A SIMPLE GUIDE TO PLAN DRAWING

To obtain the relevant permissions to build from the Planning and Building Committee you need to submit drawings of the proposal to accompany the application forms. This is so that the Committee, as advised by the technical officers can see that your proposals are satisfactory and make any recommendations they feel are necessary.

It is often unavoidable for applicants who need such permits to resort to their own efforts in preparing the drawings. To help those who may be a little unsure of how to go about it we have prepared a few notes. These are pointers only and do not provide an exhaustive list. It would be quite possible, without writing a book on the subject, to include all the facts, but you can make reference to some pre-prepared information sheets we have which are called “Preferred Construction Details” (referred to in these Notes as “PCDs”).

They advise on the construction of timber-framed external walls, foundation design, avoiding risks in a (cold) roof space such as condensation and pipe freezing, installing heat-producing appliances (peat and oil-fired boilers and stoves), ventilation of dwellings and so on. Most of these are available as electronic copies and as hard copies that are readily available from the Environmental Planning Department.

Please feel free to come and ask if you need more assistance. It may be advisable for you to telephone the department first on 28480 to make sure the Building Adviser is available to see you.

All Drawings

Need to be to scale:
1:50 or 1:100 for general plans, elevations etc
1:50 for details such as sections.
1:200 or 1:500 Block (or Site) plans
You may find it helpful if graph paper is used to get lines straight and at right angles to one another. If you are more confident draw on larger sheet of paper which can then be duplicated at the Print Shop or The Design Office otherwise keep to A3 (about 297mm x 420mm) size sheets of paper which can be photocopied.

Show on all drawings the scale it is drawn to, name of the person for whom it was drawn (yourself if the project is for you) and which way is north (an arrow pointing from a letter 'N').
Sign and date the drawing which establishes its validity – it is a legal document which forms the basis of the building work. Any subsequent revisions will need to be noted and dated.

The Block Plan

This indicates the building plot boundaries, the positions of the intended building and any buildings which already exist on the proposed site. It should also show the position of any buildings immediately adjoining the proposed site as well as the name of the owner of such building or buildings. To complete the picture, show on the block plan the proposed lines of the water supply and the drainage of the intended building. A red line drawn around the plot boundary will indicate just how much of the land shown on the drawing is for the benefit of the building. If a new access (pedestrian or vehicular) is proposed then show its position – it is also helpful to the Committee if you indicate the location of any existing access, especially if you intend to alter it.

The Key Plan

The key plan (to a scale of 1:2500) provides the initial clue to the Planning and Building Committee of where the building plot is situated. Of course if the plot is at the corner of two streets then this is not necessary as the block plan will show this information, but if on the other hand, it is remote from other identifiable land marks or – perhaps – in the middle of a long street then a key plan is needed and can usually be supplied by the Public Works Department if given a little notice of what is needed.

The Building Plans

These usually comprise the elevations, sections and plans of every floor of the intended building. They are accompanied by a written description of the materials with which it is proposed to erect the intended building and to provide drainage and services to it. Generally these details are referred to as the 'Construction Notes'.

Floor Plan(s)

Most people will start their drawing with floor plans. It is from these that elevations of the building and cross sections are derived. Having decided on room layout, draw the walls with their thickness shown to scale and include in them openings for doors and windows.

Now write on the floor plan in each room or space the intended use to which it will be put.

The location of sanitary fittings (wc, hand basin, bath, shower, kitchen sink etc) must be shown. Although it is appreciated that this final positioning may be subject to change, you will need to plan ahead to some extent to be able to include the main drainage runs and associated pipe work. This should tie in with the drain runs to be included on the block plan.

Rain-water downpipes to serve guttering and the drainage which leads from them to a soakaway or if permitted, to the main drainage. If connecting to the main drainage you must provide a trapped gully at each drain head.

Single and two storey buildings can have balconies, ramps and landings. Do not forget to include these if they are to be provided together with any steps, stairways and their associated handrails. It is not unknown for a house plan to be submitted without the all-important staircase when there is need for one.

The need to include some method of heating the building is often put to the back of one's mind as an item which is to be thought about nearer to the time of the physical start on site of construction. Due to the importance of ensuring proper safety measures are incorporated it is essential that this item is planned for now and included on the drawing. If a change is to be made in the type or position of the appliance sometime after the plans have been given the approval it is not a difficult matter to provide the new information and obtain confirmation that there are no objections if all is in order.

So, on the floor plan show a hearth of sufficient dimensions formed of incombustible and non-heat conducting nature – if solid fuel is to be burnt then a 125mm minimum thickness concrete slab is needed and this will be under the stove and project from it (see PCD No 5 for more information on this).

However, if an oil burning appliance is to be installed and the manufacturer has confirmed, in writing that the surface temperature of the floor below it is unlikely to exceed 100ºC, then it can stand on a rigid, imperforate sheet of non-combustible material without the provision of a constructional hearth. If the surface temperature at the sides and back of the appliance are similarly unlikely to exceed 100ºC then no further precautions to the surrounding wall structure are needed. Where temperatures are likely to exceed 100ºC then a hearth of 840mm minimum square non-combustible material (e.g. concrete); protection, or shielding, of the backs, tops and sides of the appliance from combustible material is to be effected by a shield of 25mm thick non-combustible material, or an airspace of at least 75mm. PCD No 4 explains this more clearly.

You can also include a note about the flue pipe or chimney on the floor plan although this may be more appropriately shown on the cross section through the building. If a "factory-made insulated chimney" is proposed (sometimes known as a "twin-wall chimney") then show the type and size and state it will be isolated from all combustible material by the minimum distance recommended by the manufacturer after test – usually 50mm but may be 63mm, depending upon which manufacturer's product you are buying.

Where the chimney passes through a cupboard, storage space or roof space it has to be cased or surrounded by a non-combustible guard to prevent damage which is set at the same minimum distance from the outer wall of the chimney as for isolation from combustible material (usually 50 or 63mm).

It is worth noting that several peat-burning appliances require the first metre of chimney to be vitreous-enamelled steel piping to cope with the higher temperature experienced at that point – add this to your drawing if applicable and once again note the isolation distances from combustible material given in PCD No 5 for flue pipes.

Termination of the chimney above the roof can be shown on the cross-section, but before leaving the subject of heating appliances a thought must be given to how they can receive enough air to make them work properly. In these days of demand for added comfort, with draught-proofed windows and doors, and the need to keep heating cost down as much as possible (even the collection and delivery of peat is never entirely free), the amount of air which squeezes into the room where the stove is sat can rarely be sufficient unless particular thought is given to the matter. The simplest answer, and one which will avoid discomfort to the room occupants, is to arrange ducting below the floor (and sloping to fall towards the outside of the building) which terminates as near as possible to the appliance. For a closed (that is non-opening) peat burning appliance or an oil burning appliance you need a 110mm diameter pipe duct, such as a standard drainage pipe, for a 60,000 BTU (17.55kW) stove, and two pipes (of 762mm and 1016mm diameter) for an 80,000 BTU (23.4kW) stove. If the building has a suspended timber floor then it is often possible to provide a grilled outlet in the floor near to the appliance bringing air from the ventilated sub-floor through the floor insulation and into the room.

Cross-section(s)

These show the most important part of the information to be included on drawings. If you can imagine slicing through a building with a big knife and then looking at the walls, floors and roof where you cut through them; this is what you see in a section which should appear on the drawing.

Begin by first drawing a line across the floor plan – that will determine where the walls will appear on the cross-section, and any openings such as windows and doors.

Now draw the walls with vertical double lines (for width of each wall) and which will show the building width. Horizontal lines will next show the floor and ceiling – again with extra lines to indicate the construction by thickness/depth of each part.

Move on now to show ground level, which will usually be 150-225mm below floor level then the concrete foundations – size will depend upon the load to be supported and load-bearing capability of the ground, but if 150mm thickness by 400mm width is shown with the bottom 600mm below ground level then that will usually be sufficient providing you add a note that the final design and depth to be dependent upon site conditions (which you will only discover when you start to dig). PCD No 6 will be found useful when you commence construction of these.

You now have the outline of the walls, their foundations, the floor and the ceiling. A damp-proof course (dpc) in each wall is a "must" and should be placed at least 150mm above ground level. Working upwards, now include in the walls those window and door openings through which the line of your floor plan crossed, and make provisions for lintel support over them.

The roof is now to be drawn and will include all the timber sizes and their centres (spacing between each member), under sheeting (or sarking felt), cladding on top to give a weather resistant "hat". To keep your heating bills down and provide comfort, insulation is installed in the roof void. Ideally it should be 200mm but could be as little as 150mm fibreglass above a plasterboard ceiling and still comply with the Building Regulations.

If the roof and ceiling members are to be formed as trusses, then show enough information on how they are to be joined together.

Ventilation of the roof void is needed because of the inclusion of insulation at ceiling level will give a cold loft space above. The idea but is that an airflow in the void will remove water vapour and condensation which will form on the underside of the roof and prevent rusting of nails and other metal fixings. In the worst cases of un-vented roof spaces timber has been known to rot and the insulation in the roof space can get sodden. Pitched roofs (the usual type seen here) should be vented on two or more sides to achieve "cross-ventilation" using the equivalent of 6mm width continuous ventilating strips.

External wall outline now needs to be "filled in" and added to with information on construction. If we assume timber frame and timber cladding above the dpc then the following notation, or similar, is needed working inwards from the external cladding –

> "Clad with horizontal boarding 18mm x 100mm fixed with non -corrosive nails to 38mm x 50mm vertical battens on breather paper secured to 9.5mm plywood sheeting on timber framing 50mm x 100mm at 600mm centres nogged at 600mm spacing. 100mm glass fibre insulation quilt within framing. Vapour barrier of 500mm gauge polythene having all joints sealed with tape and fixed to inside face of framing, and covered with 12.5mm plasterboard.

The last part of that specification should be altered if, as could well be the case, electric cables are to be buried within the walls and therefore covered by thermal insulating material which can cause the cables to overheat with risk of short circuit or fire. A simple and inexpensive remedy is to fix battens over the polythene vapour barrier and create a "service duct" before fixing the plasterboard. Alternatively, route the cables in surface mounted trunking (not so

visually attractive) or get your electrician to use larger sized cables with a derate factor of 0.75 (especially important where they serve cooker points and electric shower units).

Below the dpc show concrete blockwork, or a concrete upstand beam cast integrally with the foundation – both 150mm in width. Another option would be to show pads and piles with a ring beam on a dpc between. Anchoring of the timber superstructure to this part of the building is vital, so specify the use of 1m length galvanised steel straps each 30mm x 5mm fixed with non-corrosive screw/bolts at, about 1.2m centres.

Floor construction will show the boarding (state thickness and if using chipboard in "wet areas" such as bathrooms and kitchens specify moisture-resistant flooring) and joist support with size and centres. Size and spacing will depend on span of the joist and the following table may be used for guidance as suitable for the ground floor of dwellings only:-

JOIST SIZE AND SPACING FOR GROUND FLOOR ONLY OF SINGLE FAMILY HOUSES USING "STRENGTH CLASS 3" TIMBER (DEAD LOAD OF NOT MORE THAN 0.25Kn/M²

SIZE OF JOIST (mm x mm)	SPACING OF JOISTS		
	400mm	450mm	600mm
50 x 100	2.18m	2.06m	1.76m
50 x 125	2.79m	2.68m	2.44m
50 x 150	3.33m	3.21m	2.92m
50 x 175	3.88m	3.73m	3.38m
50 x 200	4.42m	4.25m	3.82m

ALTERNATIVE SIZE AND SPACING AVAILABLE

Up to joist span of 2.5m, strutting not required but between 2.5m and 4.5m one row of strutting (blocked to walls at ends) to be provided at mid-span of joists. Solid strutting to be 38mm thick min and min ¾ joist depth, or herring-bone 38 x 38 located clear of top and bottom edges of joists.

*Where floor is to carry non load-bearing partition walls (weight less than 0.8kN/Metre run), provide extra joist (ie double joist securely fixed together) below for partitions parallel with joists; partitions at right angles to joists can be carried providing maximum span given in table is reduced by 10%.

To reduce joist span there can be introduced 100mm concrete block "sleeper walls" below the floor built off their own foundation and formed with 'honeycombed' or 'rat-trap' openings for air-movement with dpc below the wall plate to which the joists are nailed or hung.

Where partitions dividing rooms are built off the floor without a sleeper wall or load-bearing wall below, then a double joist (two joists fixed together) should carry this additional weight if the wall is parallel to or immediately above. Where the partition is off-set or at a right angle to the joist-run, then noggin or filler pieces should be placed between the joists to support that partition. (See notes above on support of non-load-bearing partition walls).

Floor insulation is required and should be a minimum of 50mm fibreglass quilt (100mm would obviously be better and 150mm is generally adopted) between the joists and supported by plastic mesh. The mesh (the same as you would use in

gardens to support growing vegetables and flowers) is draped over the joists and stapled to their sides – do not drape the fibreglass and trap it between the boards and joist as uneven compression can lead to an unsatisfactory finish and a squeaky floor.

Within the perimeter of all the external walls show that the topsoil and vegetation is to be removed. Ventilation of the space below the ground floor is important and must not be forgotten. Air-bricks at 2m centres are satisfactory if placed first near to corners so as to avoid "dead spots". Show this on your cross-section and specify the size as at least 227mm x 75mm.

The foregoing has assumed a timber or "suspended" floor, but if a "solid" floor is intended then show, first, that the topsoil with vegetation is to be removed then a hard-core bed laid. This, ideally, should be of clean broken brick but can be of similar inert material which is free from materials including water-soluble sulphates in quantities which could damage the next layer – the concrete, but there is no need to specify this in too much detail on the drawing.

After the hard-core bed there is the concrete floor slab, which should be 100mm thick minimum. Although the all-important damp proof membrane can be located between the bed and slab in which case show a 1200 gauge polythene sheet, laid with all joints sealed, on a bed of sand on the hard-core and continuous with damp-proof courses in the walls.

The damp-proof membrane can instead be sited above the concrete floor slab. This could consist of 1200 gauge polythene sheet, again with all joints sealed, or three coats of cold applied bitumen solution (or similar moisture and water-vapour resisting material).In each case the membrane is protected by a screed or suitable floor finish and always continuous with the damp proof courses.

The inclusion of "floor insulation" is well-worth considering and can be placed either below the screed or below the concrete slab. At plan stage it would only be necessary to indicate the location with a note that the insulant (perhaps a rigid board of 50mm extruded polystyrene foam) will be of sufficient compressive strength for the loads it will have to support.

Elevations

These, are perhaps, the simplest part of your drawing. You have the floor plan(s), which will give the length and width of the building and position of doors and windows, and you have the cross-section(s) which indicate the height of the building. Now all you have to do is use this information to draw the walls, roof, windows, door(s), chimney, rain water pipes, drain-ventilation pipes etc. Write near these parts (elevations) the finishes you propose for the roof and walls so that from a planning perspective these can be quickly read, although you may also have shown these on you cross-section(s). It is very important that you also show which part of the windows open – indicate this with a cross on the opening section. What is required for living rooms, bedrooms and kitchens $1/30^{th}$ of the floor area to open and bathrooms, shower-rooms etc the figure is $1/20^{th}$ of the floor areas. Each room should also have a closable "trickle vent" of 4000 sq mm for background ventilation – this is usually already included in window frames and only one vent is needed per room.

Drainage

This, again, does not bind you to do exactly what you show on the drawings and may be varied at the construction stage by agreement with the Building Adviser. You will remember it is to be shown on the block (or site) plan, and it must be included on the floor plan where a little more detail is needed and to which brief reference has already been made under that heading in these notes.

First, the pipework: nearly always (for the small domestic dwelling) it will be 110mm diameter upvc with below-ground drain colour orange and above ground grey. Drain falls ideally for UPVC pipes should be 1-60 but can be less, to as "flat" as 1-70 although it depends on the number and type of appliances in the house which discharge into the drain. Show, therefore, in your notes "110mm dia upvc pipes surrounded with 8mm aggregate and laid to fall 1-60" (if you have doubts about getting even as little as 1-70 then get some advice and help with a "builder's level" so that this can be checked before you start planning the work).

Trapped gulleys can receive waste pipe discharge from appliances. More commonly pipes now connect direct to soil drains in which case you need to show that 75mm traps will be fitted to the appliances.

Access for cleansing is very important, so show manholes and rodding eyes in positions where they can be got at easily and quickly in cases of emergency.

At least one (and usually only one is needed) ventilation pipe is required near to the head of the drain – show a 110mm pipe rising to finish 900mm above the windows and any other openings into the building which are within 3m of it, and cap it with a "bird cage".

That, then, concludes this "simple guide" on how to draw plans. If you are embarking on plans for alterations or an extension to a building then much of the above will still apply. Remember, though, to include enough of the existing building to illustrate how the alterations or extension link with it or how the existing building will be affected – for example, if a habitable room is to have its window enclosed then a new window of sufficient area in an outside wall would be required, so the room's floor area and new window will have to be included in the information to be supplied.

For clarity colour-in the new work to distinguish it from the existing and make it quite clear what you are intending to do with the building.