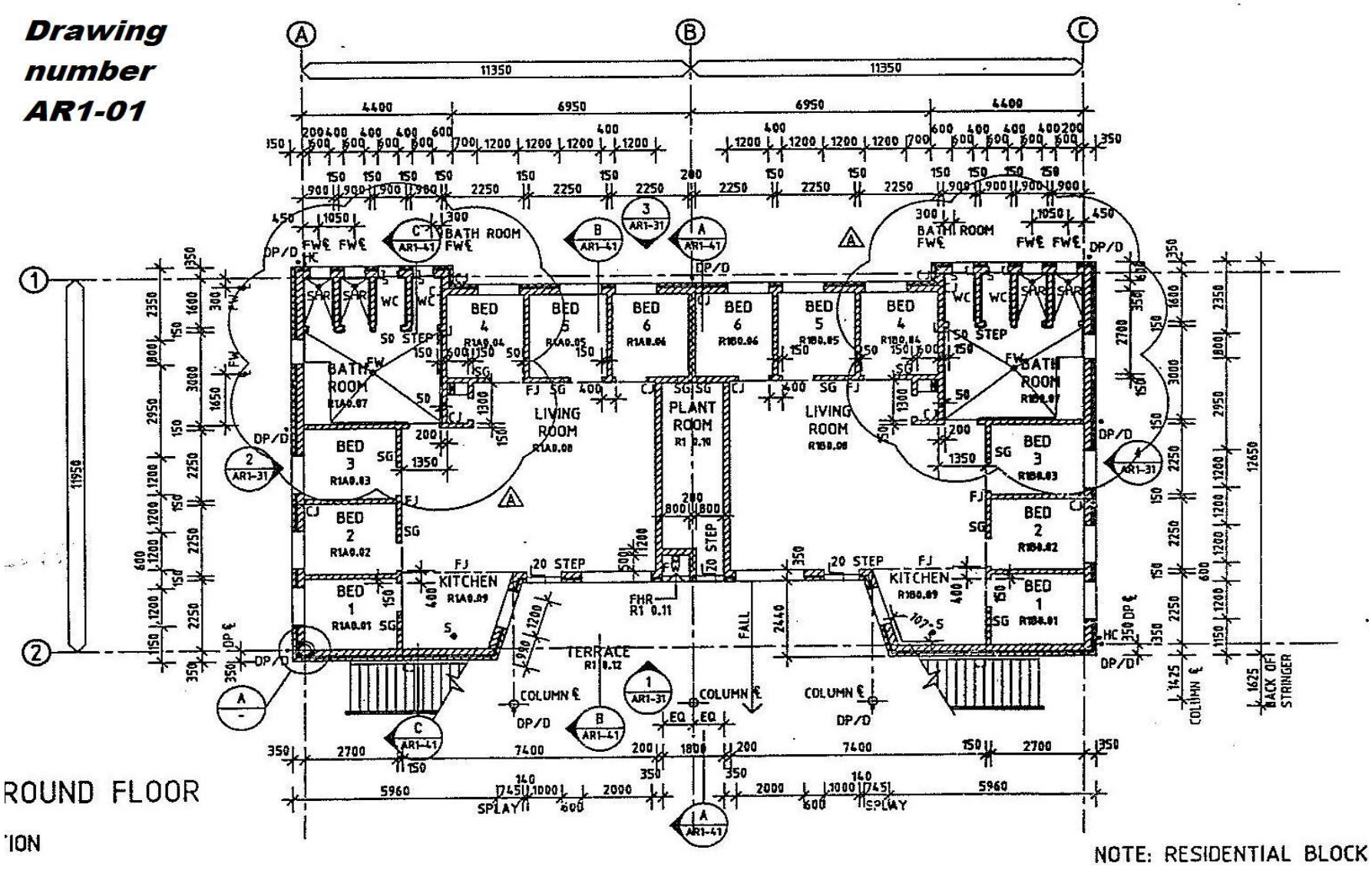
Architectural plans may or may not be amongst the plans available on site. If they are not readily available to the plan reader then they will be found within the site office. In some circumstances these plans may only be read within the office, so a plan reader may have to take notes while reading them and then transfer that information to the project.

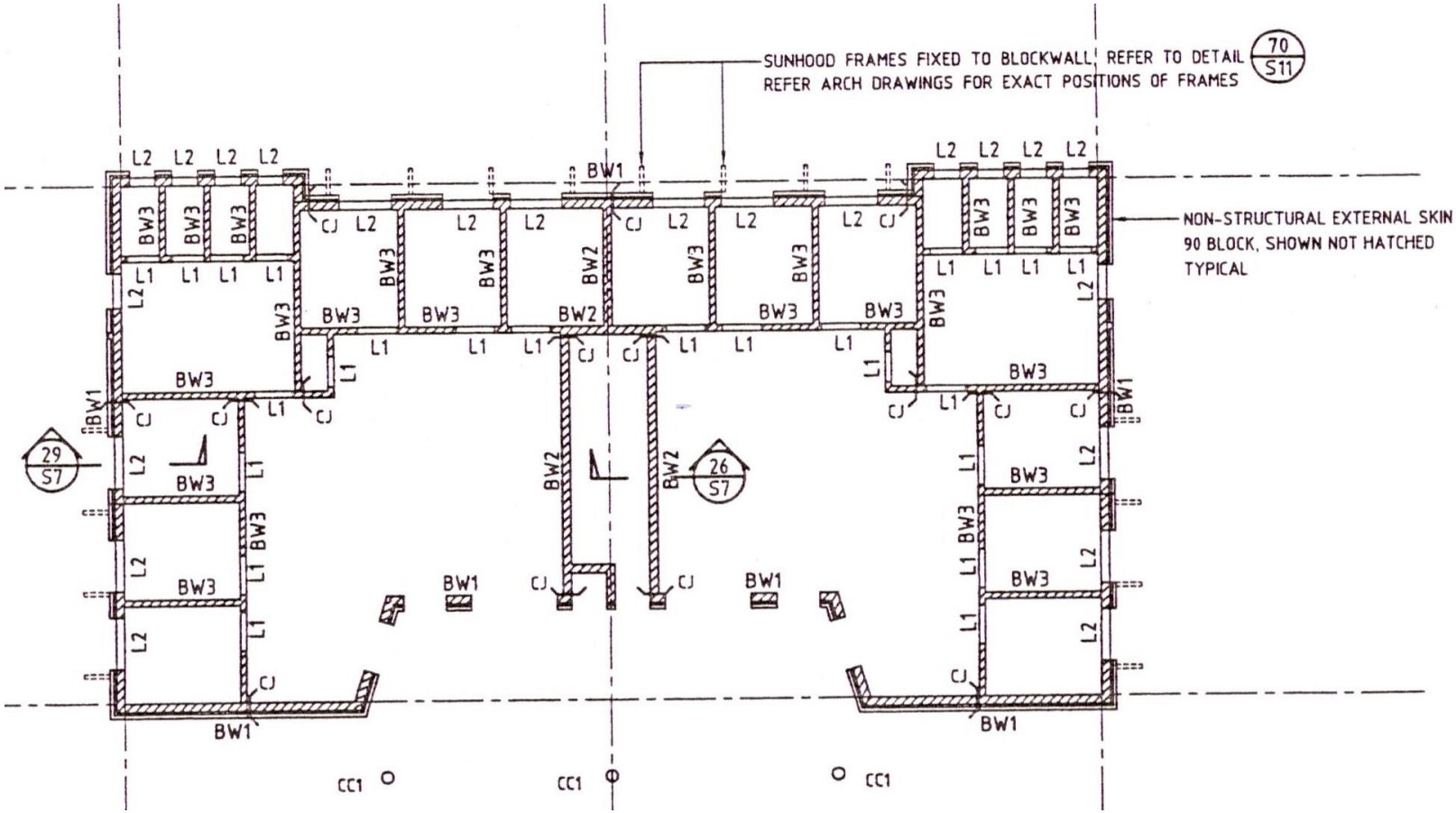
Architectural Plan Example 1



The above architectural plan not only gives measurements for wall and openings but height for the slab. (RL 32.400). There are both internal and external measurements of each room as well the thickness of walls.

Architectural Plan Example 2



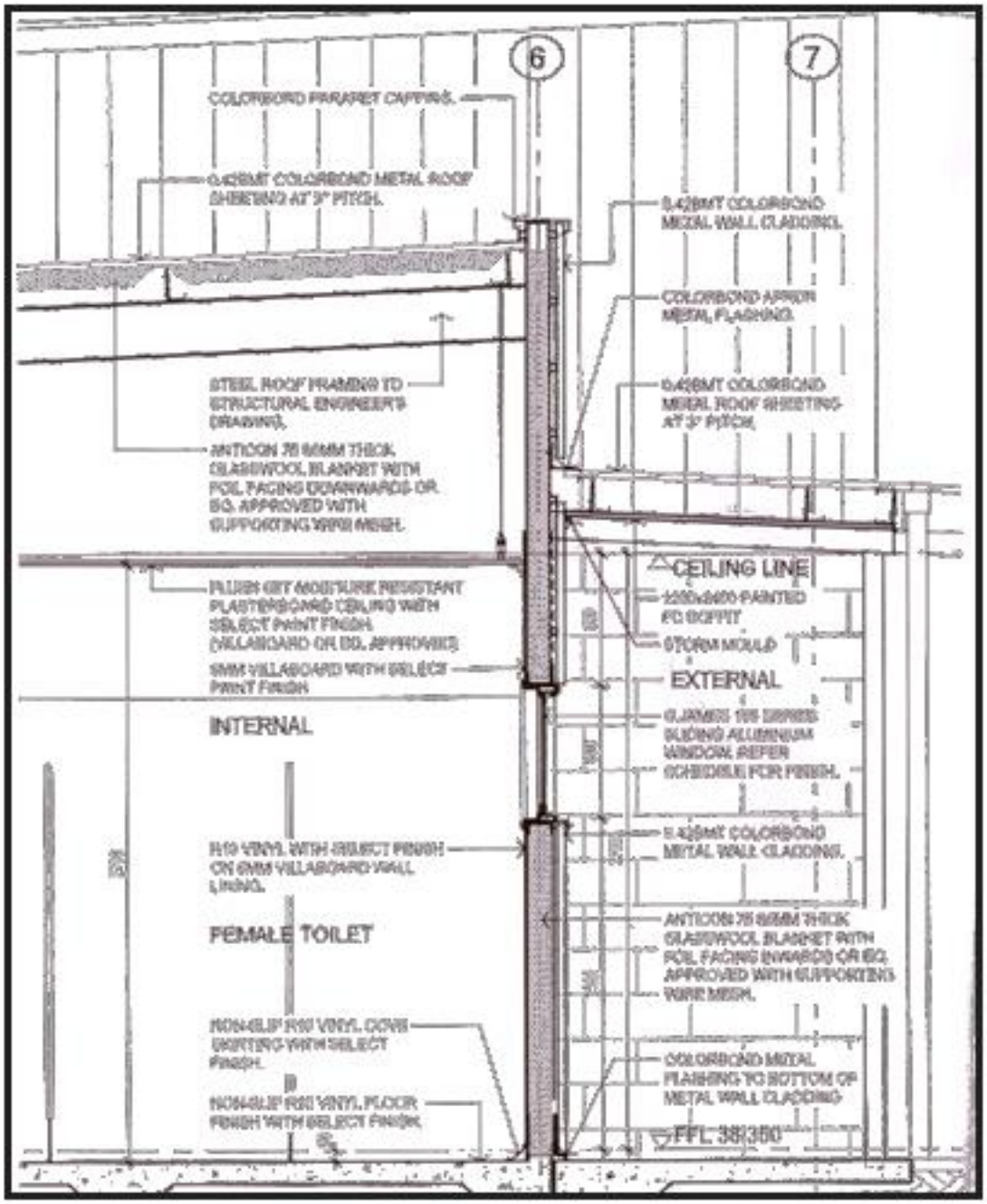


By comparing the two plans, the architectural drawing and the block wall set out above, will allow for correct placement of starter bars

Using the two previous plans as an example it is easy to see how they connect to each other. When setting up for block wall starter bar placements the steel fixer or concreter will need to cross reference the architectural plan for the proper location of the starter bars. By using the grid lines workers can measure from those grids to the exact location of the walls.

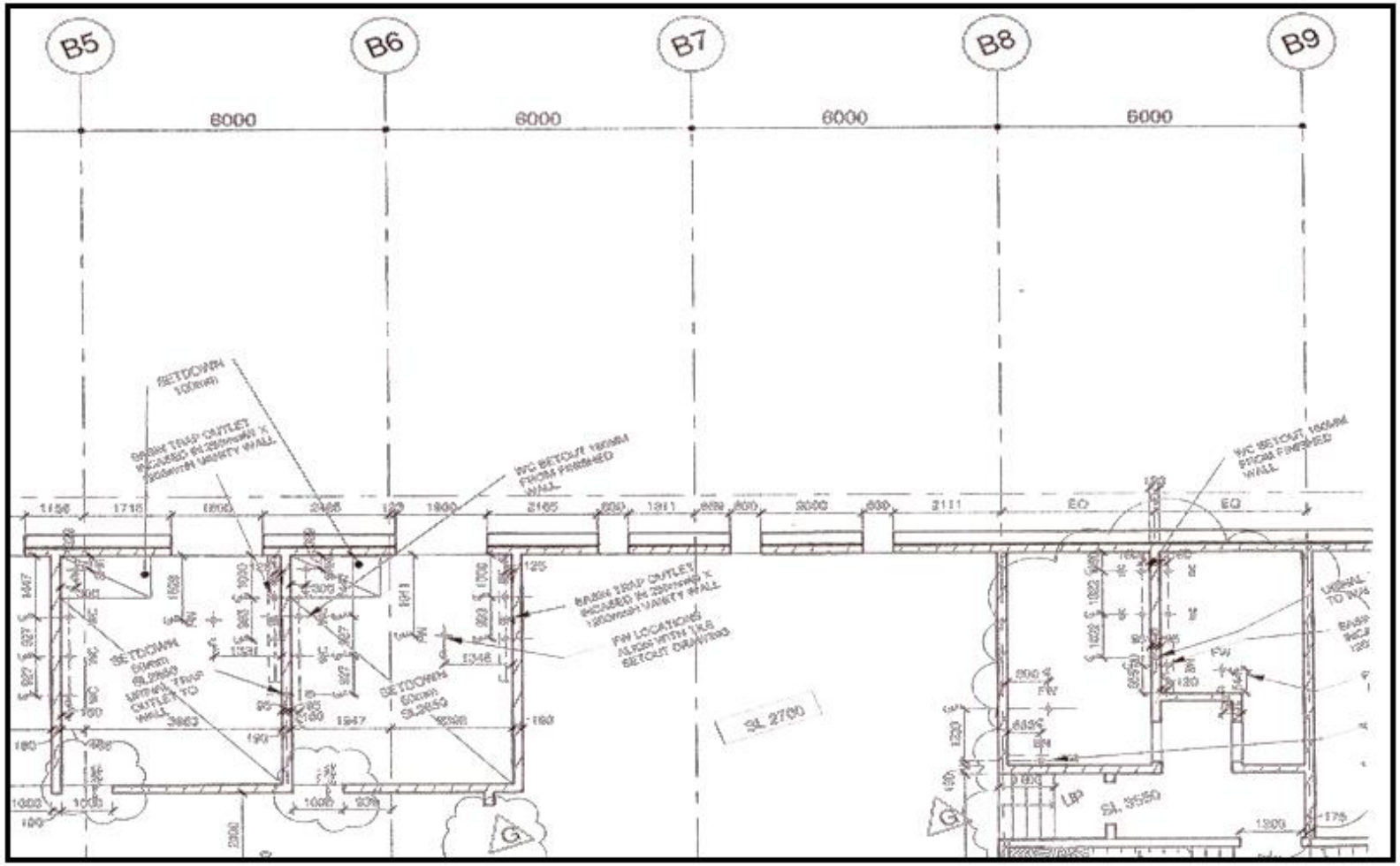
This is a typical use of architectural plans to cross reference structural plans. Architectural plans can give exact location of walls, columns, windows and other points of interest. They can also give height indications and the rise and fall of the ground and slabs.

Architectural Plan Example 3



In the architectural elevation view example above, note how measurements are placed for different points of interest.

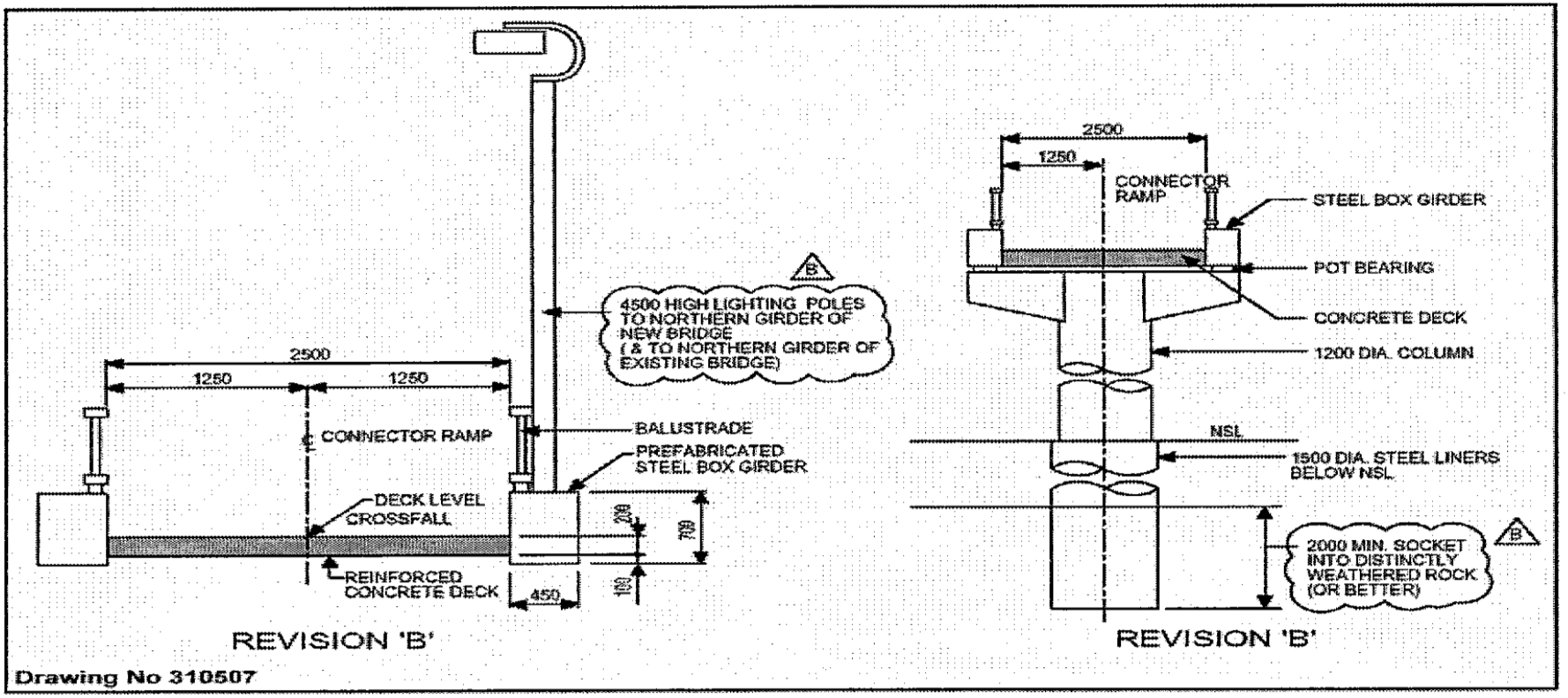
Architectural Plan Example 4



This architectural plan view gives measurements of room dimensions, door openings wall thickness as well as floor heights. When reading a structural plan the corresponding architectural plans will need to be referenced to gain correct measurements.

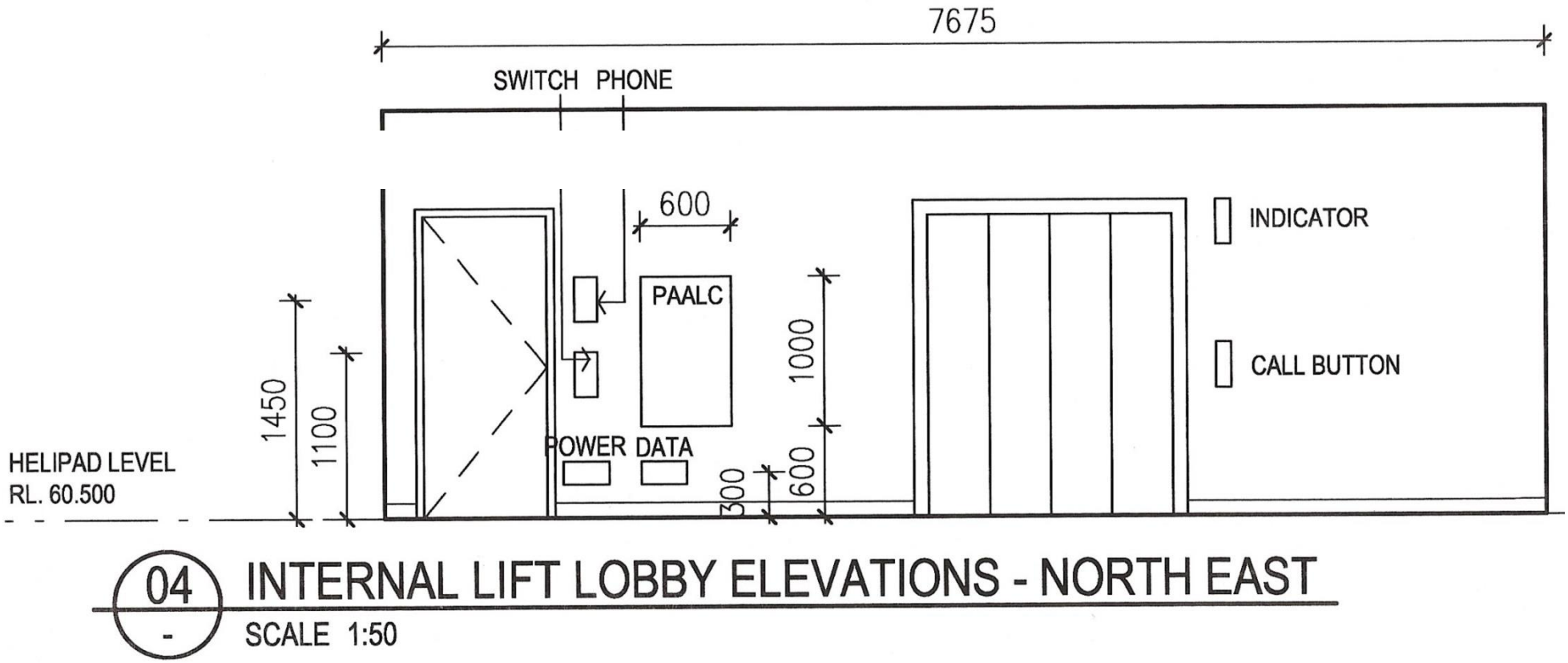
REVISION EXERCISES

REVISION EXERCISE 1



Q1	What revision is this?	Q2	How high is the light post?
Q3	What is supporting the light post?	Q4	What is the diameter of the column?
Q5	How thick is the concrete deck?	Q6	What are the dimensions of the steel box girder?
Q7	What is the plan number?	Q8	What is the diameter of the steel liners?

REVISION EXERCISE 2

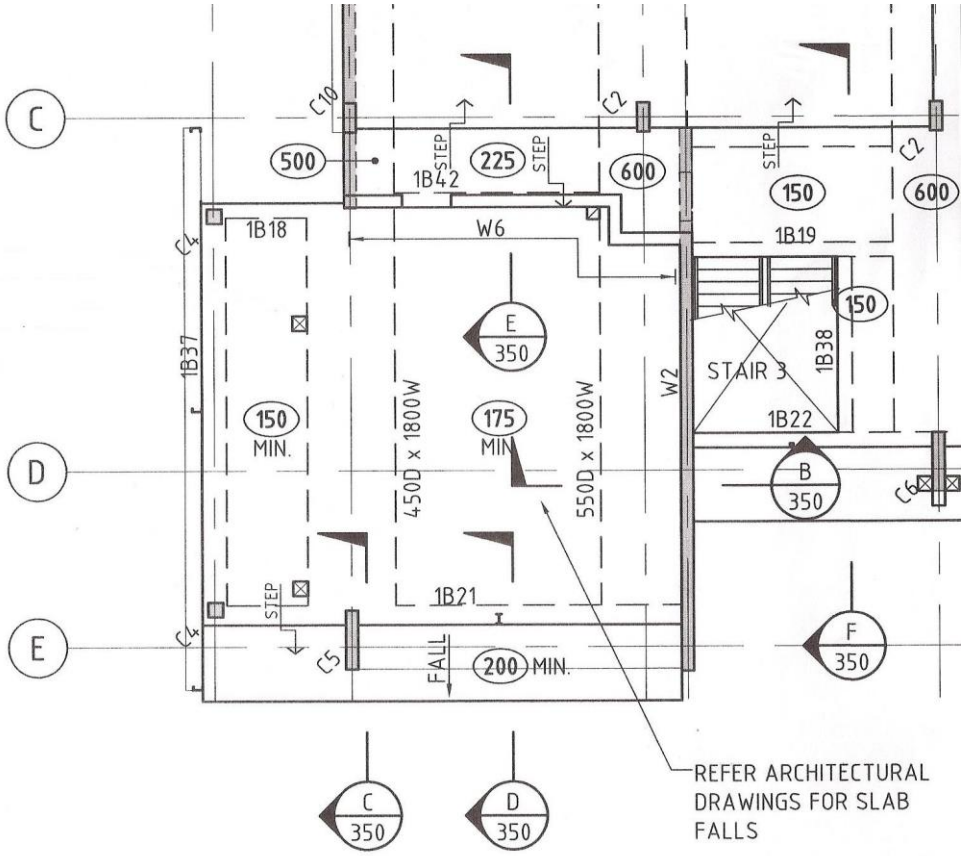


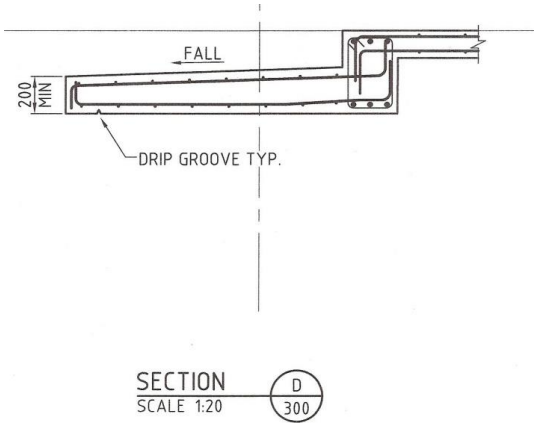
Above is an architectural elevation plan showing heights and other points of interest.

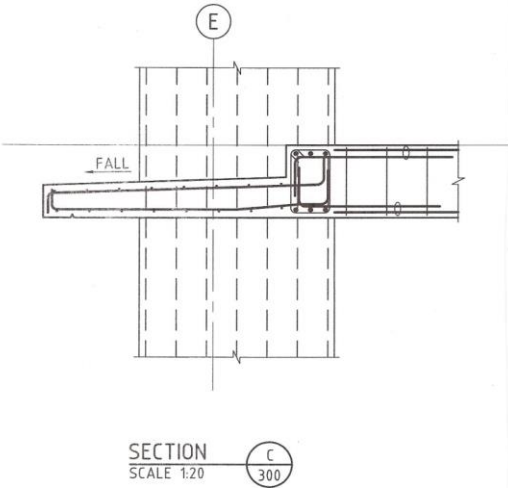
Q1	What is the RL height set at?	Q2	What is this drawing scaled at?
Q3	What is the overall measurement of this wall?	Q4	How far is the data box set from the floor?
Q5	At what height is the top of the PAALC set at?		

REVISION EXERCISE 3

This is a general arrangement plan; (plan number 300).







Q1 How many sections are shown on this plan?	Q2 On all sections what plan are we referred to?
Q3 How many columns are there?	Q4 What is the slab thickness at the top of the stairs?

COMMUNICATION

EFFECTIVE TEAMWORK IN CONSTRUCTION

Several groups generally make up a construction team, such as the architect and engineering team, the owners and investors, the contractors and the staff. All team members share the common goal of wanting to complete the project, but they may also have conflicting priorities. Owners may want value for money, while the architect and engineers are concerned with aesthetics and safety. Aligning these interests and completing a project on time and on budget require teamwork from all participants.

Team Goals

One of the first steps in building an effective team is to define the goals of the project. In construction, this can involve a preconstruction meeting or a walk-thru. Everyone should agree on the objectives, such as using green construction methods, emphasizing safety and staying within the budget. Goals should be measurable and specific. For example, when setting the project schedule everyone should agree on goals such as providing fast replies to requests for information so the builder does not lose any time.

Establishing Trust

One key to working effectively as a team is for team members to respect and trust each other. In construction, people from different professions, such as contracting and architecture, must cooperate closely and it may be difficult for these people to understand each other's' approaches to a problem. Members of the construction team should spend time getting to know each other, learning a bit about the work they each do. This can help team members trust that the other people on the team know their jobs well and can accomplish what they set out to do.

Responsibilities

When working as a team, each member has different duties and responsibilities. To function effectively, team members must understand these, as well as the duties and responsibilities of the other team members. At the beginning of the project, each team member should set out what he is responsible for. This will prevent overlap of duties that can cost money and cause confusion. For instance, design engineers need to make field visits to confirm that the engineering specifications they are liable for are being met. The architect or contractor should not be doing this job.

Risk Management

At the beginning of the project, team members should decide what risks there are and allocate responsibility for managing those risks. For example, a shortage of labor may cause expensive project delays, a failed building inspection can require expensive alterations and injuries on the work site can delay work and add costs. Teams should prioritize the risks, based on the likelihood and consequence of their occurring, and then develop a plan for mitigating or reducing each risk.

How to Communicate Well With People from Other Cultures

When working in a team you should understand that people from other cultures might have entirely differently value systems than yours, but still not be explicitly wrong.

Different cultures have different norms regarding what personal space is public (in which other workers can stand and converse with you) and private (reserved only for your family and friends). For example: Arabians do not share the concept of "personal space" that Aussies have. It is considered offensive to step or lean away while talking to an Arab! Make sure you create proper distance between others when you talk. If you're unsure, you can always ask the others what they would like.

Never belittle another's religion: Remember, most people believe passionately in their religions, and what strikes you as unreal, may be your co-worker's strong belief. If you have trouble dealing with it, you may wish to skirt the topic of religion altogether.

Many people from a different cultural background think Aussie relationships are superficial (with a brief "good day, Jim", and never a backward glance). Aussies might think relationships in other cultures are too sentimental. So, know that if a person strikes you as too fluent or too withdrawn, it may be considered normal in their culture.

Make an effort to learn about their culture. Learn about the greetings, the goodbye rituals, the before-meal ceremonies, the food, the clothes. If some catch your fancy, you might even try them! This will help you understand your workmates from other cultures.

Even the best communicators fall short when jumping across the vast cultural chasm. Humor and non-defensiveness are the best bridges at such times.

If in doubt just ask. There is no better tool for effective communication. If something strikes you as funny or inappropriate, if you feel the other person is neglecting you or is offended, simply ask him what you can do to remedy the problem. Grievances are like silence- broken when they are spoken out.

Communication Equipment

Mobile Phones

Mobile Phones are common in all businesses today, however they pose significant safety issues on a construction site, such that they are often banned. Most safety issues relate to users being distracted from their work tasks whilst on a mobile phone. For example, in Queensland 2010, a Stop Slow Operator was killed by a reversing truck because he could not hear the reverse beeper. Another common issue is how operators tend to walk around during a conversation and presenting risks of slips, trips and falls. Precautions to follow when using a mobile phone include:

- do not operate a mobile phone on a site where they are banned.
- if you are allowed to use a mobile phone onsite, do so in a site office.
- hold onto a stationary object whilst talking; to stop yourself walking.
- if you have to use the mobile phone, only do so during break times.

Two-Way Radios

It is important that the two-way system provides clear and immediate signals without interference. There are two types of two-way radio - conventional and trunked.

Conventional Radio

Great care is taken when allocating frequencies to make sure that there are no other operators using the same frequency in the area. It is not possible, however, to control radio users in the field who may be using the frequency in the wrong area.

Always use a good quality system from a reputable company with a properly allocated frequency for the area. Interference on your frequency can be a safety hazard. If there is continual interference have the systems checked or a new frequency allocated.

Trunked Radio

Trunked radio is a computer controlled two-way system that locks other radio users out of your frequency. No other operator can cut in and overpower your signal. With trunked radio it is possible to have several separate groups on one building site communicating by radio without interfering with each other. Trunked radio is recommended for large city building sites.

Using a Two-Way Radio

To make a call on a UHF

1. Hold down speech button for 2 seconds before speaking,
2. call the other persons by their call name the say over,
3. wait 2 seconds then release the button,
4. after hearing the response wait 2 seconds,
5. then hold down speech button for 2 seconds and say who is speaking then pass on the message, when finished say over,
6. wait 2 seconds and release the speech button.

   Repeat the above procedure until complete then say over and out.

Computers

It is essential that today's worker has a good understanding of computers and software. Computers play a big part in site communication and compliance. The computers at your work site may include:

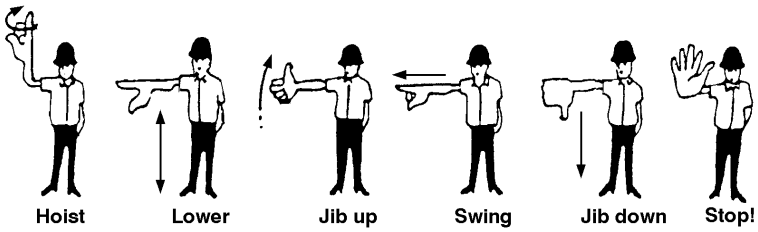
- Desktop computers
- Laptops
- Smartphones
- Notebooks
- Tablets (Ipad/Android)

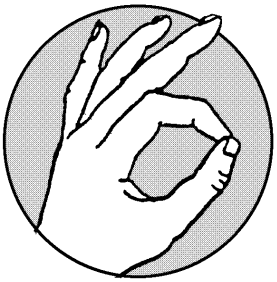
The methods used to access and operate a computer will vary from model to model and from site to site. If you are issued with a computer as part of your job role it is important that you read the operators manual and all associated software documentation. These devices carry a risk of fire or explosion if used incorrectly or in an environment that they are not designed for. Always refer to the manufacturer's instructions for correct and safe use.

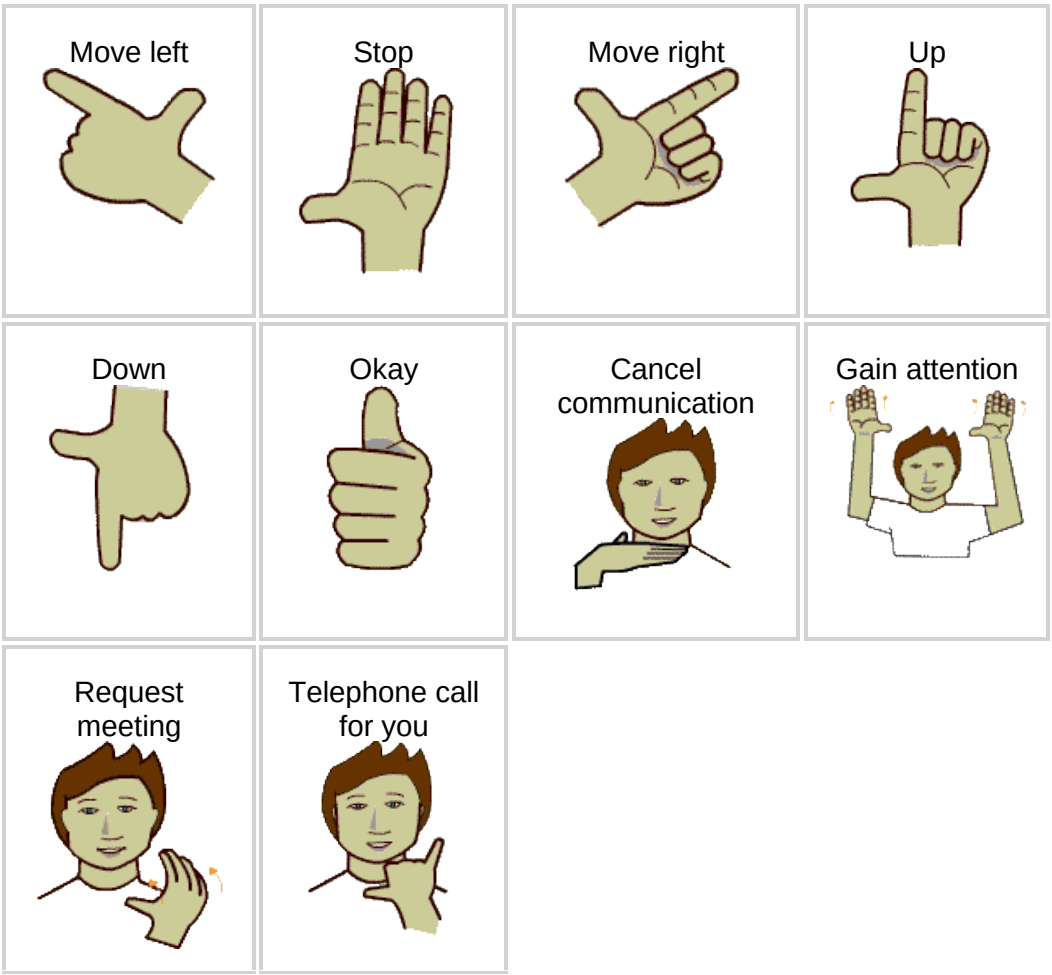
Using Signals to Communicate with Others

Visual communication, (consisting mainly of hand signals), is a type of non-verbal communication that is often used in the construction industry. Hand signals may be used when it is too noisy to talk to a person or the person is too far away to hear you. There is no Australian standard relating to hand signals so you will need to check with your supervisor to learn what signals are used in your workplace. Look below at some of the most common hand signals that may be used in your workplace.

These are abundant and cover thing like road signs, maps, safety signs, graphs and signals.







Specific hand signals are used to guide:
- crane operators
- surveyors
- truck drivers
- excavators
- traffic

Other workers may use hand signals or body gestures to tell you to:
- watch out for danger;
- stop what you are doing;
- stay where you are;
- get out quickly;
- watch out above you;
- watch out underfoot or below you;
- watch out behind you;
- lift something in unison;
- lover something in unison;
- 'go over there';
- 'come over here';
- 'come and help quickly'.

Facial expressions may tell you if another worker is:
- concentrating on the task at hand;
- in difficulty;
- confused;
- happy;
- angry;
- frightened;
- in pain;
- ill.

Posture, colour and breathing may indicate:
- illness;
- injury
- poisoning;
- poisonous bite/sting;
- sunburn
- dehydration
- asphyxiation
- intoxication
- staggering from illness or injury.

Communicating Health & Safety in the Workplace

Construction work is undertaken against a background of myriad regulatory and legislative requirements. This is because it is a high hazard industry that is required to meet the many legislated and regulated demands for safety and quality. All forms of construction work performed on a worksite will be underpinned by these legislated and regulated demands no matter how small the task may seem. For example before a worker may even set foot on a construction site they must have undertaken induction training to meet health and safety requirements. These requirements do not end at the induction process; particular work roles, tasks, practices, systems, settings, processes, materials, machinery, equipment, in fact everything will be guided by regulated and legislated requirements for safety and quality in a construction setting.

As a worker you will be required to undertake training and induction to understand the regulated and legislated requirements that affect your particular work role and work area. This knowledge will enable you to understand your duties and to guide the way you are expected to perform your work according to these requirements. These requirements are typically guided by the following types of requirements and guidelines:

Acts

An Act or Statute is a law made by Parliament. In Australia, Acts are made by the Parliament of the Commonwealth of Australia, State Parliaments and the legislatures of the two Territories. The types of Acts that generally apply are:

- Commonwealth Acts - these generally apply throughout Australia; and
- State and Territorial Acts - apply within the boundaries of the enacting State or Territory.

When an Act is passed by Parliament it is complete in itself and has been enacted for a particular purpose. These are known as principal Acts. An Act is essentially a sequence of provisions containing statements and rules designed to give effect to a particular policy. What is achieved by the Act depends on the interpretation of the provisions.

An Act generally deals with all matters of importance for the implementation of a particular policy. Matters of detail and matters likely to experience frequent change are generally contained in subordinate legislation. Within an Act all persons are required to comply with legislation that applies to them. An Act is a public document and is not confidential; they can be found on Federal and State/Territory websites.

As a construction worker you will be required to understand the Acts that apply to your position. Examples may include: Work Health and Safety Act; Electrical Safety Act; Environmental Protect Act; etc.

Subordinate Legislation

Acts are usually general in nature, establishing broad principles. Subordinate legislation will contain the many details necessary to ensure that the Act will operate successfully.

Subordinate or delegated legislation is a generic term for a variety of legislative instruments including:

- Statutory Rules;
- Regulations;
- Ordinances;
- By-laws; and
- Rules.

The most commonly encountered subordinate legislation encountered in the construction industry is Regulations. Regulations will contain the many details necessary to ensure that the Act will operate successfully. A regulation is a legal provision that creates, limits, or constrains a right, creates or limits a duty, or allocates a responsibility. For example the Act will state what must occur whilst the accompanying regulation will also state how this must occur; what is required; who is responsible; and any penalties for non-compliance. A Regulation is a public document and is not confidential; they can be found on Federal and State/Territory websites.

As a construction worker you will be required to understand any Regulations that apply to your position. Examples may include: Work Health and Safety Regulation; Electrical Safety Regulation; Environmental Protect Regulation; etc.

WORK HEALTH AND SAFETY ACT 2011

For construction, in particular ensure that you maintain your awareness of health and safety legislation and requirements. According to the Work Health and Safety Act 2011; a person is a worker if the person carries out work in any capacity for a Person Conducting a Business or Undertaking (PCBU). This includes: employees, contractors, subcontractors, outworkers, apprentices and trainees, work experience students, volunteers and PCBUs who are individuals if they perform work for the business.

While at work a worker must take reasonable care for their own health and safety and that of others who may be affected by their actions or omissions. They must also comply, so far as is reasonably able, with any reasonable instruction given by the PCBU and any reasonable policy or procedure of the PCBU to comply with the WHS Act and WHS Regulation. Examples of how you must comply may include: comply with the site safety plan; comply with safe work procedures.

< http://www.safeworkaustralia.gov.au/sites/swa/model-whs-laws/model-whs-act/pages/model-whs-act >

Safe Work Method Statements (SWMS)

Safe work method statements (SWMSs) assist an employer or self-employed person to consider how certain activities will be carried out safely. The following should be noted:

- SWMSs must be easy to understand, signed and dated;
- SWMSs must be amended if there is a change in the activity and a copy must be given to the principal contactor; and
- all persons affected by changes must be advised of amendments to the work method statement.

The Work Health and Safety Regulation (2011) states that where a PCBU is required to carry out high risk construction work, a safe work method statement must be prepared, or have already been prepared by another person, for the proposed work before that work commences.

Job Safety Analysis (JSA)

A Job Safety Analysis is essentially the same documentation and process as a SWMS however; a SWMS is often a general overview of how a construction activity must be carried out. A JSA is often used by many employers to identify specific hazards or emerging hazards at the start or finish of a given day of work.

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