BRAMM

IMPROVING STANDARDS

THE BLUE BOOK

Updated: January 2021

A Foreword from the BRAMM Board

The British Register of Memorial Masons was established in 2004 to improve the standards of memorial construction, installation and safety within the UK's cemeteries and churchyards.
Our supporting organisations have monitored and underpinned the development of BRAMM including industry training and appropriate qualifications to ensure BRAMM Registered Businesses and their qualified Fixer Masons are working to the current British Standard ~ BS8415.
A BRAMM Registered Business should issue "A Certificate of Compliance" to confirm a newly constructed memorial meets the current standard. These certificates, if requested, are issued without charge.
Recently, the BRAMM Blue Book has been reviewed to provide technical, constructional and safety information in line with the current BS8415:2018. In addition, all Memorial Masonry Companies wishing to be included on the BRAMM Register sign a formal declaration saying, *'I declare that all materials used will comply with BS8415 and that fixers will become accredited in accordance with guidance issued by BRAMM'*. This important level of certification gives security to both the Bereaved and the Burial Authorities.
To ensure our industry standards are maintained we recommend the BRAMM Blue Book as a sound source of information and further reading.

BRAMM's Supporting Organisations

ICCM Institute of Cemetery and Crematorium Management

Businesses registered with BRAMM are accountable to both the bereaved and the cemetery management. Work that is not compliant with BS8415 can be reported to BRAMM, who provide a service to cemetery management to assist in resolving such matters. In extreme cases additional training may be required and/or offered to maintain industry standards.

SLCC Society of Local Council Clerks Professional Supportive Innovative

The BRAMM register provides, without charge, access to a national data base of all registered businesses who confirm their intentions to work to the current BS8415. A registered business can only engage qualified fixer masons and ensure their work will be of an appropriate standard. Registered cemeteries that endorse working to BS8415 and have adopted the free scheme will receive a BRAMM affiliated certificate for display in public areas demonstrating commitment to current industry standards.

CWGC Commonwealth War Graves Commission

Here at the Commonwealth War Graves Commission we are continually striving for excellence. The Commonwealth War Graves Commission endorses the maintenance of high industry standards and supports the work of BRAMM.

FBCA ~ The Federation of Burial and Cremation Authorities strongly recommends the adoption of the BRAMM Register by cemetery management and personnel. The BRAMM data base is straight forward to use and assistance is readily available if it is required. All work is carried out to the current BS8415 which is reassuring to both cemetery owners and bereaved families ensuring that the memorial is stable and safely constructed.

ECCLESIASTICAL JUDGES ASSOCIATION

The approval of memorials in churchyards is part of the important role of the church in supporting the recently bereaved. It is generally delegated to incumbents on the understanding that they have access to good advice. The churchyard regulations issued by the chancellor in each diocese provide guidance as to the design of memorials and the choice of an inscription; but they do not go into the relevant constructional details. The Ecclesiastical Judges Association is therefore happy to welcome this new edition of the BRAMM Blue Book as a comprehensive guide to the technicalities of erecting memorials in churchyards. It will be a valuable supplement to BS8415 and will hopefully minimise the need for the remedial works that can cause so much distress. We are pleased to commend it to parishes and cemetery managers throughout England.

open college network WEST MIDLANDS

Whilst it is in not within the remit of an Educational Awarding Organisation to endorse a particular industry's standards, we can readily certify that we have worked in close partnership with BRAMM to develop their set of Memorial Masonry industry-based courses. In addition, we have been fittingly impressed with their high levels of professionalism, commitment and transparency throughout.

Contents

BRAMM's Aims & Objectives

- Churchyard Managers and Local Authority Cemetery Managers will be able to check that only qualified fixer masons work in their churchyards and cemeteries.
- To ensure the bereaved have memorials constructed to a safe standard ~ BS8415.
- Businesses registered with BRAMM will maintain the principals of working to BS8415.
- All registered fixer masons will be qualified to work to current industry standards.

Benefits for the bereaved when using a BRAMM Registered Business

- A registered business will provide to BRAMM proof of Public liability insurance.
- The Business will agree to use only BRAMM registered fixer masons.
- The business will use only materials and components that comply with BS8415.
- Only a business meeting the above criteria can be BRAMM Registered.
- Only BRAMM qualified fixer masons will install a memorial.
- All work carried out by a BRAMM registered fixer mason must comply with BS8415.
- Compliance with the performance requirements of BS8415 will ensure that memorials are constructed safely.
- The grave owner will be issued with a Certificate of Compliance ensuring the construction complies with the current BS8415.

Benefits for Churchyards and Local Authority Cemeteries

- All personnel responsible for managing a cemetery can use the BRAMM Register.
- BRAMM is a FREE service to Churchyard Managers and Local Authority Cemetery Managers.
- A business can be checked to establish whether or not it is BRAMM Registered.
- A BRAMM Registered Business will hold public liability insurance, employer's liability, insurance if necessary, appropriate risk assessments and method statements and will only use qualified fixer masons as indicated on the BRAMM web site.
- Technical queries will be answered.
- Memorials installed by a BRAMM registered business that do not meet BS8415 can be reported to the BRAMM Office to discuss appropriate actions to resolve the issues.
- Local authorities will receive full support from the BRAMM Board.
- The BRAMM Board comprises of representatives form ICCM Corporate, FBCA, SLCC, Ecclesiastical Judges Association, CWGC and three Memorial Mason representatives.
- The BRAMM Administration Office and Managing Officer together with its Trainers and Assessors are there to assist cemetery managers.

Please remember this is a free service. All that is required is for Cemetery and Churchyard Managers to register with BRAMM and to work to the current BS8415:2018 ~ the National Industry Standard.

Introduction

The best tradesmen are always looking for ways of improving their practical skills and level of job knowledge ~ BRAMM can assist. The information provided in the BRAMM Blue Book offers an account of Best Practice for memorial installation and furthermore is a good reference point for anyone developing their knowledge or preparing to take an associated industry qualification.

The BRAMM Blue Book is also intended help ensure that Burial Ground Managers and their staff understand fully the processes and procedures used by Memorial Masons when fixing and re-fixing memorials in cemeteries and burial grounds. Using the correct materials and methodology is an essential part of this trade and it is the responsibility of the fixer mason to ensure their work meets the industry standards as laid out in the current BS8415. (The British Standard for the Memorial Masonry industry)

It is clearly understood that there are many different ways of compiling with the current BS8415 when erecting a memorial. However, following the BRAMM Blue Book's easily understood recommendations, diagrams and guidelines will ensure the requirements of the current BS8415 will be achieved by competent memorial fixer/mason tradesmen.

Permission to reproduce extracts from BS 8415:2018 is granted by BSI. Copies of current British Standards can be obtained in either PDF or hard copy format from the BSI's online shop: www.bsigroup.com/Shop or by contacting BSI Customer Services for hard copies only: Tel: 020 8996 9001 ~ email: cservices@bsigroup.com.

BS8415 is the industry's definitive Standard. It must be clearly understood that the rationale behind the BRAMM Blue Book is not in any way to take the place of BS8415, or indeed any similar publications; its primary aim is to offer a helpful reference guide and easily understandable document to support both Memorial Fixer/Masons and Cemetery Personnel.

Wherever practicable, BRAMM have used plain English and simple line drawings in the explanation narrative, Page layout and production of the Blue Book. In addition, metric to imperial conversions are rounded up/down to the nearest ½" and follow the metric measurements to aid familiarisation.

BRAMM Memorialisation Education & Training

For the benefit of Memorial Masons and those responsible for Managing Churchyards and Local Authority Cemeteries, BRAMM run three education and training courses which are underpinned by the Open College Network (West Midlands).

The suite of three separate courses falls under the overarching 'BRAMM Memorialisation' umbrella and consists of 3 separate Units:

Unit 1 ~ Installation of Lawn and Monolith Memorials

Unit 2 ~ Advanced Fixer Mason

Unit 3 ~ Memorial Inspections – Assessments – Actions*

**Pending accreditation ~ please contact BRAMM for further information.*

Memorial Design & Construction Considerations

All memorials over 625mm (24.5") in height should be designed and installed in compliance with the current BS8415. They are required to be constructed to withstand a force of 70kg applied at the apex of the memorial or at 1500mm (59") from the ground, whichever is the lower.

The British Standard is a performance specification that requires memorials over 625mm (24½") in height to be constructed to withstand a force of 70kg. Note that the pressure is nearly triple the force that the memorial and its components may be subjected to for stability test. In the Cemetery, any subsequent test pressure should **not exceed 25kg.**

Memorials over 625mm (24½") in height: When using an independent foundation slab for a memorial, the slab should be wider than the grave so it sits on virgin ground and be made from pre-cast reinforced concrete or a suitable hard stone. BRAMM also recommend that a lawn memorial foundation should be wider than the memorial's base and, if possible, a little deeper front to back (depending on the cemetery's R&Rs) to facilitate both aesthetics and a more even weight distribution. This will also help to prevent the possibility of accidental mower damage to the memorial's base during cemetery ground maintenance procedures.

In all cases the base must be fixed to the foundation using a recognised and accredited memorial anchorage system, compliant dowels or a recognised memorial locking system.

The requirements are achieved by ensuring that all parts of the memorial are able to withstand the forces required.

Important: The following items should always be taken into consideration when constructing the memorial to ensure it achieves the performance requirements of BS 8415.

1) **Ground conditions.**

   It is the responsibility of the fixer mason to ensure the ground conditions are suitable for the selected fixing method.

   The minimum front to back dimension of undisturbed ground to permit proper fixing for a lawn type memorial shall be 600mm (23½") at the head of the grave ~ see Page 38. The Burial Authority shall ensure that their grave digging practices meet this standard.

   If the Burial Authority has been unable to provide 600mm (23½") of undisturbed ground at the head of the grave then every effort should be made to use a foundation of sufficient length, depth and width so as to support the memorial on undisturbed ground.

2) **Foundations and Foundation Design**

   It is essential that memorial foundations, either pre-cast or cast in situ, shall be designed in accordance with sound engineering principles having regard to the size and load/weight imposed by the memorial and the foundation's reinforcement must meet the current BS8415 standard.

   In addition, local soil conditions, possible foundation movement and any special requirements shall be considered in the foundations design. Foundations shall be level on both axes with drainage provided to resist water accumulation within the structure.

It is the purchaser of the foundation who should ensure the foundation is fit for purpose. The fixer masons should also be aware that a foundation design and reinforcement must meet the requirements of the current BS8415. (Page 27)

No actual size of individual lawn memorial foundation is stipulated in BS8415 but, for standard HS&B lawn memorials, BRAMM strongly recommend the **MINIMUM** size should be 900mm x 450mm x 75mm (36" x 18" x 3") for suitably reinforced concrete and/or granite or hard stone foundations slabs. (See Page 33) Note: The foundation size must meet the requirements of the ground anchor manufacturer where appropriate. In addition BRAMM recommend, wherever possible, that the foundation slab should be larger in footprint in both 'side-2-side' and 'front-2-back' axes dimensions than the memorial's base to distribute the overall weight over a wider area.

Trough or *'knock-out'* foundations must **NOT** be used as per BS8415:2018. Large or multiple holes in pre-cast concrete foundations for flower containers reduce contact area's strength and must be kept to a minimum as clearly stated in BS8415:2018.

4) Assembly

Stainless steel dowels, minimum grade A2 or A4, shall be used between all components; the minimum sizes are illustrated on Pages 8 to 20.

It is recommended that as small memorials, i.e. less than 625mm (24.5") in height are not covered by the structural requirements of the British Standard, they should, as a minimum, be dowelled to their foundations in compliance with the specified dowel and dowel hole sizes for the plate to base joint which can be referenced on Pages 8 to 20. Where possible, a mechanical means of securing the base to the foundation should be adopted. However, if the memorial is made from 50mm (2") material it is possible to have suitable dowels from within the plate, through the base and into the foundation.

Memorials of 625mm (24½") and above must have either an accredited ground anchor, an approved mechanical locking system *(often referred to as a 'lock-downs')* or be dowelled to a suitable foundation.

It is essential to always work to the ground anchor and/or mechanical locking systems manufactures specifications and/or to contact them for further advice if necessary to ensure compliance with the current BS8415.

All holes for the ground anchor in the foundation and memorial base/sub base must not exceed those directed by the ground anchor manufacturer's specifications.

If a sub-base is used with a lawn memorial construction, it is important to ensure the length of the anchor is correct for this use ~ refer to the manufacturer's specifications.

The experienced fixer mason will know the memorial installation process is often determined by seasons and/or weather conditions. Cement has many known limitations and the fixer may chose to avoid the use of cement when there is greater possibility of rain, frost, snow or stormy weather. Alternatives such as mechanical locking systems and, in some limited circumstances, industry tested adhesives may be considered.

5) Joints

Joints shall be constructed as tight as practicable. Any item that could otherwise act as a spacer, i.e. nuts or washers, should be countersunk into one of the adjoining parts.

6) Ground Anchors

There are numerous ground anchor systems available. Information regarding ground anchors and their usage is available from each manufacturer and/or supplier together with evidence of their specifications and product testing results.

Before using a system it is essential to carefully read the manufacturer's instructions to ensure that the chosen anchor is the correct size for the memorial and it is correctly fitted.

If fixing on sandy soil or on steep slopes where thicker memorial foundations are being used, the ground anchor manufacturer should be consulted for guidance on length and diameter of ground anchor to be used.

Ground anchors are designed to be used on single/multiple foundations, poured foundations and for use with a sub-base or, where necessary, a support bearer. The ground anchor manufacturer will be able to advise wherever necessary.

7) Selecting a Ground Anchor

BS8415 requires a 'Rigid' type of ground anchor system *(for use mainly with granites and hard stone)* to withstand a force of 150kg for 1 minute whilst a 'Progressive Failure' system *(specifically suitable for softer or weaker stone)* is required to withstand a force of 100kg for 1 minute. See both the ground anchor manufacturer's instructions and/or specification sheets for the correct usage and more detailed information.

8) Ground Anchor Manufacturers' and Users Responsibilities:

a) It is the responsibility of the Ground Anchor Manufacturer to ensure their products are tested in accordance with both their printed specifications and BS8145:2018.

b) It is the responsibility of the fixer mason to select an appropriate anchor system and to ensure it is used in compliance with the manufacturer's instructions.

9) Soil Types ~ Ground Anchor testing *(to meet BS8415:2018)* will be carried out in medium sand and gravel. It follows therefore that the new testing procedures will ensure ground anchors provide suitable resistance in all soil types.

Note: When reinstating a memorial with a previously installed ground anchor, the fixer mason should seek confirmation from the manufacturer that the system previously used meets the current requirements of BS8415:2018.

Dowels, Dowel Holes & Their Usage

Dowels are a traditional means of fixing in the memorial industry and, with lawn memorials, can be used for plate to base, base to sub-base and base to a suitably reinforced concrete or granite or hardstone foundation.

In each case, dowels must be secured by cement paste or suitable resin. All dowels used in a memorial's construction **MUST** be made from either A2 or A4 grade stainless steel.

The correct dowelling and dowel-hole Ø requirements differ slightly depending on the lawn memorial's material and size. If the memorial's material is Granite, Hard Limestone, Marble or Slate there are slightly different specifications to be followed from those if the material being used is General Limestone and/or other types of softer stone.

In most instances, the *'Rule of Thumb'* dowel-hole size is: Ø of dowel + 4mm for the dowel holes in the plate and + 8mm Ø for the dowel holes in the base. Example: When using 16mm Ø dowels you would need 20mmØ holes in the plate and 24mmØ holes in the base.

The following index and illustrations will help clarify the specification differences visually.

It is most important to bear in mind that the dowel lengths and dowel engagements shown in the illustrations are **MINIMUM** lengths and engagements.

Please note that this information is sourced from BS8415:2018 with permission from BSI.

Description: Granite, Hard Limestone, Marble or Slate Lawn Memorials	Pic:	Page
Overall height of up to 625mm (24½") ~ Minimum plate thickness 50mm (2")	1	11
Overall height above 625mm (24½") ~ Minimum plate thickness 50mm (2")	2	11
Overall height between 625mm (24½") & 900mm (35½") ~ Minimum plate thickness 75mm (3")	3	12
Overall height between 900mm (35½") & 1200mm (47½") ~ Minimum plate thickness 75mm (3")	4	12
Overall height above 1200mm (47½") ~ Minimum plate thickness 100mm (4") *Note: For memorials with an overall height above 1200mm in height, the dowel engagement into the plate should be increased by 25mm (1") for every 300mm (12") of additional height.*	5	13
Description: General Limestone and other types of soft stone Lawn Memorials *Note: The General Limestone and other types of soft stone Lawn Memorials require **THREE** dowels rather than the two dowels required in harder material.*		
Overall height of up to 625mm (24½") ~ Minimum plate thickness 75mm (3")	6	14
Overall height between 625mm (24½") & 900mm (35½") ~ Minimum plate thickness 75mm (3")	7	14
Overall height between 900mm (35½") & 1200mm (47½") ~ Minimum plate thickness 100mm (4")	8	15
Overall height above 1200mm (47½") requires special consideration	9	N/A
Note: Pics 1 to 8 are all shown without foundation slabs and are above ground level.		

Lawn Memorials Shown To Approximate Scale

Pics: 1, 2 & 6 ~ Up to an overall height of 625mm (24½")

Height shown 625mm (24½")

Pics: 3 & 7 ~ Overall height between 625mm (24½") & 900mm (35½")

Height shown 900mm (35½")

Pics: 4 & 8 ~ Overall height between 900mm (35½") & 1200mm (47½")

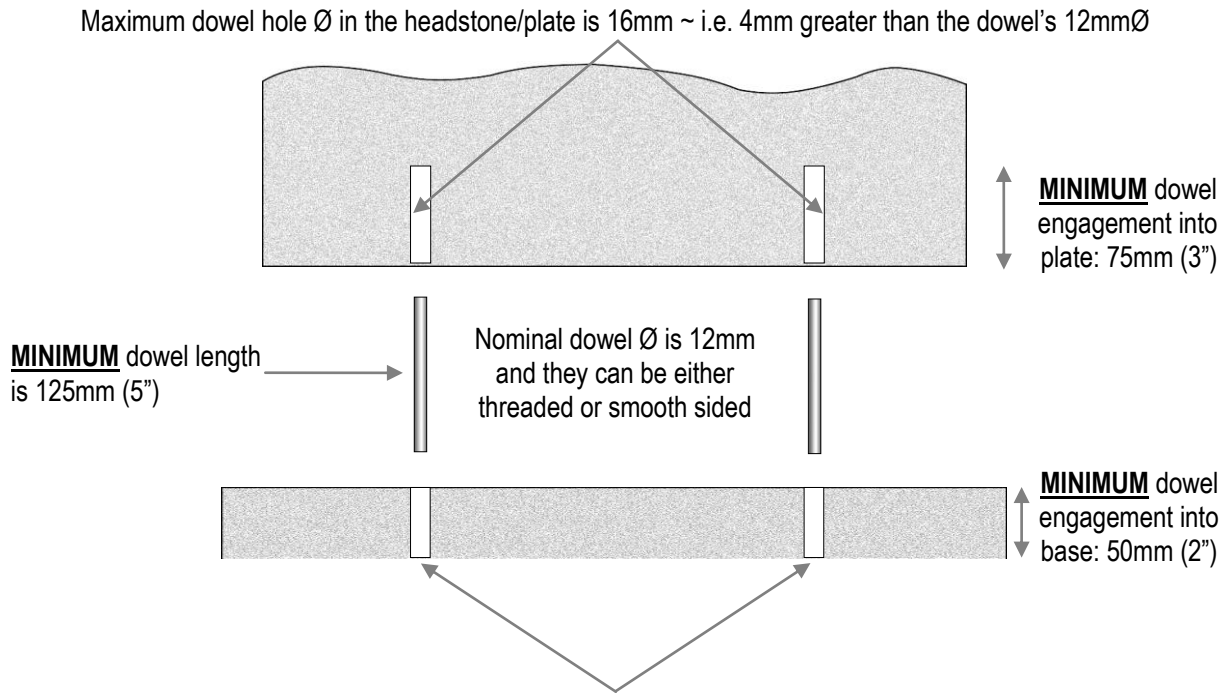
Height shown 1200mm (47½")

Pics: 5 & 8 ~ Overall height above 1200mm (47½")

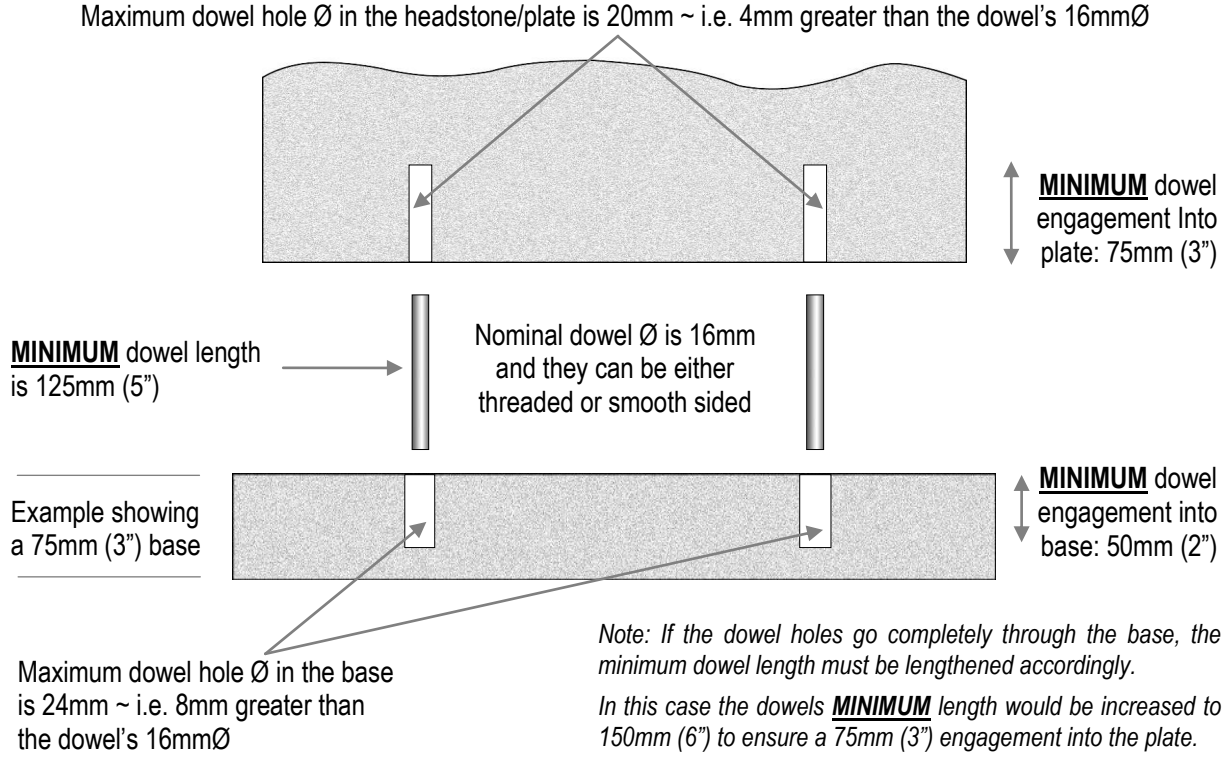
Height shown 1500mm (59")

Note: The above illustrations are size approximations shown without foundations.

Pic: 1	**Granite, Hard Limestone, Marble or Slate Lawn Memorials with an overall height of up to 625mm (24½") *Minimum plate thickness up to 50mm (2")***



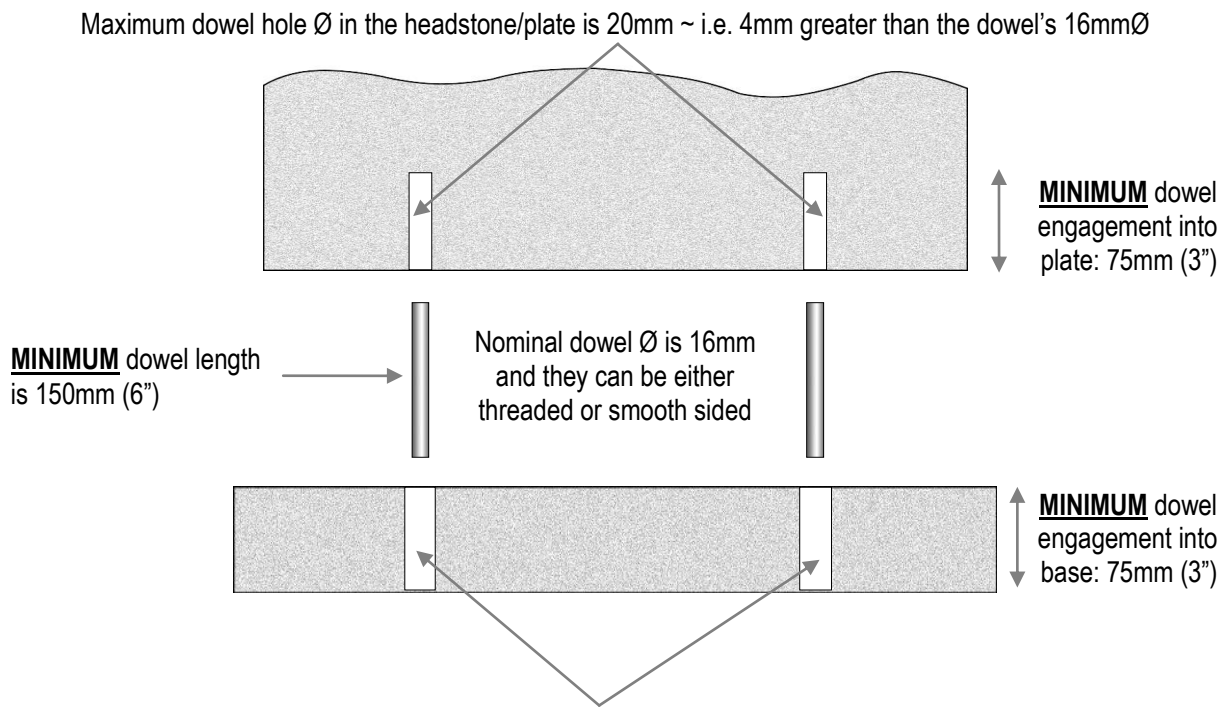
Pic: 2	**Granite, Hard Limestone, Marble or Slate Lawn Memorials with an overall height above 625mm (24½") *Minimum plate thickness 50mm (2")***



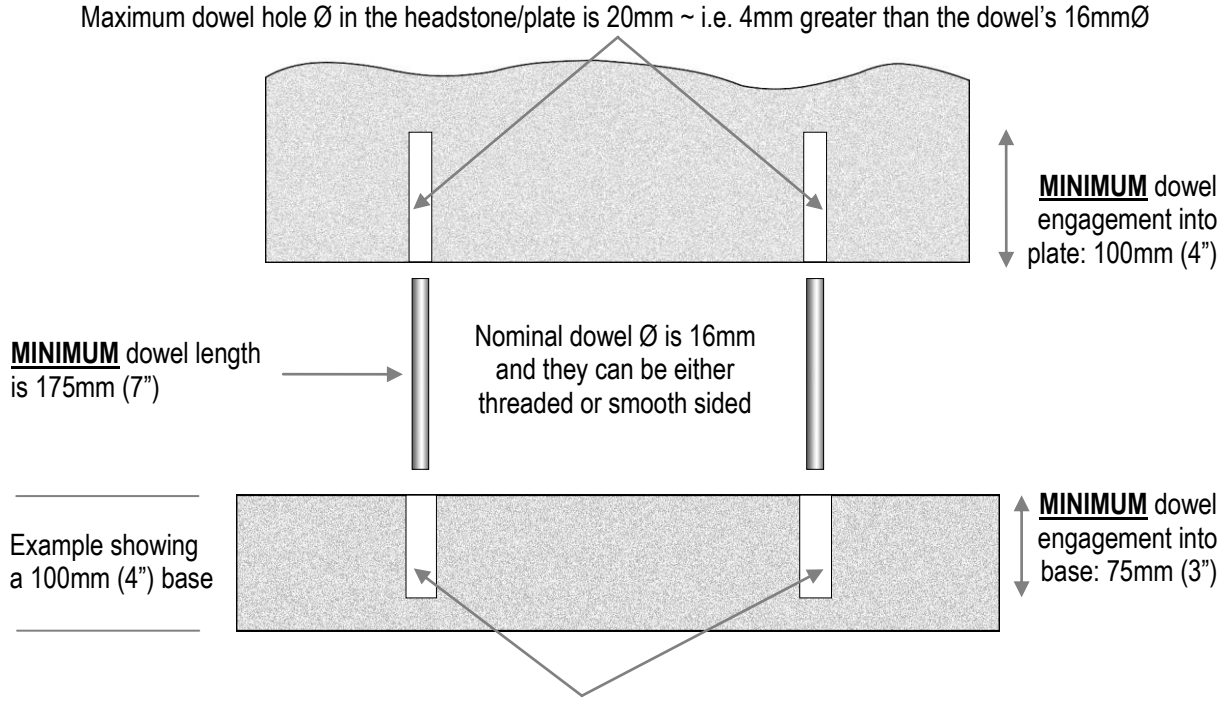
Note: If the dowel holes go completely through the base, the minimum dowel length must be lengthened accordingly.

*In this case the dowels **MINIMUM** length would be increased to 150mm (6") to ensure a 75mm (3") engagement into the plate.*

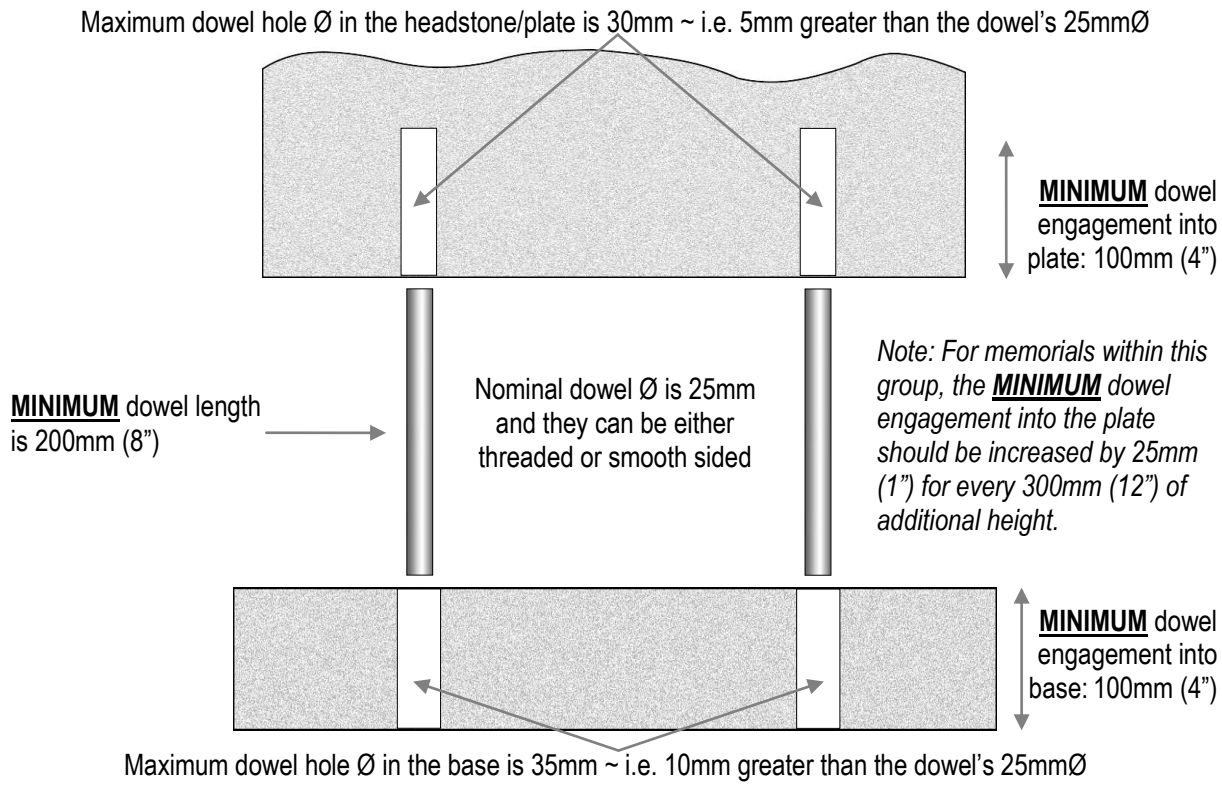
Pic: 3	**Granite, Hard Limestone, Marble or Slate Lawn Memorials with an overall height between 625mm (24½") & 900mm (35½)** ***Minimum plate thickness 75mm (3")***



Pic: 4	**Granite, Hard Limestone, Marble or Slate Lawn Memorials with an overall height between 900mm (35½") & 1200mm (47½")** ***Minimum plate thickness 75mm (3")***



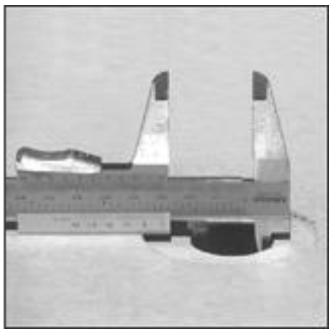
Pic: 5	**Granite, Hard Limestone, Marble or Slate Lawn Memorials with an overall height above 1200mm (47½") *Minimum plate thickness 100mm (4")***



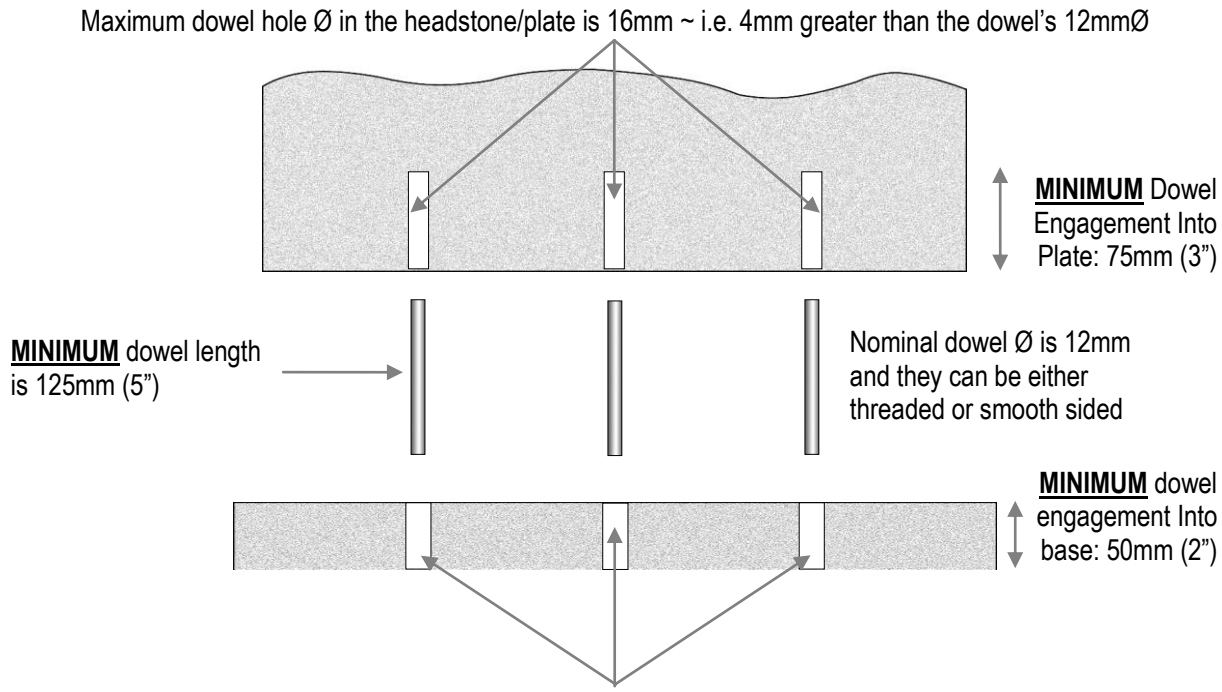
IMPORTANT

Note: The technical specifications shown in Pictures: 1, 2, 3, 4 and 5 deal with Granite, Hard Limestone, Marble and Slate lawn memorials.

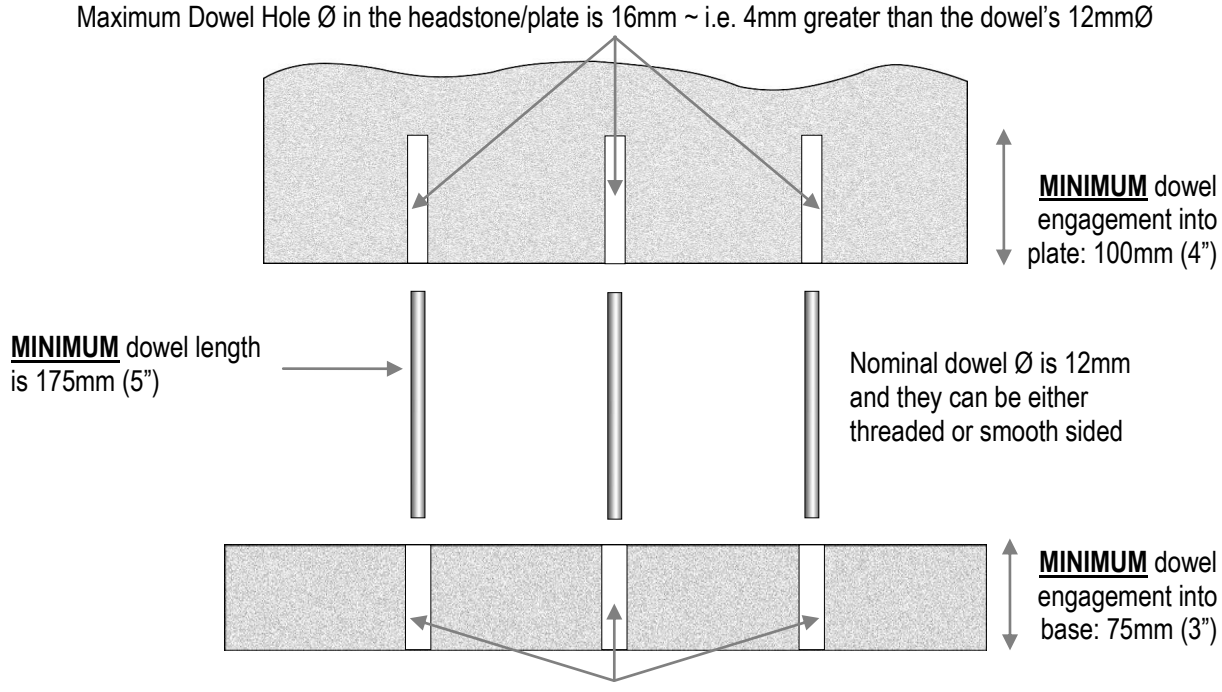
The following technical specifications shown in Pictures: 6, 7 and 8 deal with General Limestone and other types of Soft Stone lawn memorials.



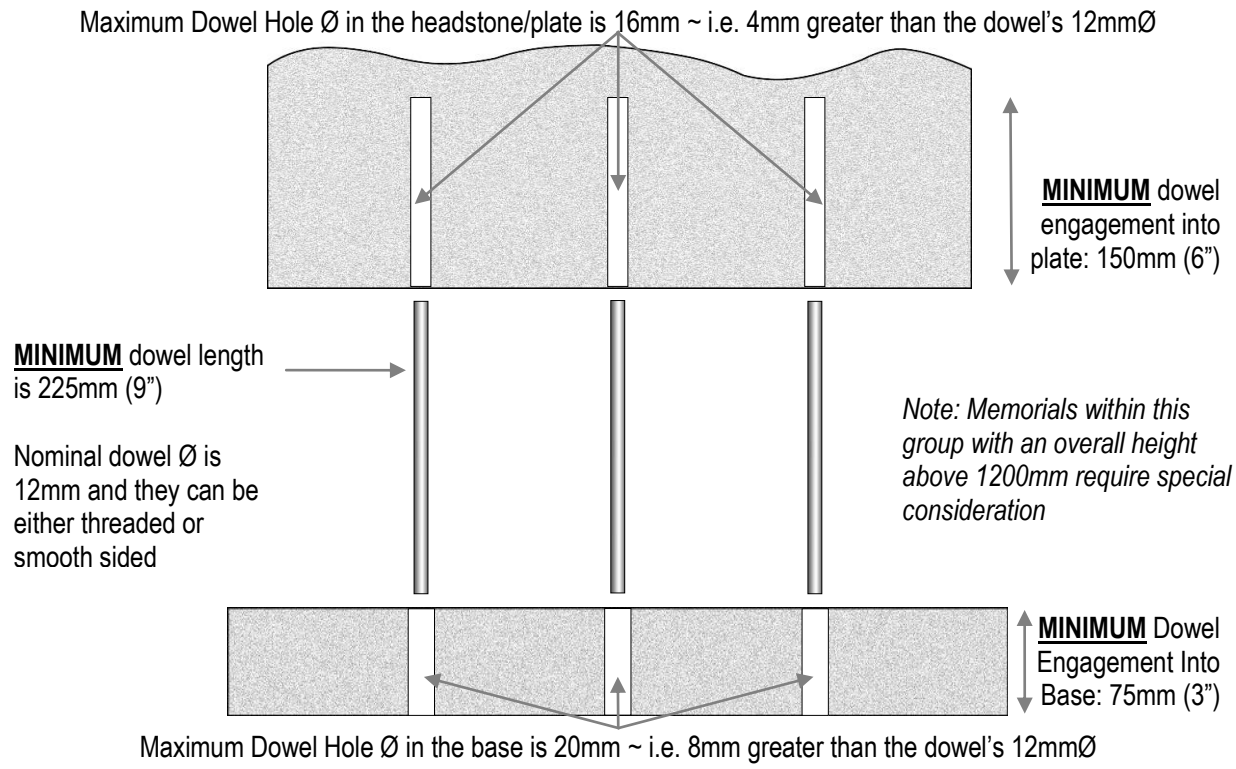
Pic: 6	**General limestone and other types of soft stone lawn memorials with a height up to 625mm (24½")** ***Minimum 75mm (3") for plate & 50mm (2") for base***



Pic: 7	**General limestone and other types of soft stone lawn memorials with an overall height between 625mm (24½") & 900mm (35½")** ***Minimum 75mm (3") for plate & 75mm (3") for base***

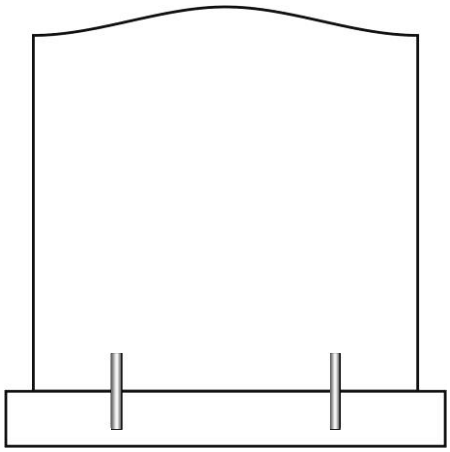


Pic: 8	**General limestone and other types of soft stone lawn memorials with an overall height between 900mm (35½") & 1200mm (47½")** ***Minimum 75mm (3") for plate & 75mm (3") for base***



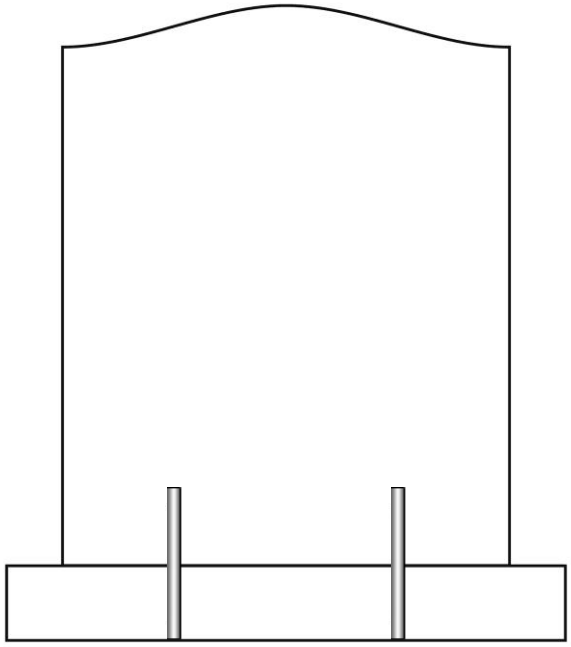
The Following Generic Illustrations are of Lawn Memorials, Monoliths, Book Sets, Canopy Sets, Wall Plaques, Cross & Die Sets and Various Types of Foundations

Fig 1 ~ Lawn Memorials Under 625mm (25.5") Minimum material thickness 50mm (2")



Minimum Dowel Ø: 12mm
Minimum Dowel length: 100mm (4")
Minimum Engagement into Plate: 50mm (2")
Minimum Engagement into Base: 50mm (2")
Maximum dowel hole Ø in Plate: 16mm
Maximum dowel hole Ø in Base: 20mm

Fig 2 ~ Lawn Memorials from 625mm (25.5”) to 900mm (35.5”)



Minimum Dowel Ø: 16mm

Minimum Dowel length: 150mm (6”)

Minimum Engagement into Plate: 75mm (3”)

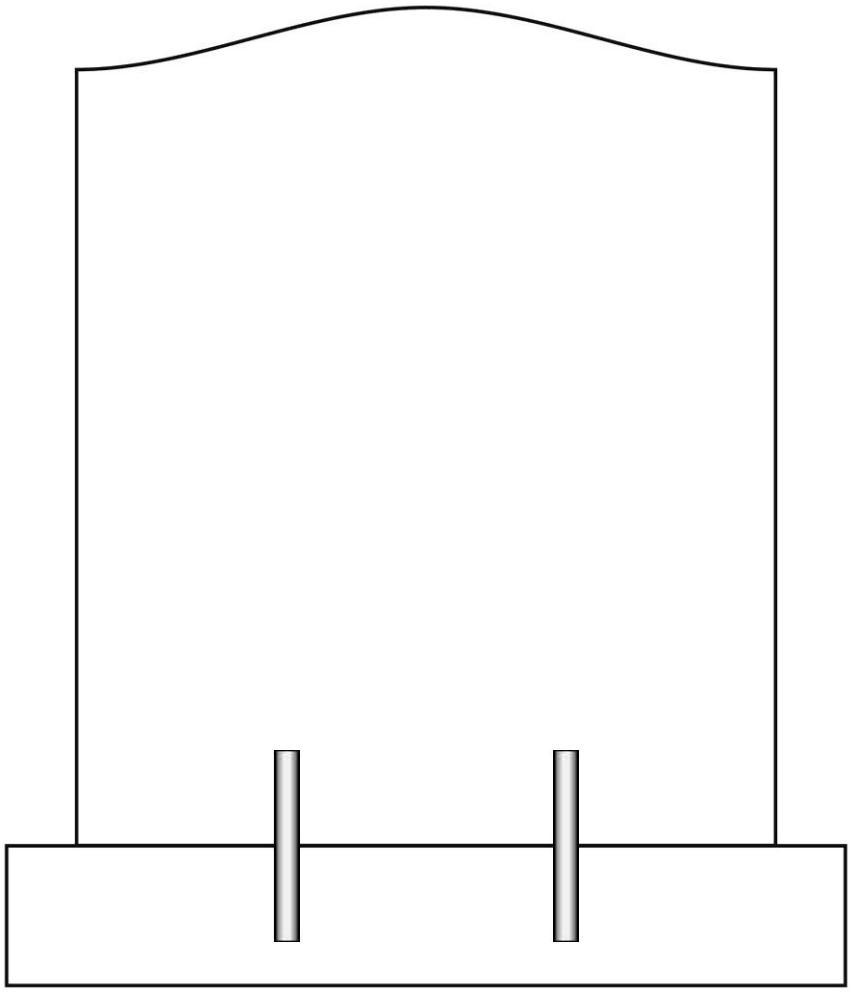
Minimum Engagement into Base: 75mm (3”)

Maximum dowel hole Ø in Plate: 20mm

Maximum dowel hole Ø in Base: 24mm

Fixer masons may find it easier to use a 175mm (7”) x 16mmØ dowel to ensure a 75mm (3”) engagement in the plate where a 100mm (4”) thick base is used.

Fig 3 ~ Lawn Memorials from 900mm (35.5”) to 1200mm (47”)



Minimum Dowel Ø: 20mm

Minimum Dowel length: 200mm (8”)

Minimum Engagement into Plate: 100mm (4”)

Minimum Engagement into Base: 100mm (4”)

Maximum dowel hole Ø in Plate: 24mm

Maximum dowel hole Ø in Base: 28mm

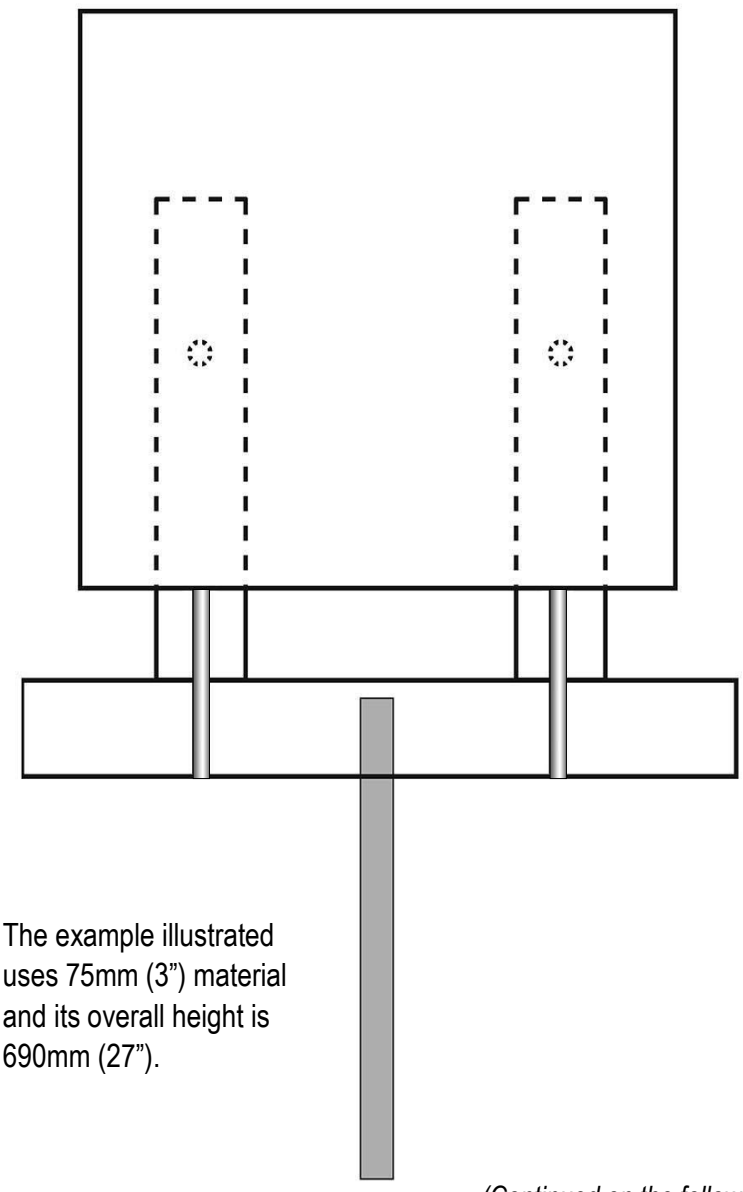
In all cases, a maximum clearance of 4mm in memorial plate dowel hole and 8mm in base must be maintained. Larger diameter dowels can be used to achieve this. This applies to Fig 1, Fig 2 and Fig 3

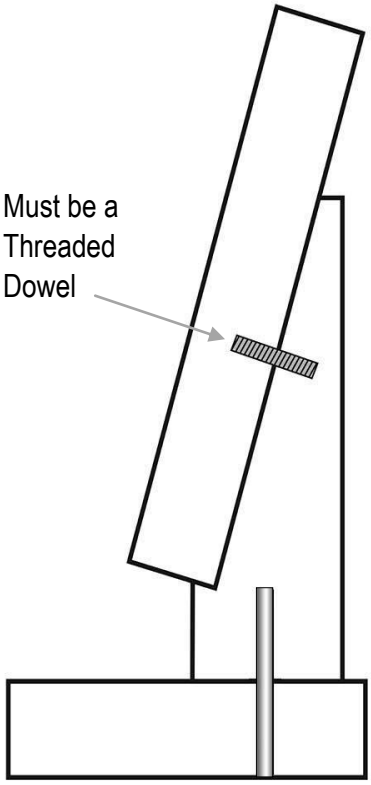
Fixer masons may find it easier to use a 250mm (10”) x 20mm dowel to ensure a 100mm (4”) engagement in the headstone plate where a 150mm (6”) thick base is used.

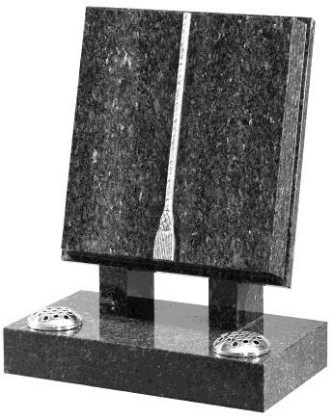
Note: Very Large Memorials heavier than 4t (4 metric tonnes = 3.9 imperial tons)

All memorials with a mass greater than 4t excluding any foundations are required to be specially designed by a structural engineer or architect and have drawings submitted to the burial authority for authorisation prior to the commencement of any work.

Fig 4 ~ Book Set Memorials







The example illustrated uses 75mm (3”) material and its overall height is 690mm (27”).

(Continued on the following page)

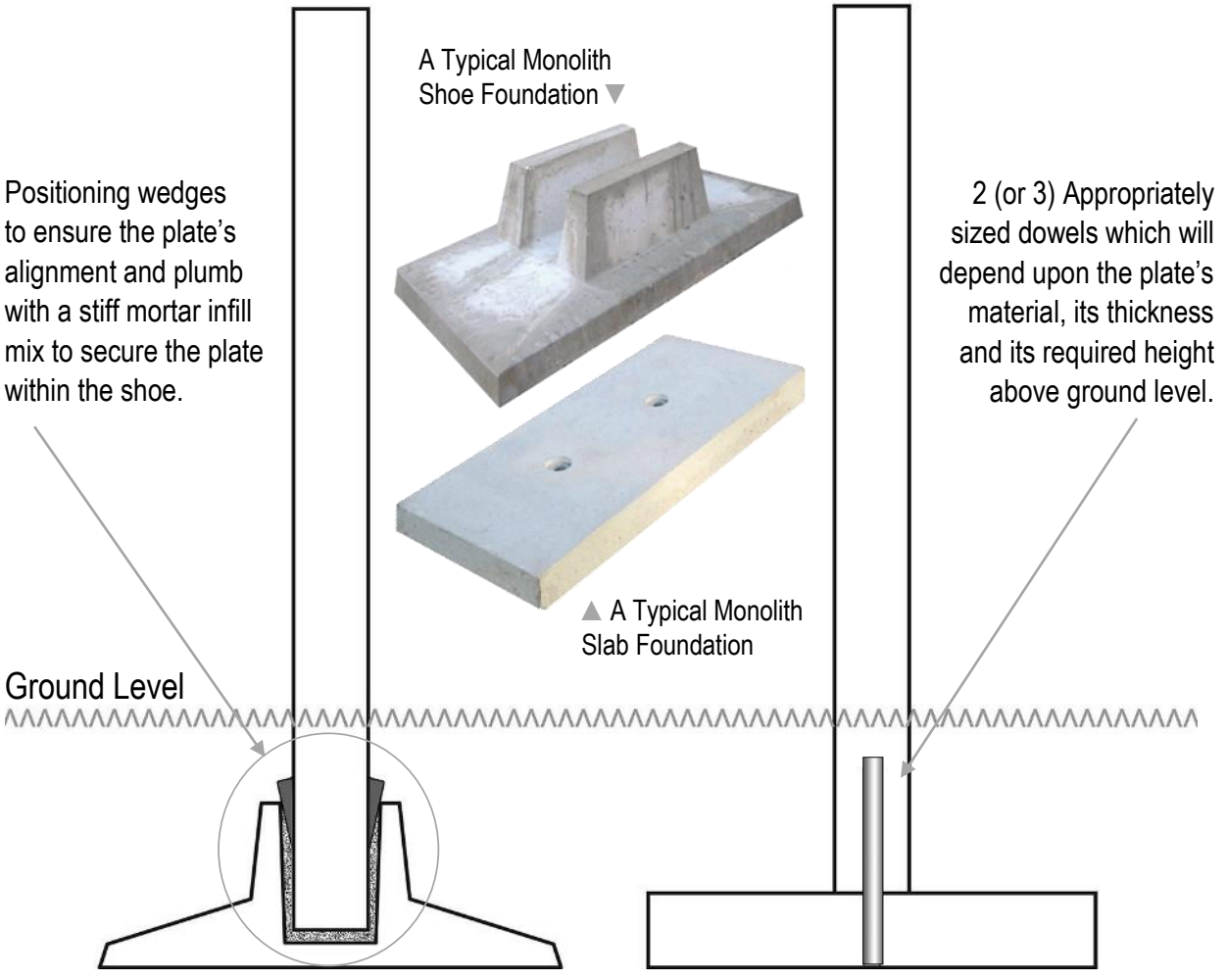
Book to Tick Rests: Threaded dowels MUST be used ~ minimum of 12mmØ and a minimum 50mm (2") in length fixed and set 25mm (1") into each component in the workshop.

Tick Rests to base: Dowels 16mmØ x 150mm (6") and a maximum clearance of 4mm in the tick rest's dowel holes and 8mm in base's dowel holes must be maintained.

If the memorial's overall height is below 625mm (24.5") dowels may be used to secure the memorial's base to its foundation. See the dowel size information on Page 9.

If the memorial's overall height is above 625mm (24.5") an accredited ground anchor system must be used or, if preferred, a compliant memorial locking system may be used to secure a book set to its foundation subject to the system manufacturer's instructions.

Fig 5 ~ Monolith Memorials ~ there are several recognised methods of installing monolith memorials. Two commonly used methods are shown below.



A Typical Shoe Fixing Method Dowelled to a Foundation Slab Method

Ideally, the minimum depth below ground should be 375mm (15") or 25% of the overall height (including the foundation) whichever is greater.

If this is depth not possible, monoliths may be installed at a shallower depth providing that one third or more of the total weight of the monolith and its foundation is below ground level.

Fig 6 ~ Memorials Foundations Cast-in-Situ on Flat Ground

A Continuous Reinforced Concrete Linear Raft or Strip Beam must be a minimum of 150mm (6”) thick and have suitable expansion joints incorporated within their construction.

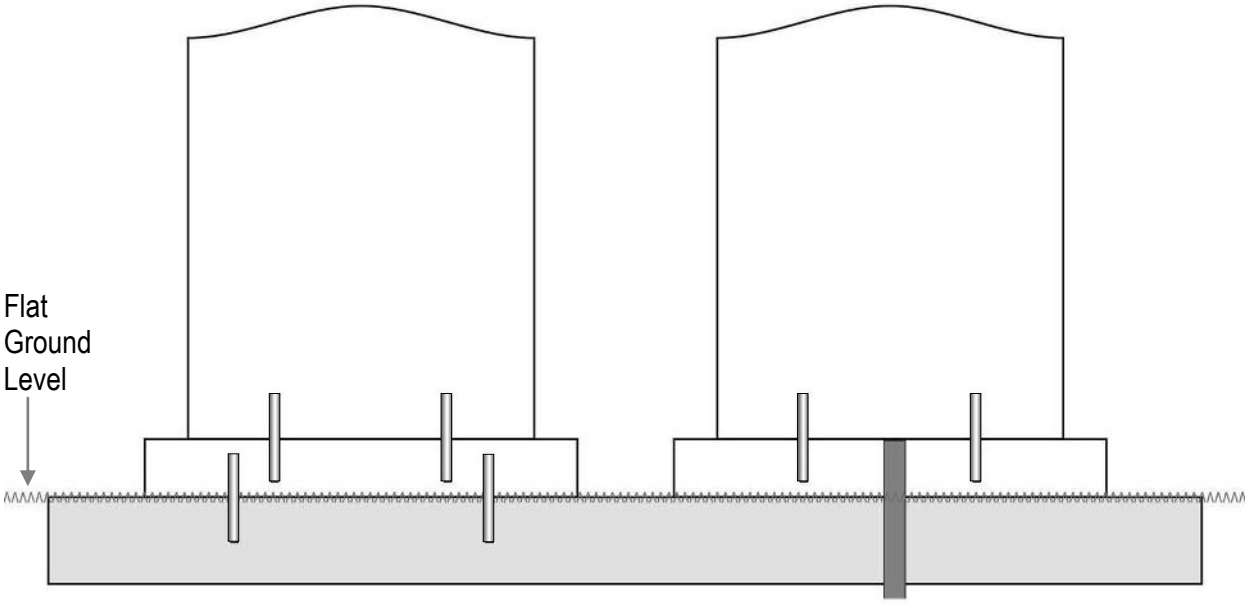
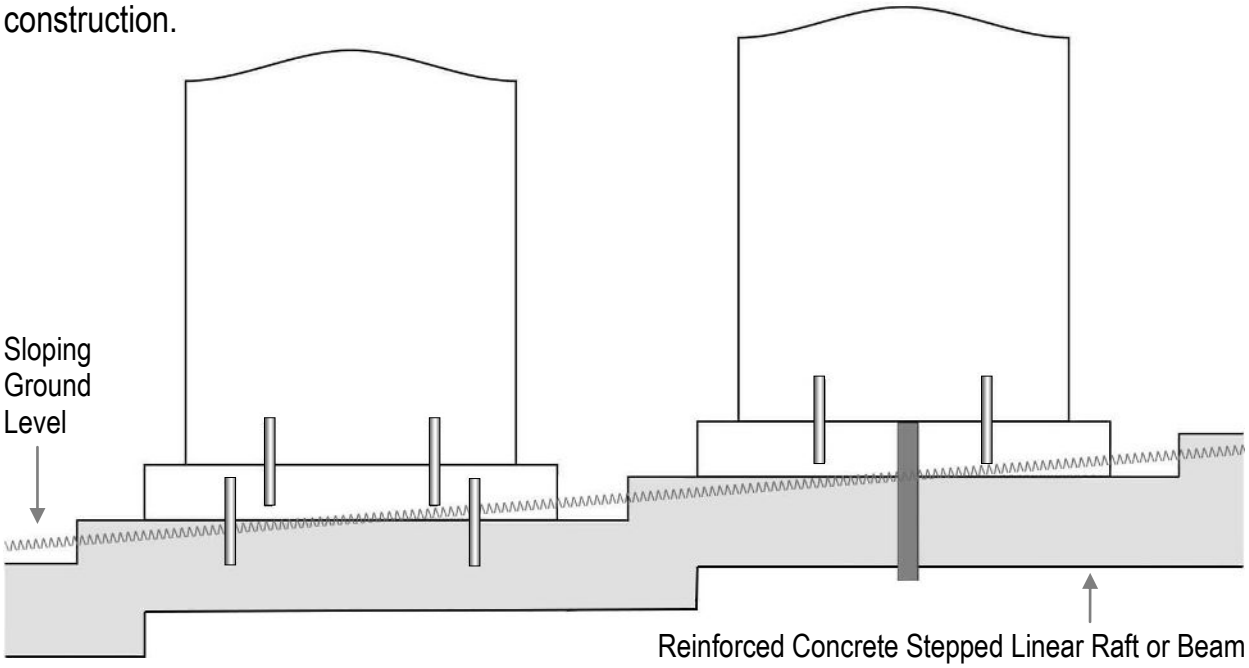


Fig 7 ~ Memorials with Foundations Cast-in-Situ on Sloping Ground

Continuous Reinforced Concrete Linear Rafts or Strip Beams should be laid to follow the contours of the ground and be appropriately stepped to ensure the force load is perpendicular to the ground. However, they must still be a minimum of 150mm (6”) thick throughout their length and have suitable expansion joints incorporated within their construction.



Note: It is recommended that a Burial Authority uses the services of an appropriately qualified specialist to produce a design and specification for all Cast-in-Situ foundations.

Fig 8 ~ Pillar Foundation Example Using Dowelled Concrete Blocks to form Pillars

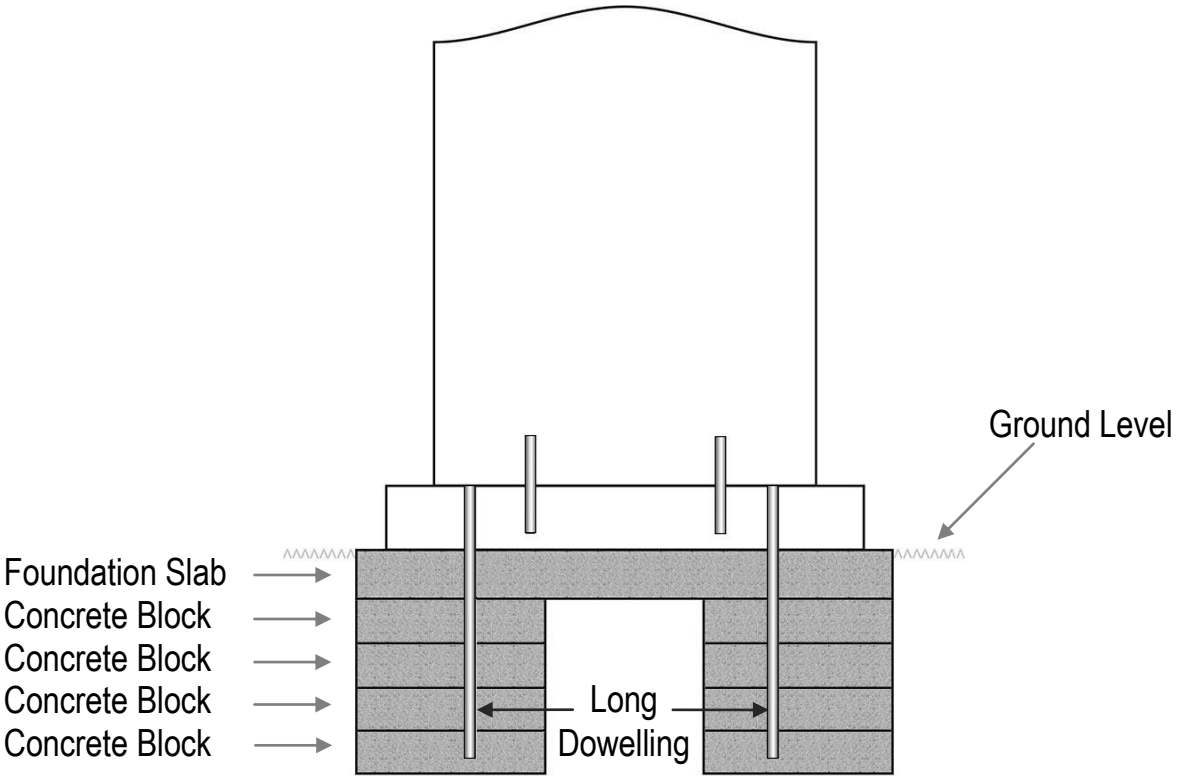
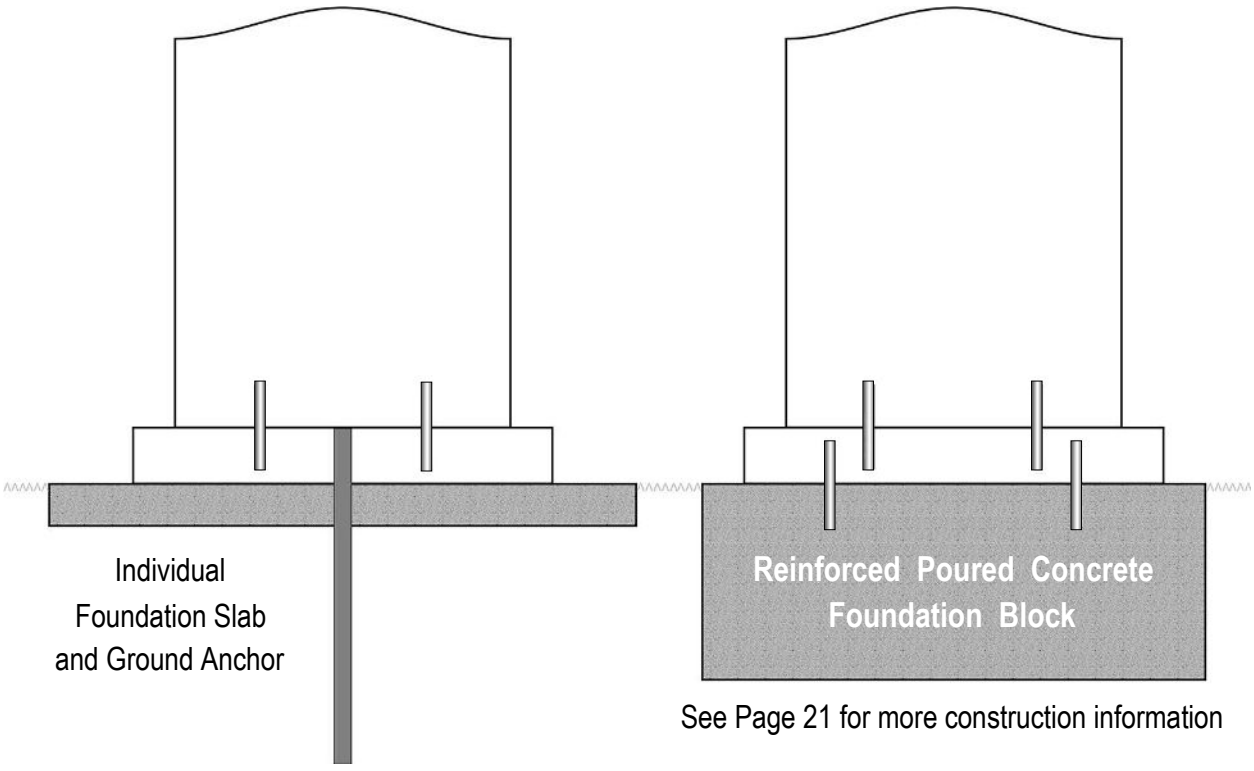


Fig 9 ~ Memorials in Situ



See Page 21 for more construction information

Fig 10 ~ Pillar Foundation using threaded dowels (Studs) and 75mm (3") granite (2'3"x1'9")

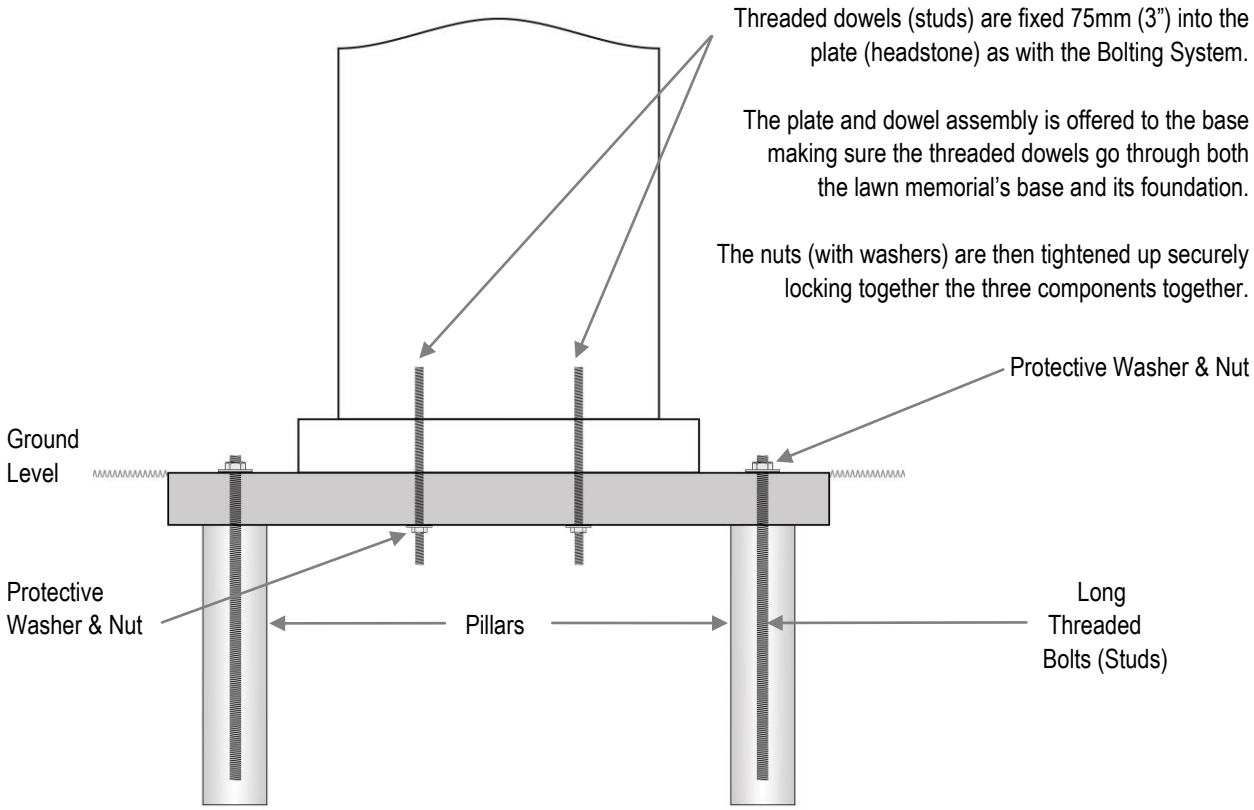
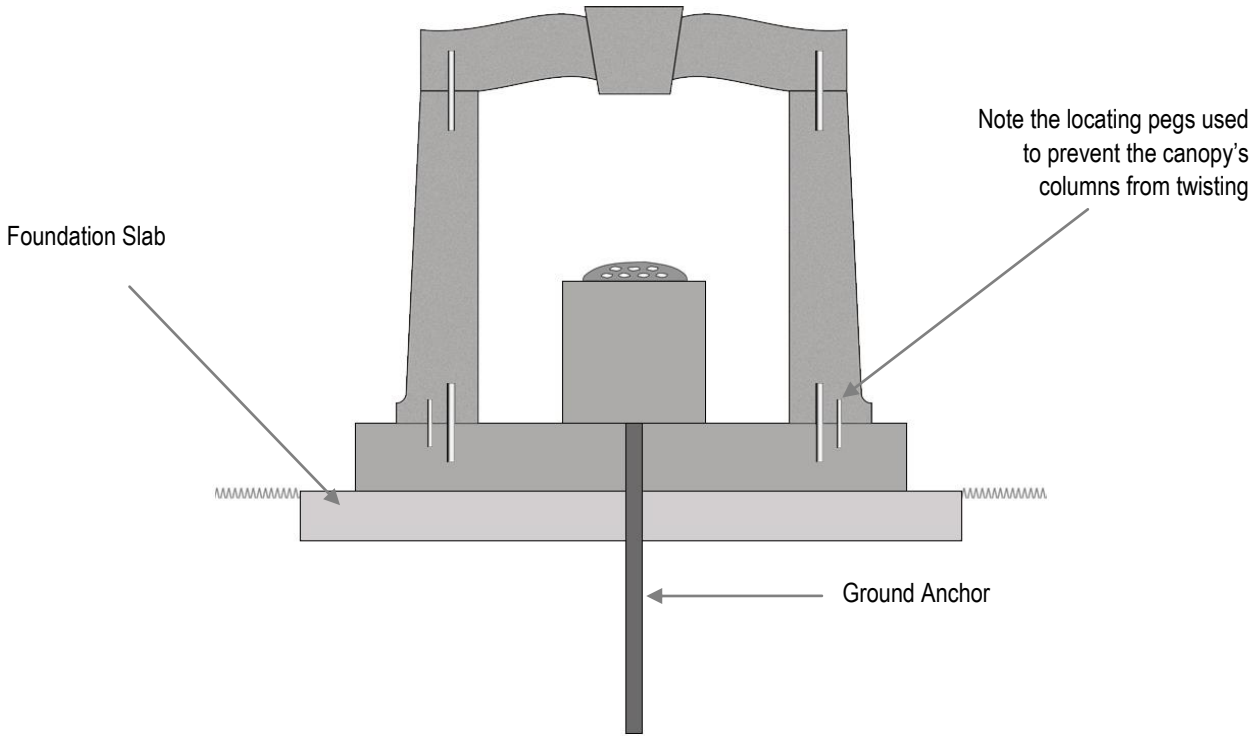


Fig 11 ~ A typical Canopy Set memorial fixed using dowels, locating pegs and ground anchor



Securing Lawn Memorials to their Foundations

There are three main methods of securing lawn memorials to their foundations:

a) An accredited/approved Ground Anchor
b) Dowels ~ as plate to base specification
c) Mechanical locking systems (not illustrated ~ please see notes below)

Mechanical Locking Systems

- There are several mechanical locking systems *(often referred to as 'lock-downs')* available for the fixer mason to use depending on the type of fixing to be carried out.
- Mechanical locking systems are a 'cement free' fixing method used to fix a lawn memorial to its foundation after its plate and base have been bolted together.
- Typically, the plate/base assembly is 'bolted' *(or locked-down)* to its foundation and, once the bolt is correctly tightened, the memorial is held firmly in place.
- It will be appreciated that mechanical locking systems will usually make subsequent removal easier for perhaps any renovation work or perhaps for a further inscription.
- It is the mason's responsibility to ensure the mechanical locking system chosen has a current Manufacturers Specification Sheet, Instructions for Use and is accredited to BS8415:2018 standards.

Cast In-Situ Concrete Poured Foundations

The following list is a recommended guide to the necessary minimum specifications,

a) The pre-poured lawn memorial foundation's excavation size must be a minimum of 900mm (36") wide x 375mm (18") front to back and 370mm (14.5") deep wherever possible. Any water ingress must be pumped out of the excavation before the concrete is poured.

b) The sides of the excavation must be perpendicular and its bottom must be flat.
c) The concrete mix must follow the mix ratio recommendations on Page 26 of the BRAMM Blue Book with appropriate reinforcing added during the pouring process.
d) Pouring must have been completed at least 14 days before the memorial's installation to allow the concrete sufficient time to cure *(set)* properly.
e) The top surface of the foundation must be trowelled smooth, level and well finished.
f) The memorial must be either dowelled to the pre-poured foundation following the Blue Book's guidance or fixed using an accredited 'lock down' anchor system.
g) A mechanical locking system will make subsequent removal easier.

Full Grave Memorial Foundations

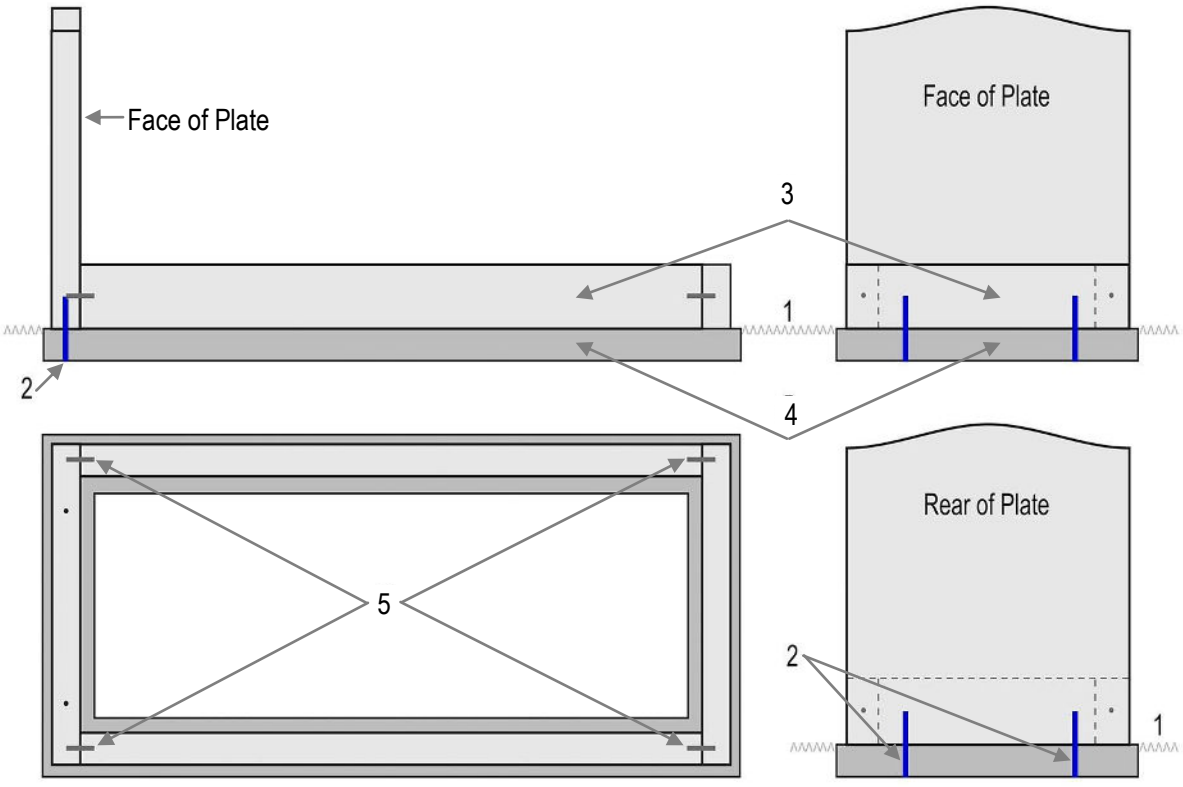
Full grave traditional memorial foundations are many and varied and depend largely on the memorial's design, its overall size and weight and the destination cemetery's ground conditions.

Purely as an example, and in its simplest form, a typical single width full grave memorial foundation would comprise of a one-piece reinforced concrete frame landing similar to the example shown above.

Note: Manufactured foundations must be reinforced to meet the standards of both BS8415 and BS4449. It is the responsibility of the fixer mason to acquire the evidence that the proposed foundation is manufactured and reinforced to the aforementioned standards.

Frame landings may require additional support if necessary depending on the ground conditions ~ two examples are shown on the following page. As with most traditional full grave memorial foundations, the footprint should be larger than the memorial itself.

Again, purely for example, the fixing of a standard headstone and three kerbs set using 75mm (3") material in its simplest form would follow the diagram below:



1 ~ Ground Level
2 ~ 16mmØ x 150mm (6") dowels engaging 75mm (3") into both plate and frame landing.
3 ~ 150mm x 75mm (6" x 3") kerbing.
4 ~ One-piece reinforced concrete frame landing which must be a minimum of 75mm (3") thick.
5 ~ Minimum 10mmØ x 75mm (3") dowels engaging a minimum of 37mm (1½") into the adjoining material.

Examples of Additional Frame Landing Support

There may be occasions where a reinforced frame landing used on its own requires some additional support to help ensure its long term stability.

Generally speaking, these occasions usually fall into one of three categories:

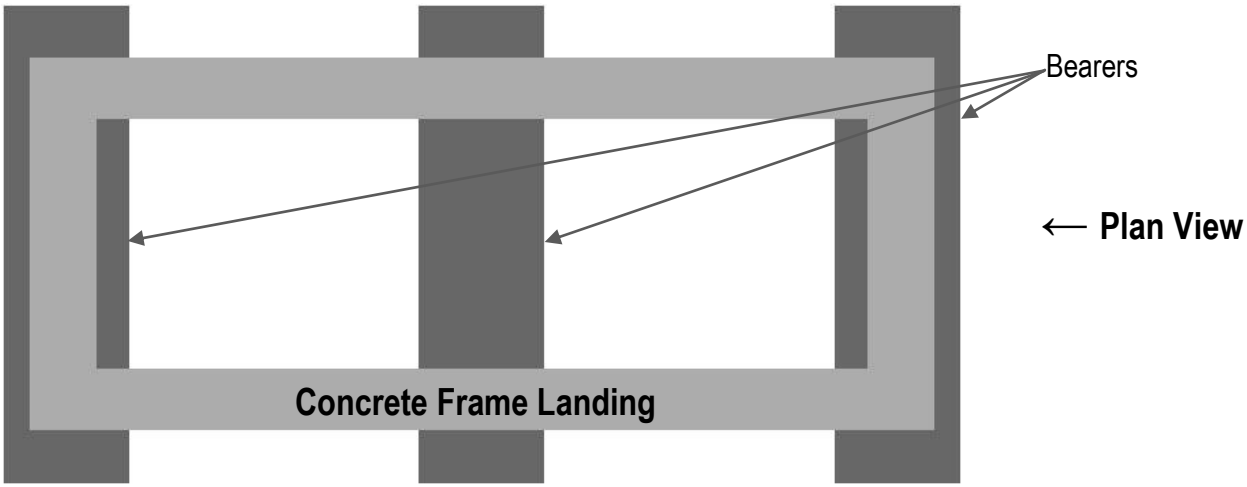
a) On steeply sloping cemetery ground

b) On softer, sandy cemetery ground

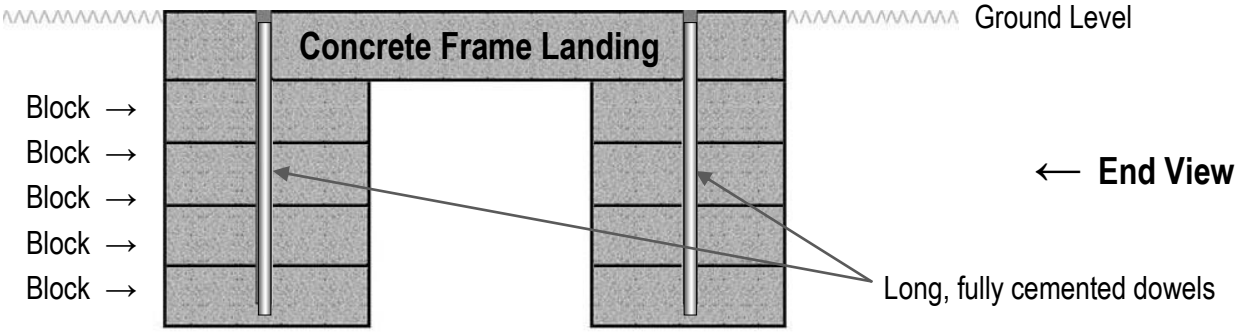
c) On spongey cemetery ground with a high water table

Either of the following additional supports may be used if necessary:

1) Reinforced concrete or hard stone bearers spanning the maximum width of the burial plot to make full use of the support given by undisturbed ground.



2) A typical corner pillar foundation example: In this case the pillars are made from dowelled 75mm x 225mm x 225mm (3" x 9" x 9") centre dowelled, concrete blocks.



Note: There are other types of foundations recommended for various site specific situations, memorial weights and ground conditions within the current BS8415.

Fixing Cross & Die Sets

The set on the right shows part of a standard Latin cross, three die (sometimes known as blocks or bases) and kerb set.

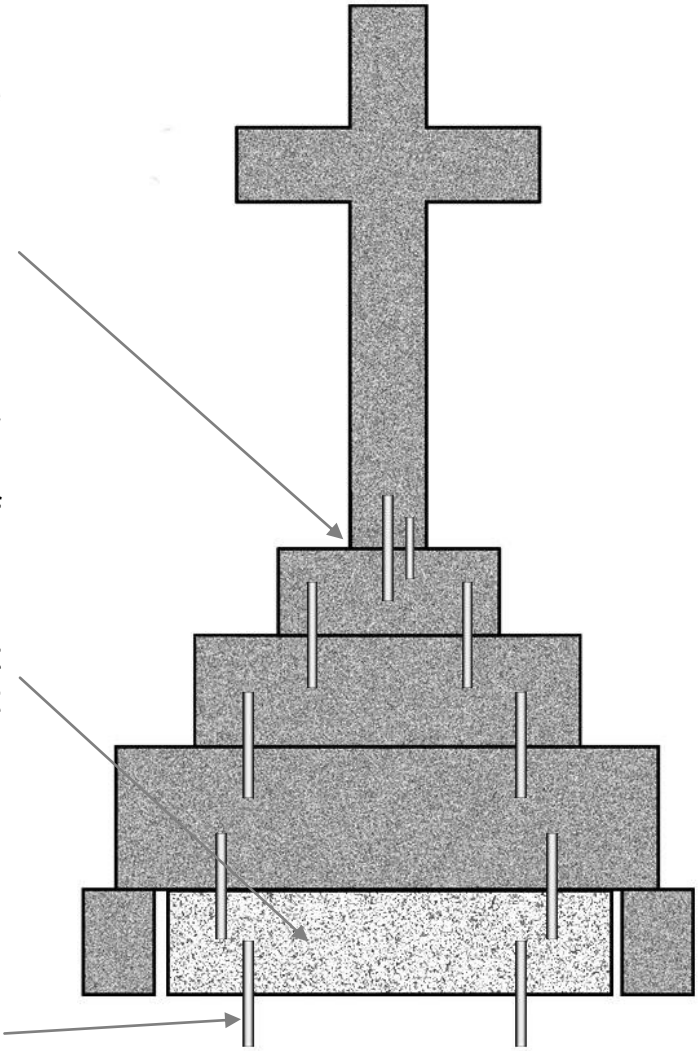
A single, centre dowel is used in conjunction with a shorter locating peg used in order to prevent the cross twisting on the centre dowel.

The centre dowel should be fully cemented and the locating peg may be fitted dry but must be a minimum of 10mmØ.

The bottom die must have a suitable support block or support pillars under it so the cross and die's combined weight is not taken by the memorial's side and head kerbs.

These do not need the same material as the rest of the memorial if they won't be seen when the memorial is complete.

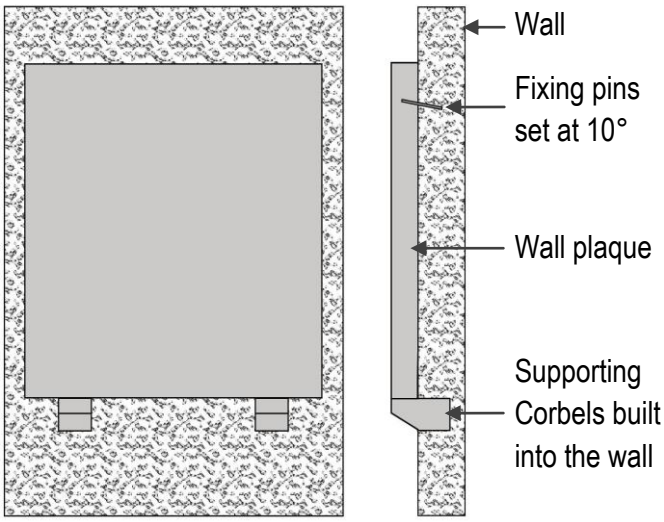
However, they must be dowelled to both the bottom die and the memorial's foundation.



Fixing Wall Plaques

Wall plaques should be supported by appropriate corbels and fixed to the vertical surface using suitably sized stainless steel fixing pins which should slope at least 10° from the horizontal.

It is considered Best Practice to point up only the top and side joints where the plaque meets the wall to prevent any ingress from water, grass seeds, etc. Should there be any ingress, it will drain away via the un-pointed bottom joint.



Cement

Health & Safety issues when using cement.

Cement is commonly used in the memorial industry but all too often its users are not fully aware of its Health & Safety issues.

PPE (Personal Protective Equipment)

The correct PPE should be fit for purpose and worn when using and mixing cement as it can cause dermatitis and damage to nerve endings. Wet cement when in contact with the skin can cause an alkaline burn. Cement contains liquid chromium which can cause nerve endings damage. When mixing cement avoid breathing in the dust as it is carcinogenic so always protect yourself with suitable gloves, a dust mask and eye protection when mixing.

General guidance

It is important to remove air from a joint. This is usually achieved by working the surfaces together. This will maximise the grip between the joint's surfaces and will prevent 'voids' were water may collect, freeze and possibly expand and fracture the joint.

All surfaces where cement paste is used should be "keyed" to give better adhesion.

Ensure there are no entry points for rain water to access the joints.

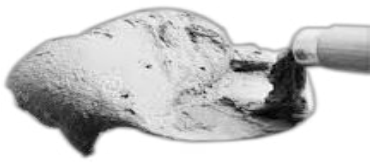
Trough slabs are no longer allowed as their troughs reduced the contact area for the cement and, as a consequence, resulted in a weaker joint.

All flower container holes should have sufficient clear drainage to the sub-soil.

If cement has been used to construct the memorial, the structure should not be tested for stability for at least 28 days ~ i.e. the minimum curing time of the most types of cement.

Tried and tested methods of using cement.

Prepare the memorial for installation.



The mixing of cement should be carried out immediately prior to its use.

Only mix enough cement for the proposed work to be carried out.

The cement should be thoroughly mixed to a thick, creamy 'yoghurt-like' consistency to achieve best results.

Note: In the memorial industry, masons generally use neat cement, which is mixed with clean water into what memorial masons refer to as a 'cement paste'.

Once mixed to the right consistency a chemical reaction begins.

If the cement begins to dry out a little before use **DO NOT** add additional water. By adding more water the cement's chemical reaction will be changed and the strength of the cement will be adversely affected.

All surfaces to be joined should be clean, dust free and well damped with clean water before the cement is applied in order to prevent cement drying too quickly and causing hydraulic shock.

If the temperature is likely to fall below 5° centigrade during the initial 28 day curing period a suitable frost proofing cement additive should be used ~ see Page 29.

Any excess or unused remaining cement mixed must be taken off-site and disposed of in compliance with the current COSHH Regulations.

Storing cement

Cement has a defined 'shelf life' because of the trace elements it contains.

When buying Cement always check the 'use by' date before purchase.

The cement bag should have a CE mark which will confirm the product is manufactured to the current BS EN 197-1 standard.

BS 8415 requires the fixer mason to use Cement 1 or 2 which will be marked on the cement bag.

Cement 1. This is generally known as 'Portland Cement'. This product achieves a higher strength in the early stages of setting (curing). Cure time 28 days.

Cement 2. This is readily available from most builders' merchants. Cure time 28 days.

Concrete used for Memorial Foundations

BS8415 has three basic requirements to ensure reinforced concrete foundation compliance.

1. The concrete used in the foundations of memorials within burial grounds and memorial sites shall conform to the current BS EN 206-1.
2. The characteristic compressive strength of the concrete at 28 days shall be not less than 30 N/mm^2. *(For clarity, 30 N/mm^2 is equivalent to 4351psi)*
3. The reinforcing steel used in the concrete foundations of memorials within burial grounds and memorial sites shall conform to the current BS4449.

Concrete must be thoroughly and carefully mixed using clean water and the following ratio: **1 x Cement ~ 2 x Sand ~ 4 x Aggregate**

Great care must be taken to not make the mix 'too wet' as to do so will have an adverse effect on both the concrete's curing time and its long term integral strength.

Reinforced Concrete Memorial Foundations

Part of the Registration Process of a Memorial Masonry Company wishing to be listed on the BRAMM Register is a declaration on the Application Form in which the applicant certifies that all the materials used by the Company will comply with the current BS8415.

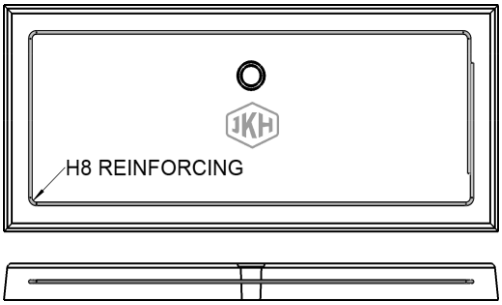
The information below has been included in the BRAMM Blue Book both for the sake of clarity and as a useful aid to a BRAMM Registered Company wishing to ensure they are in full compliance with BS8415 with the reinforced concrete memorial foundations they use.

BS8415 has three basic requirements to ensure reinforced concrete foundation compliance.

1. The concrete used in the foundations of memorials within burial grounds and memorial sites shall conform to the current BS EN 206-1.
2. The characteristic compressive strength of the concrete at 28 days shall be not less than 30 N/mm^2. *(For clarity, 30 N/mm^2 is equivalent to 4351psi)*
3. The reinforcing steel used in the concrete foundations of memorials within burial grounds and memorial sites shall conform to the current BS4449.

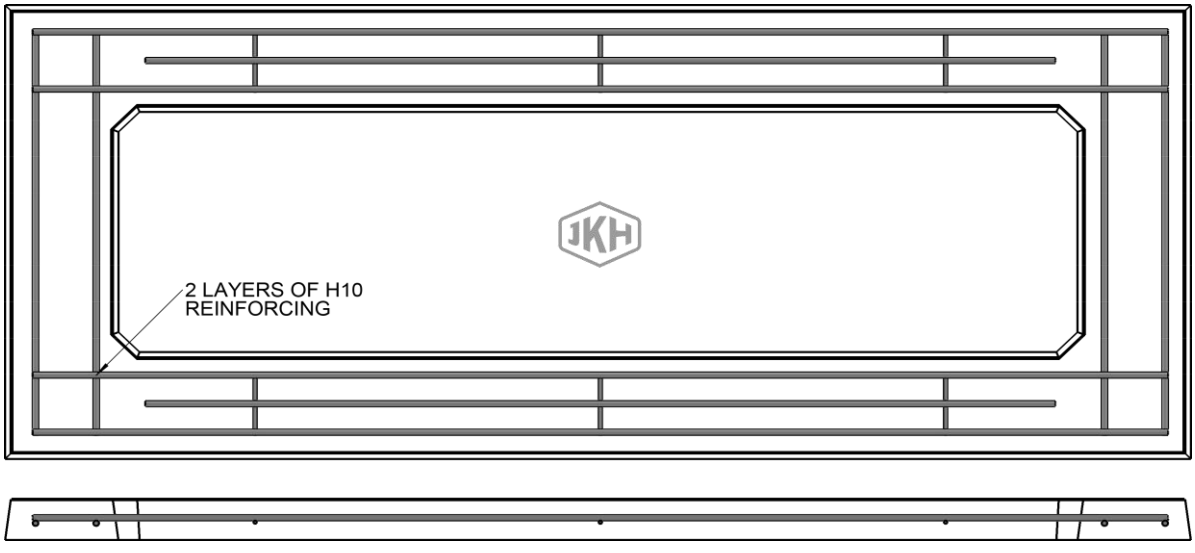
These three images show the correct steel reinforcement *(known as 'Rebar')* and its usual positioning within a typical reinforced concrete foundation for both a standard lawn memorial and a traditional kerb set.

Please Note: Fibre reinforced concrete memorial foundations without rebar **DO NOT** comply with the current BS8415.



All ground anchor holes, whether precast or cored at a later stage, must be the correct diameter for the proposed ground anchor to be used. The minimum 'front to back' depth of the foundation slab must correspond to the accreditation of the ground anchor.

BRAMM always recommend using the largest foundation slab allowed in the burial ground to give a greater spread to the memorial's weight and reduce the likelihood of settlement.



(Technical specification drawings courtesy of JKH Ltd)

The Bolting System

The epoxy resin used to secure studs *(the construction industry's correct term for threaded dowels)* into a lawn memorial's plate must be as recommended by the manufacturer as suitable for use in the memorial industry or that has a proven suitability within the stone construction industry.

The bolting together of components is usually carried out in the mason's workshop and a suitable membrane, e.g. damp-proof course material or similar product, MUST be used to cover the entire area between the headstone's plate and base to help limit water ingress.

The wet cored holes in the plate must be clean, dust free and, if necessary, suitably keyed to give good adhesion to the epoxy resin which will firmly hold the dowels in place.

Bolting memorial parts together has been proven to achieve the necessary standards using sizes as shown in the table below.

Height of Memorial	Diameter of A4 Grade Stainless Steel Threaded Dowel	Minimum Engagement of Threaded Dowel into Memorial Plate*	Correct Torque to be Applied
Up to 915mm	12mm	75mm (3")	40Nm (30 ft/lbs)
916mm – 1220mm	16mm	100mm (4")	90Nm (65 ft/lbs)
1221mm – 1830mm	16mm	150mm (6")	90Nm (65 ft/lbs)

*Refer to Pages 8 to 20 regarding the size of dowel holes in the inscription plate.

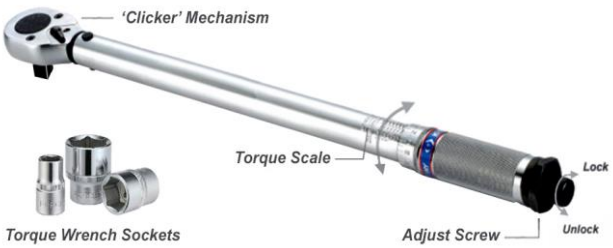
A single stainless steel washer must be used under the nuts. The washer must be minimum 3mm thick and of a diameter of at least one and a half times the diameter of the base dowel hole, e.g. a 30mm washer for a 20mm hole.

Important:

a) Great care must be taken to apply the correct torque and not over-tighten the nuts.

b) It is important for the torque wrench used to be regularly calibrated to ensure its accuracy is maintained.

c) The nuts used in the Bolting System must be 'Locking Nuts' ~ e.g. spring washers, lock-tight nuts.



MS Polymers & Flexible Bonding Agents

In some limited circumstances, MS Polymers and/or Flexible Bonding Agents may be used to join granite and stone to each other or to concrete.

As with using any form of adhesive, including MS Polymers or Flexible Bonding Agents to join granite and/or stone to concrete surfaces, it is essential that all surfaces are dust free and thoroughly cleaned off to ensure any salts and/or releasing oil is completely removed to help ensure good adhesion.

A vigorously applied good quality wire brush is essential for this work.

However, be aware that regarding flexible bonding agents, BS8415 says, 'Performance class specified in BS EN ISO 11600, accompanied by manufacturer's guarantee that the product is fit for external use with natural stone, granite or marble and its curing temperature is suitable to the UK climate.'

Obviously, the manufacturer's instructions must be followed to the letter at all times.

*Note: Epoxy Resin is the adhesive to be used when securing dowels into stone, e.g. into a lawn memorial's inscription plate when using the Bolting System - **NOT** MS Polymers.*

Use of Cement Additives

Cement additives are usually designed to make working with cement easier and help to produce better results.

For example, in very hot weather a cement mix may dry out too quickly and cause fine 'hair cracking' in the cement which will weaken it and allow water ingress.

Conversely, in very cold weather, the mix may dry out too slowly which will result in a weak joint and could even lead to the joint having permanent frost damage!

Cement additives can go some way to helping to prevent these problems.

However, it is generally accepted Best Practice to try and avoid using cement wherever possible if the ambient temperature in the cemetery or churchyard drops below 5ºc.

Important Fixing Considerations

Preparation prior to transportation of a memorial

It is Best Practice, but not mandatory, for the fixer mason to have a correctly stocked First Aid Kit in his vehicle at all times.

All materials, tools and equipment should be safely secured to protect them against movement damage during transportation to the destination cemetery or churchyard.

Ensure that others know where you are working and how long you are likely to be away.

A fully charged mobile phone is essential item in case of emergencies. See also the HSE guidance on 'Working Alone' ~ http://www.hse.gov.uk/pubns/indg73.pdf

Documentation

Fixing permits, local fee payments (where applicable) and all cemetery or churchyard authorisations must be completed and approved **before** an installation takes place.

Fixer masons must always familiarise themselves and fully comply with the Rules and Regulations of the cemetery or churchyard they propose to work in.

Risk Assessment in the Cemetery

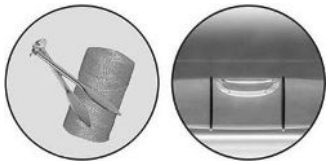
It is mandatory to carry out a visual risk assessment when arriving on site. However, if you find a potential hazard you are required to carry out written site specific risk assessment and implement the necessary control measures. This is known as a Site Specific Risk Assessment and covers the working area and its approach route. Included are those carrying out the memorial's installation and anyone else who may be in or near the working area such as passing members of the public, cemetery staff and other fixer/masons.

Preparing the site for the memorial installation

Define the working area using road cones, road pins and tape or suitable signage to help create a safe and secure area in which to work. Decide where tools and waste materials will be placed and how the memorial and its components will be moved and positioned for installation.

Installation Objective

To ensure the installation of the memorial meets BS8415 and is in line, level and plumb with the aid of a string line and a spirit level.



During the Installation

Should a funeral cortège arrive in the vicinity of the working area, all installation work should cease and any mechanical or electrical equipment should be switched off until both the cortège and all the funeral's mourners have left the cemetery.

Leaving the Cemetery or Churchyard

Ensure that both the installation and its surrounding area are left in a clean, tidy and safe state and that no tools or equipment, spoil, etc. have inadvertently been left behind.

Report your departure to the cemetery or churchyard office if required.

It is also Best Practice to report any dangerous memorials to the cemetery or churchyard office together with your own office so everyone is aware and forewarned aware of the potential hazard.

Re-fixing/Re-installing Memorials

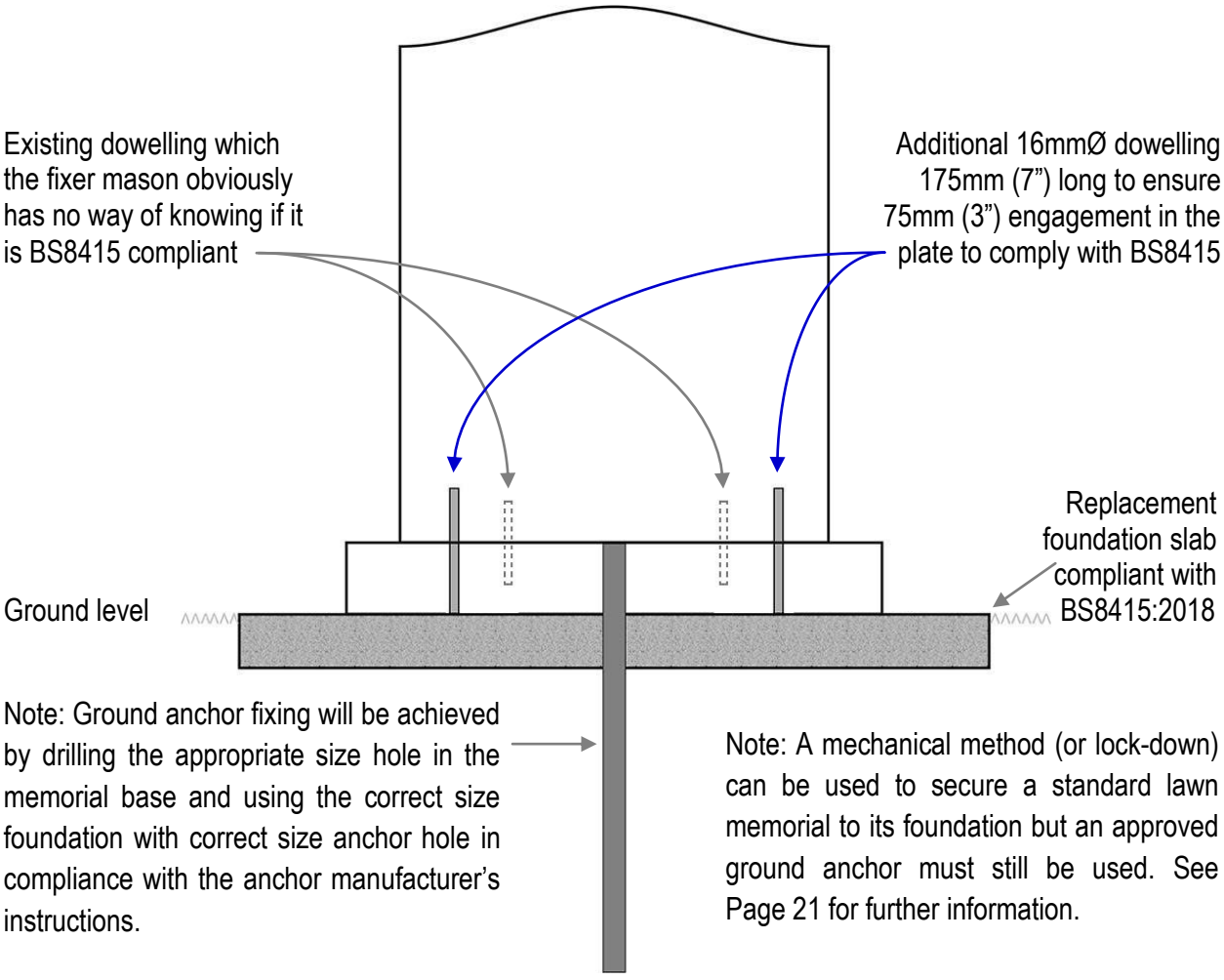
If needing re-fixing, all memorials must be re-fixed to the current BS8415 standard.

As an example, if a lawn memorial has to be re-fixed after being deemed to be dangerous or perhaps following the addition of a further inscription, it must be re-fixed in compliance with the current BS8415. However, in some instances the memorial plate may not need to be removed from its base. In these circumstances the fixer mason has no knowledge of the integrity of the joint and/or the dowels and whether or not it/they comply with BS8415?

In such circumstances, the mason must core through the base into the plate and secure the base to the plate using dowels and cement or an approved resin. It is advised that a 20mm core drill is used with 16mm dowels. With a standard size lawn memorial the dowel holes must be of sufficient depth to allow dowels at least a 75mm (3") engagement into the plate.

It is also necessary to check the memorial's ground anchor and foundation to ensure they both are compliant with the BS8415. If in any doubt whatsoever ~ always replace both.

Fig 10 ~ Re-fixed Lawn Memorial ~ *Example Shown: Overall Height 900mm (35.5") using 100mm (4") material*



BRAMM Supplementary Information

Health & Safety requirements:

The Health & Safety at Work Act 1974 places a legal duty on all people at work. Under the act it is the responsibility of all concerned to **'ensure their own safety and that of others'** in the workplace ~ which of course, in our case, includes cemeteries and churchyards. It is important to view and understand your employer's Health & Safety policy as it explains how your health and safety is managed. PPE is supplied by employer and must be used, worn and/or maintained as necessary. Rubbish or other materials left over after fixing it should be gathered up and either removed from the site or placed in on-site designated areas.

Work place accidents must be reported to the cemetery office and also be recorded in the company's Accident Book. Care should be taken when using adhesives and other substances. Always follow manufacturer's specifications for their correct usage. A correctly stocked First Aid Kit should be available in the workshop and, whilst not mandatory, in the fixer's vehicle in case of an emergency whilst out on-site.

Risk Assessments

A thorough Site Specific Risk Assessment will reveal any possible risks or hazards which may affect safe on-site working. Each business should have relevant Risk Assessment documentation and memorial fixers need to carry out on-site risk assessments prior to carrying out a memorial installation. Risks or hazards may come from people, equipment and/or the environment. Control measures must be decided upon and implemented before the commencement of any work.

Memorial design requirements

Refer to Page 6 for the main criteria. All metal used in the construction of a memorial must be stainless steel conforming to BS6744 Grade A2 or A4. Installation of Monolith memorials require a minimum of 25% of the memorial (including its foundation) to be installed below ground level. Monolith memorials are frequently installed into a reinforced concrete or hard stone shoe to increase their long term stability. See Page 17 of this BRAMM Blue Book.

Pre-cast Concrete, Hardstone and Granite Lawn Memorial Foundations

Note: Manufactured foundations must be reinforced to meet the standards of both BS8415 and BS4449. It is the responsibility of the fixer mason to acquire the evidence that the proposed foundation is manufactured and reinforced to the aforementioned standards.

Reinforcement: BS8415:2018 references indicate that metal reinforcement should be used in the manufacture of pre-cast concrete memorial foundations and anchor holes should be supported with suitable reinforcement.

When purchasing reinforced pre-cast concrete foundations, the mason must firstly consult the foundation manufacturer to confirm that their foundations fully comply with the current BS 8415:2018 recommendations for the reinforcement of pre-cast foundations.

Trough foundations are **NOT** permitted and multiple flower container holes in pre-cast concrete foundation slabs should be kept to a minimum as clearly stated in BS8415:2018.

As no specific individual lawn memorial foundation size is stipulated in BS8415, BRAMM recommend the following **MINIMUM** foundation size for standard type lawn memorials up to 915mm (36") in overall height:

- *Reinforced Concrete: (Refer to Page 28)*
  900mm x 450mm x 75mm (36" x 18" x 3")
- *Hardstone (density must be at least 2400 kg/m³)*
  900mm x 450mm x 75mm (36" x 18" x 3")
- *Granite (density must be of at least 2650 kg/m³)*
  900mm x 450mm x 75mm (36" x 18" x 3")

For lawn memorials exceeding 915m (36") in overall height, BRAMM recommend the use of a larger, more substantial foundation help distribute the additional weight more effectively. One way to achieve this is to use a larger, thicker and deeper bespoke foundation slab to provide greater integral strength and additional load bearing capacity. Ideally, these larger slabs should be the maximum width allowed in the cemetery so that as much of the weight as possible is supported on virgin ground. If in doubt, seek professional advice from your foundation manufacturer. In extreme cases, a pre-poured concrete foundation (Page 21) may possibly be allowed, but this would depend on the cemetery's Rules & Regulations. Also, bear in mind that with larger lawn memorials you will have to increase the ground anchor specifications ~ check with your anchor manufacturer to ensure BS8415 compliance.

Important Note: It is strongly recommended that all individual lawn memorial foundation slabs should have a minimum depth (front to back) of 450mm *(18")* **or** meet the chosen anchor manufacturer's requirements as shown on the Anchor Manufacturer's Accreditation Specification and/or its Instructions for Use Sheets. The slabs should also be wide enough to ensure they span the grave with as much of it as possible to rest on virgin ground.

Many lawn memorial foundation slab manufacturers supply their foundation slabs with three *'ground anchor style'* holes already in place as shown in the illustrations above. This allows the fixer to use the same slab for either the Bolting Method or the Cement & Dowels Method to fix a lawn memorial. If using the Bolting Method to fix the memorial's plate to its base, the washer, nuts and any excess length of threaded dowels are accommodated within the two outer holes with the centre hole being used for the chosen ground anchor.

However, if the lawn memorial is to fixed using the traditional Cement & Dowels Method there is a real possibility of the dowels being pushed, or even slipping, downwards into the 'void' in the foundation slab below the dowel holes in the lawn memorial's base designed to ultimately contain the fully cemented dowels. This risk is exactly the same if the dowels are pre-cemented into the plate prior to the plate being offered to the base as the dowels may well push the cement in the base's dowel holes down into the void in the foundation slab.

It is critically important to understand that, if either suggested scenario should occur, it would make the lawn memorial's fixing non-compliant with BS8415:2018.

Where there is a possibility of this happening, the two outer holes in the foundation slab must be carefully filled in or plugged flush with the overall surface of the foundation slab to prevent this non-compliant situation from occurring.

Lawn Memorial Foundation Preparation

Soil should firstly be properly prepared, vigorously rammed and tamped (firmed and consolidated) with a suitable heavy metal rammer as shown on the left before the pre-cast reinforced concrete, hardstone or granite foundation slab is carefully positioned as it helps to ensure the memorial's long term stability. Sharp sand can also be used as a fine levelling agent.

All spoil removed must be placed on a tarpaulin or in a wheel barrow to protect the surrounding turf from any damage and ultimately removed.

Linear Raft or Strip Beam reinforced pre-cast concrete foundations must be a minimum of 150mm (6") thick and correctly stepped if used on sloping ground. (See Page 18)

Individual poured block foundations require a mix of concrete to a ratio of 1 x cement, 2 x sand and 4 x aggregate with appropriate reinforcement used. The foundation should be allowed to cure *(set)* for at least 14 days before proceeding with the memorial's installation. See Page 21 for more information on individually poured block foundations.

It is appreciated that it is usual practice for the memorial mason to supply and install the individual foundation slab as part of a lawn memorial's overall installation. However, some Burial Authorities provide, and even install, their own foundation slabs and insist that the memorial mason fixes to them. These foundation slabs should always comply with the current BS8415 and the relevant information should be given in the Burial Authority's written Rules & Regulations. In such cases the Burial Authority must accept full responsibility for the foundation they supply in terms its stability, longevity and specification.

Memorial Inspection, Assessment & Action

It is most important for those in charge of the management of Churchyards and Local Authority Cemeteries that they have a written policy in place (as stated in BS8415:2018) to cover the safety inspection and assessment of existing memorials within their premises.

Broadly speaking, and ideally, satisfying the need to make sure all memorials in their burial sites are in a safe condition and the risk to anyone on-site is minimized.

This is covered by the Ministry of Justice under their 'Duty of Care' umbrella ~ it is therefore a legal requirement and is, as aforementioned, supported by BS8145:2018.

This policy must cover everything from the initial decision to carry out a memorial inspection scheme through to having a suitable exit strategy for the completion of the project.

There are a number of important considerations to be addressed with pre-planning being the most important part of the whole process. A non-exhaustive list would cover:

a) Generating the necessary paperwork and ancillary documentation.

b) Effective communication with the local community and other bodies who may be involved to obtain their understanding and support.

c) Prioritising the burial areas within the burial ground which are most at risk.

d) Setting realistic time scales and budgets for the tasks to be carried out.

f) Organising for competent and qualified contractors to undertake the task.

g) The importance of avoidance of any perceived conflict of interest between those carrying out the inspection and assessment and those carrying out the necessary actions to re-instate any unsafe memorials.

h) Formulating a workable, satisfactory and fully understood exit strategy.

i) Record keeping and arrangements for ongoing inspections.

BRAMM can offer advice to Memorial Masons and Churchyard or Cemetery Managers.

Useful Symbols and Acronyms

BRAMM	British Register of Accredited Memorial Masons
BSI Group	British Standards Group *(National Standards Body)*
BS8415	The National Standard for memorial installation
COSHH	Control of Substances Hazardous to Health
CWGC	Commonwealth War Graves Commission
EJA	Ecclesiastical Judges Association
FBCA	Federation of British Cremation Authorities
HSE	Health & Safety Executive
ICCM	Institute of Cemetery and Crematorium Management
LEV	Local Exhaust Ventilation
LOLER	Lifting Operations & Lifting Equipment Regulations
NAMM	National Association of Memorial Masons
OCN	Open College Network
PPE	Personal Protective Equipment
PUWER	Provision and Use of Work Equipment Regulations
SLCC	Society of Local Council Clerks
SSRA	Site Specific Risk Assessment
Ø	Universal symbol meaning diameter ~ in this case the diameter of dowels, studs, washers and/or ground anchors, flower container holes, etc.

Approximate Metric to Imperial Conversion

Fixer masons may find it useful to refer to the information table below to find approximate imperial size converted measurements;

25mm ~ 1 inch	200mm ~ 8 inches	910mm ~ 36 inches
75mm ~ 3 inches	250mm ~ 10 inches	1000mm ~ 39½ inches
100mm ~ 4 inches	300mm ~ 12 inches	1200mm ~ 47 inches
150mm ~ 6 inches	450mm ~ 18 inches	1500mm ~ 59 inches
175mm ~ 7 inches	625mm ~ 24½ inches	1800mm ~ 71 inches

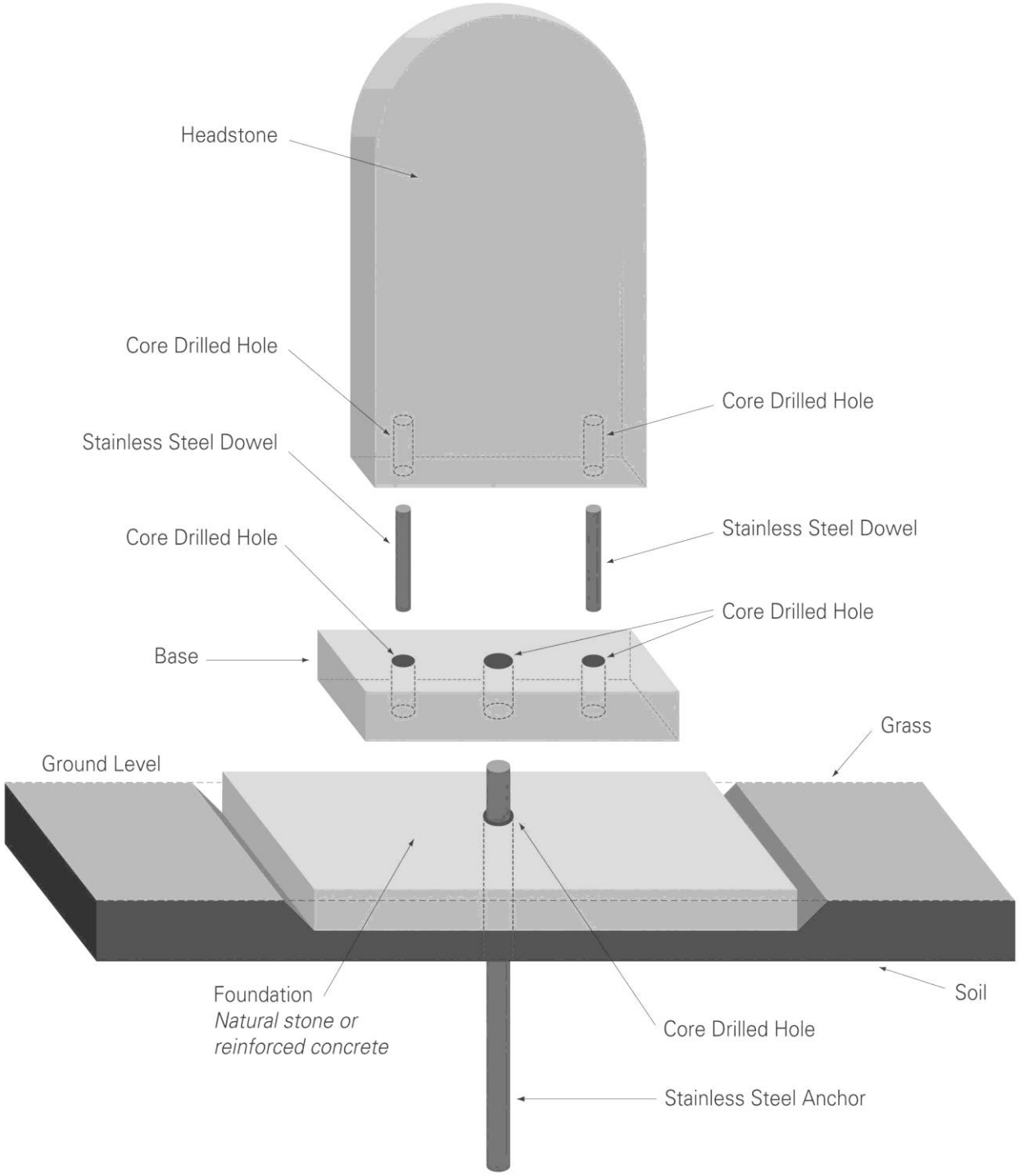
Glossary

Arris	A sharp edge, created when two surfaces meet.
Burial Authority (BA)	An organisation responsible for managing a burial ground.
Cement	A fixative used to secure dowels into the cored or drilled holes in the memorial and/or foundation. Note: Threaded dowelling (studs) used in the bolting system must be fixed in the plate using a suitable Epoxy Resin.
Chamfer	Where two surfaces meet the corner is removed to create a flat surface joining the two existing surfaces.
Dowel	A stainless steel pin to align, prevent movement and make a secure joint between adjacent elements of a memorial.
Epoxy Resin	The adhesive used when securing dowels into stone, e.g. into a lawn memorial's inscription plate (headstone) when using the Bolting System.
Foundation	A part of a structure in direct contact with and transmitting load to the supporting ground.
Ground Anchor	Typically, a long stainless steel bar driven through the foundation in order to pin it to the ground thus providing stability. Several approved ground anchors are available and are currently being used by Memorial Masons.
Hydraulic Shock	This is a term used when cement is applied to a dry surface. Water will quickly be drawn from the cement mix altering the chemical reaction. Cement suffering hydraulic shock will cure to a much weaker strength.
Joggle Joint	A method of jointing construction which is no longer recommended. It is best described as a joint where one piece of stone is let into another, similar to a carpentry mortise and tenon joint.
Lawn Memorial	A jointed memorial with an upright stone fitted to the back of a base stone. This type of memorial is often between 600mm (2') and 1200mm (4') in height and is a more modern design often found in abundance on lawn sections of British cemeteries.
Lock Down System	A mechanical system used to 'bolt' *(or lock-down)* a memorial base to the foundation. A number of approved lock-down systems are currently in use by Memorial Masons.
Memorial Mason	A tradesperson responsible for installing memorials.
Monolith memorial	One-piece memorial buried between 25% and 35% into the ground. It is always advisable to fit the memorial into an appropriate "shoe" foundation. (See Page 18 for further information)
PPE	Personal Protective Equipment (See Pages 26 and 39)

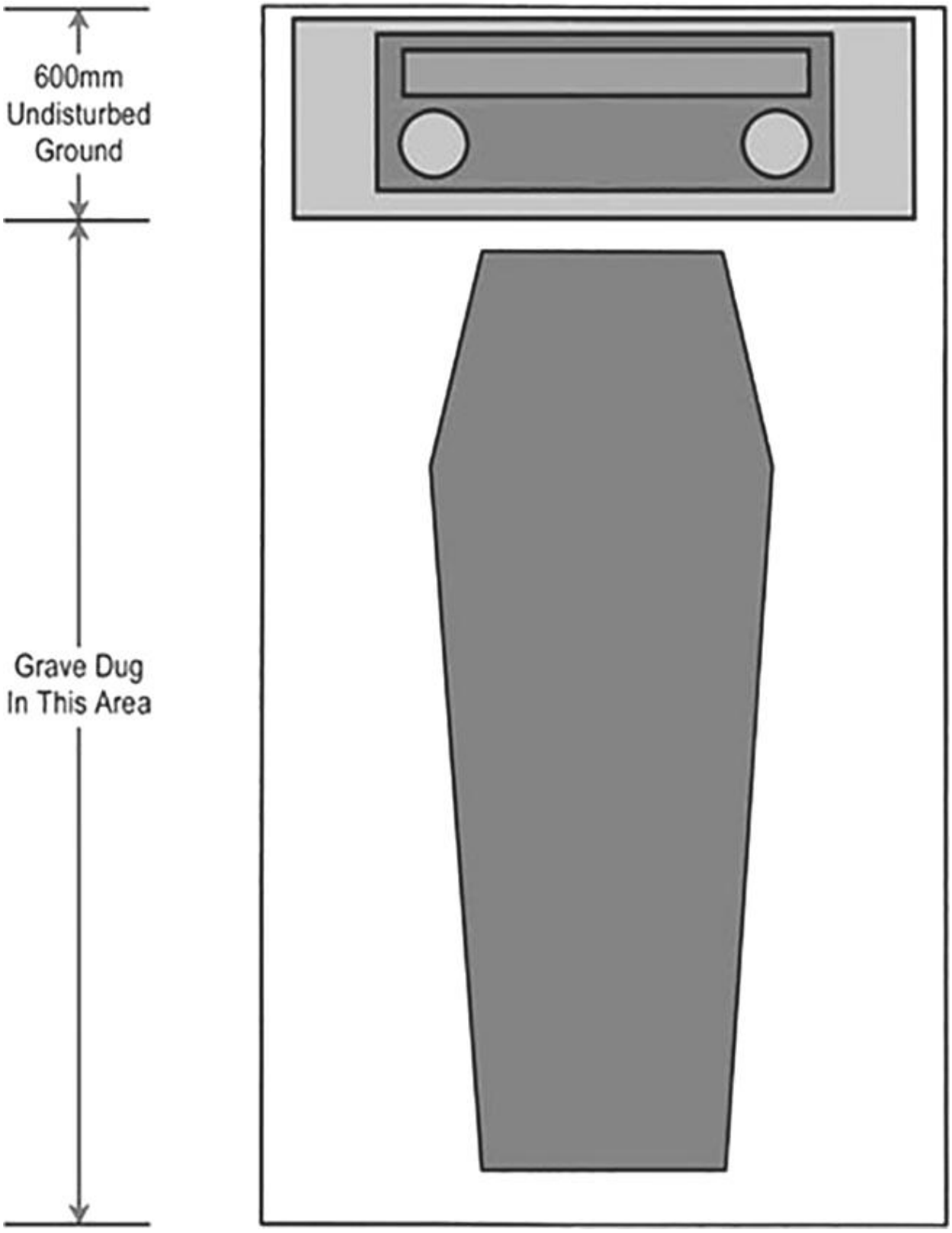
Generic Lawn Memorial Construction Diagram

EXAMPLE of COMPONENTS ~ Cement Method

Lawn Memorial over 625mm (24.5”) in height



Grave Space Layout



General Health & Safety for the Memorial Mason

These final notes have been designed and produced to give a simple, yet none-exhaustive, list of General Health & Safety subjects ~ some with 'Internet URL locations' ~ where the memorial mason can easily source further, more detailed, official information if required.

The Health & Safety Executive
http://www.hse.gov.uk/

- The HSE is the Government Department with the responsibility of providing and monitoring a robust framework for work place health and safety in Great Britain.
- For the memorial mason 'the work environment' means both working in the masonry workshop or out on-site in the cemetery or churchyard.
- The Health & Safety at Work Act (1974) considers the foremost and primary responsibility of an employee is that of 'ensuring their own safety and that of others'.

Risk Assessment
http://www.hse.gov.uk/pubns/indg163.htm

- Part of managing the H&S of your business must be control risks in your workplace.
- To do this you need to think about what might cause harm to people and decide whether you are taking reasonable steps to prevent any such harm occurring.
- This is known as Risk Assessment and it is something that you are required by law to carry out.

PPE *(Personal Protective Equipment)*
http://www.hse.gov.uk/toolbox/ppe.htm

- PPE is the generic term for equipment and/or clothing that will help to help to protect the user against any health or safety risks in the work place.
- Employers have duties concerning the provision and use of PPE in the workplace and employees have a duty to use and store it PPE correctly.
- Correct PPE storage is very important so it's always fit for use.

RIDDOR *(Reporting of Injuries, Diseases and Dangerous Occurrences Regulations)*
http://www.hse.gov.uk/riddor/

- RIDDOR puts duties on employers, the self-employed and the people in control of work premises to report certain serious workplace accidents, occupational diseases and specified dangerous occurrences (sometimes known as near misses) to the HSE.

COSHH *(Control of Substances Hazardous to Health)*
http://www.hse.gov.uk/coshh/

- COSHH covers substances that are hazardous to health. They can take many forms such as chemicals, fumes, dust, vapours, gases, etc. plus mixed but unused cement and unused marble, stone and granite cleaning chemicals.
- Note: If any packaging displays any of the many COSHH Hazard Symbols then the contents is classed as a 'Hazardous Substance'.

PUWER *(Provision and Use of Work Equipment Regulations)*
http://www.hse.gov.uk/work-equipment-machinery/puwer.htm

- PUWER concerns anyone with responsibility for the safe use of work equipment.
- It places duties on people and companies, who own, operate or have control over work equipment.
- PUWER also places responsibilities on businesses and organisations whose employees use work equipment, whether owned by them or not.

LOLER *(Lifting Operations & Lifting Equipment Regulations)*
http://www.hse.gov.uk/work-equipment-machinery/loler.htm

- The LOLER regulations protect everyone who uses lifting equipment in the workplace.
- It covers a wide range of lifting equipment such as cranes, fork lifts, gantry's, hoists, etc. and also includes lifting accessories such as chains, slings, webbing and Lewis pins.
- LOLER also requires that all equipment used for lifting is fit for purpose, appropriate for the task, suitably marked and, in many cases, subject to statutory periodic 'thorough examination'.

IMPORTANT: Checking Tools & Equipment

- Whenever you use any tool or piece of equipment you MUST carry out a thorough 'before and after' operation check.
- For example: A hammer drill - check the plug and cable for splits or cuts and check the body is not cracked, damp or damaged, check the drill bit is not cracked, etc.
- It is equally important to carry out the same checks in reverse before its item is put away.

Manual Handling
http://www.hse.gov.uk/msd/manualhandling.htm

- Only lift manually if there is no alternative ~ always ask for help wherever possible.
- If none is available, use a lifting aid such as a sack truck or a hydraulic pump-up truck.
- If you have to lift alone, make sure route is planned, free from obstacles and any loads are handled with a straight back using your legs to provide the lifting force as these are your strongest muscles and do not under any circumstances 'lift and twist'.
- Never, ever abuse your back!

Slips, Trips and Falls
http://www.hse.gov.uk/slips/

- These are the most common form of hazard causing accidents.
- Be aware of their causes and wear suitable footwear and clothing.
- Carry out a visual risk assessment and put suitable control measures in place before you begin any practical work.
- Define your working area, keep it tidy and don't leave any tools or equipment lying about for anyone to trip over.
- Always remember the time honoured Health & Safety maxim, *'A tidy site is a safe site!'*
- Be aware of the possibility of loose memorials or any suspect brickwork nearby.

Weather Conditions
http://www.hse.gov.uk/logistics/slips-trips-bad-weather.htm

- Sometimes we all have to carry out work in cold, wet or hot weather.
- Some types of stone, such as all polished granite for example, can be extremely slippery when wet so always wear suitable gloves whenever necessary.
- Multiple clothing layers help keep out the cold and water proof clothing will help keep you dry.
- In very hot weather carry a bottle of water to help prevent dehydration and sun blocker to prevent any sun damage to your skin.

Broken Glass

- Broken glass can be lethal ~ it is usually broken glass flower vases, jam jars, etc.
- Always have a check around the working area before starting work - beware of 'long grass areas' which may hide broken glass.
- Always use suitable gloves to protect the fingers and knee pads to protect the knees.
- Be very careful to check the ground carefully before carrying out a task.

Work Equipment
http://www.hse.gov.uk/pubns/indg291.htm

- There is little point considering carrying out a task unless you have the correct tools and equipment.
- They must be serviceable, in good condition and generally 'fit for purpose'.
- Carry out a quick visual check to ensure all is safe to use and a power check to ensure all is in working order before leaving the workshop.
- Any defects should be immediately reported to the management for their attention.

First Aid
http://www.hse.gov.uk/firstaid/

- H&S state that it is mandatory to have a correctly stocked First Aid Kit in the masonry workshops.
- Be aware that many items have a 'use before' date.
- It is also deemed 'Best Practice' to carry a portable Emergency First Aid Kit in any company vehicles.
- Perhaps one of the most important items of First Aid equipment out on-site could be a mobile phone to summon help in the case of an emergency!

Members of the Public

- In a workshop environment you can pretty well control foot traffic such as visiting customers however, a cemetery is a public place where people, particularly children, my walk near, or even through, your own working area.
- If possible, clearly define your working area with a sign or some road cones and always be polite and answer any questions the public may ask in a courteous and professional manner.

Vehicles

- We are all aware of Funeral Cortèges in cemeteries and churchyards, and of course members of the public generally use the cemetery's internal roadways, so everybody must be constantly aware of them.
- In addition to the public's vehicles, cemetery vehicles are very often moving about on-site.
- All this noise and movement will have an effect the working environment so the mason must be continually aware of his surroundings ~ this is known as a 'Dynamic Risk Assessment'.

Drug Paraphernalia
http://www.hse.gov.uk/alcoholdrugs/drugs.htm

- Sadly, drugs, and therefore, drug paraphernalia are part of our lives on the 21st century.
- This paraphernalia could include discarded syringes, razor blades, small spoons, etc.
- Do **NOT** touch anything like this which causes you to be suspicious and, if you are in any doubt whatsoever, contact the Cemetery Management, the Burial Authority or the Police.

Control of Exposure to Silica Dust
http://www.hse.gov.uk/pubns/indg463.htm

- Silica is a natural substance found in most rocks, sand and clay and in products such as bricks and concrete.
- In the workplace these materials create dust when they are cut, sanded, or carved, etc.
- Some of this dust may be fine enough to breathe deeply into the lungs causing serious harm to health.