Datchet Village Society

Conserving Datchet's Milestone

Report by Datchet Village Society

January 2019

Conserving Datchet's milestone

Contents

Current status

Datchet's milestone is Grade II Listed:
5130 DATCHET LONDON ROAD (south side) Milestone in pavement outside Church Cottage, SU 9877 5/14, Grade II. C18, stone with following inscription: London 20, Windsor 1, Colnbrook 3. Listing NGR: SU9882077076

The milestone, carved from Portland stone, was knocked over and damaged by a motor vehicle in September 2018. It has been temporarily cemented in place while a decision is made about its future conservation and possible relocation for its own safety.

It is in a parlous state. Milestones are like the roots of teeth; they are very long and are usually set deep below ground. At some point in its history, Datchet's milestone was cut and separated from its deep 'root'. The exact location of the 'root' is not known. There is currently nothing to anchor the milestone in place, making it particularly vulnerable to further damage by vehicular impact. The section of the stone closest to the road has been damaged previously and some of the lettering is missing. This lower section, where it touches the pavement, also suffers from salt-spreading on the road, rainwater sprayed from the gutter, and exhaust pollution. It has no gravel breather margin and the temporary cement repair is also detrimental, causing 'wicking'. In its current location, the milestone is suffering significant ongoing and disfiguring decay. Its location and insecure fixing represent immediate, potential threats to the well-being of this milestone. It is at real risk of damage or loss.

It has been proposed to relocate the milestone in order to protect it, to have it cleaned and conserved and the 'root' replaced.

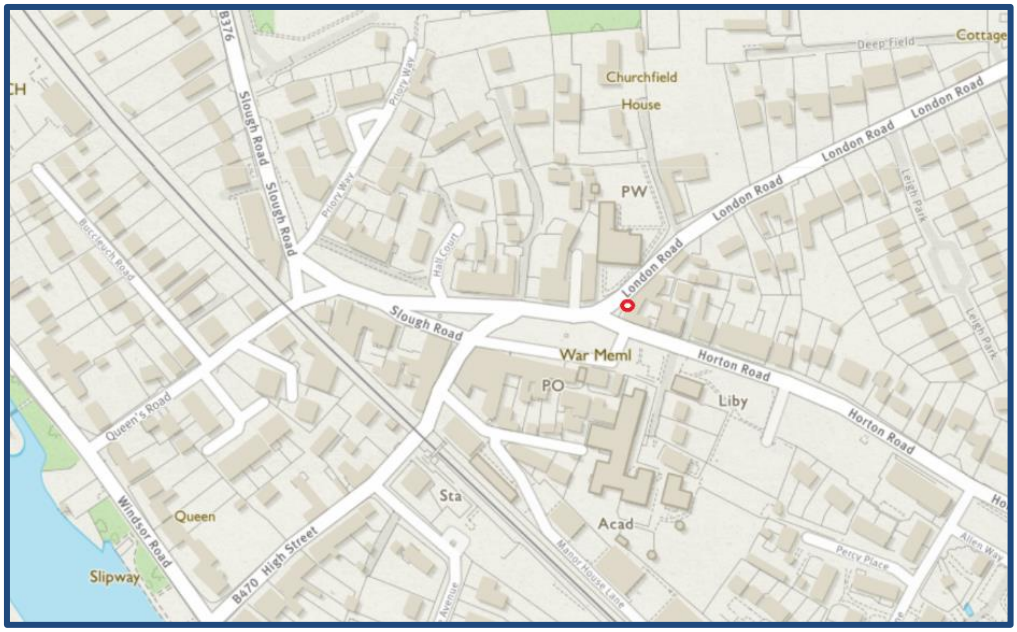
Location

Datchet's milestone is set in the pavement outside Church Cottage* on London Road, close to the junction with Horton Road and the Village Greens, and opposite St Mary's Church. It is inscribed with these distances:

- London 20 miles
- Colnbrook 3 miles
- Windsor 1 mile

The junction of London Road, Horton Road and The Green is one of the busiest junctions in Datchet. London Road, the B470, links the village with the M4. Horton Road is the B376 linking Slough with Staines. Traffic also flows through this junction en route to Windsor and Old Windsor.

The approximate location of the milestone is shown in red



**For more information about Church Cottage, one of the oldest houses in Datchet, see datchethistory.org.uk*

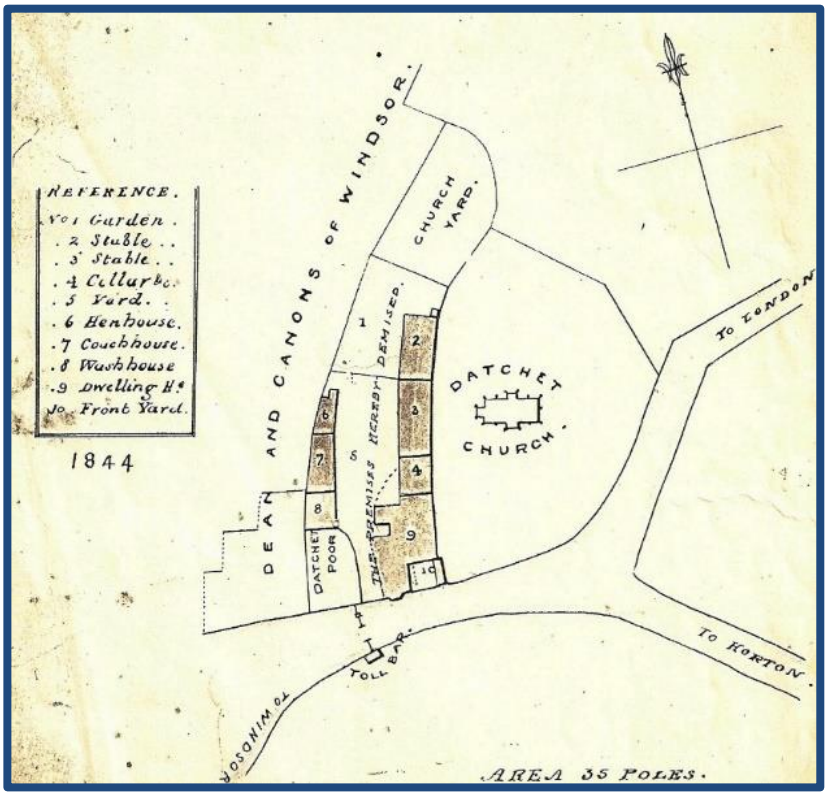
History

1600s

Today London Road is the main route leading out of the village towards Colnbrook and the M4, but it is not the original main road. In the 1600s, Horton Road was the old route to Colnbrook and the London–Bath road, while London Road was a narrow lane leading to Riding Court and Ditton Park, known as Churchfield Lane.

1768

In 1768, Churchfield Lane was upgraded and widened by the Colnbrook Turnpike Trust as a direct route to the London–Bath road, the modern A4. Turnpike Trusts erected milestones to mark out the length of their own roads and to navigate long distance journeys. In 1768 the Colnbrook Trust re-cut their earlier main road milestones and added new ones on their new side or branch roads, Datchet's milestone being one of them. It is the 20th milestone from London and would have been positioned close to the Toll Gate.



1844

On this map the toll gate or toll bar can be seen across the road right opposite the present-day Bridge cafe, (marked on the map as Datchet Poor) in approximately the same position as the zebra crossing. The toll house is indicated on the opposite side**.** Attempts to avoid paying fees were very common, and in Datchet there were complaints about wagons and horses being driven round on the grass and joining the road to Windsor by the present-day Manor Hotel.

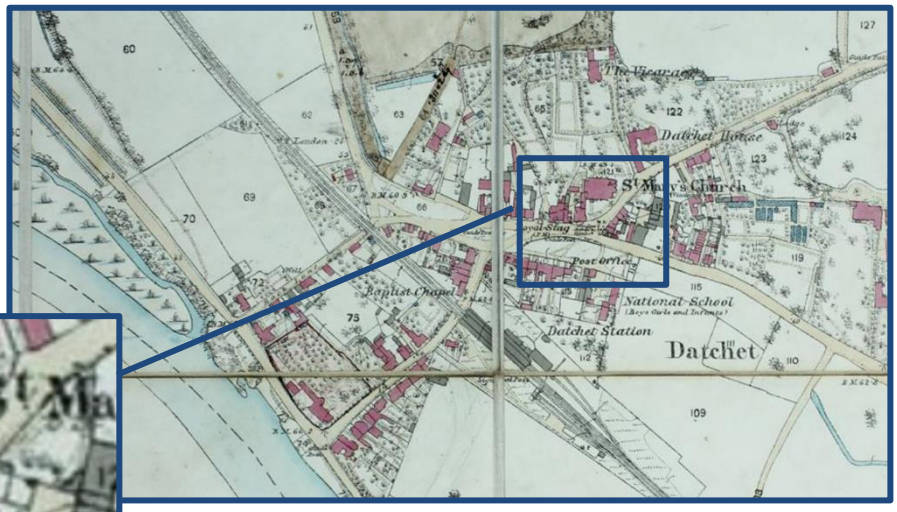
1860s

Datchet Village Society and the Barker Bridge House Trust recently purchased the 19th-century painting shown below. It has been dated around 1860 and illustrates the turnpike, toll gate and toll house in Datchet. The position of the toll house is consistent with the 1844 map, on the site of the present-day Green.

This detail focuses on Datchet's toll gate and toll house, where fees for using the turnpike road were paid. The tolls collected were used to keep main roads in repair. A Trust of local gentlemen and farmers would be formed, and in this district the Colnbrook Turnpike Trust was responsible for the road from Colnbrook to Maidenhead (our A4). The toll collector lived in the tiny cottage on the left of the toll gate.

1868

By 1868, the village greens had been created. The 1868 map indicates the location of the milestone. This appears to be in the same or similar location to its present position.



Previous conservation work

Photos: 2004

By 2004, there were serious concerns about the deteriorating condition of the milestone. Although its base had been eroded on all sides in the past, a chunk of stone had fallen off the bottom right corner and it was being seriously undercut at that point by rainwater sprayed up from the gutter. It used to be whitewashed regularly, as much for preservation as for visibility, but it was feared that coating the area of damage in situ would not solve the problem as the damp would be sealed in and continue to degrade the stone.

At the time, Alan Rosevear, the regional representative of the Milestone Society which keeps a watching brief on restoration and rescue projects all over the country, reported on the stone's condition. He was concerned that it was very likely to fall due to the undercutting, even without further damage caused by motor vehicles. He concluded that it was in a precarious position and was a risk to traffic and pedestrians.

It was suggested that the milestone might be moved away from the road edge to a new site close to the wall of Church Cottage. However, the Highways Department of RBWM (Royal Borough of Windsor and Maidenhead) warned that there is a very large manhole beneath the pavement and hardly any solid ground between that and Church Cottage. They would not consider digging a new hole for the stone so near to a house wall.

It was then proposed that the stone should be moved across the road to The Green where there would be access all round for future conservation work and where it would be safe from

traffic. The Green, being the site of the former toll house and gate, offered a strong historical connection in its own right. Also, The Green already houses two monuments which have been removed from their original sites for safety; the drinking fountain which was on a road edge in the middle of the village, and the horse trough which stood in Windsor Road.

RBWM's Conservation Department was consulted for permission to move a listed monument and they in turn asked English Heritage (now Historic England) for guidance. The Milestone Society was asked if there were precedents for moving milestones, and the following information was supplied by Alan Rosevear:

> *'The stone has been moved several times already. It dates from the 18th century but was turned and recut (by the Turnpike Trust) in about 1826 and hence moved then. It was almost certainly dug up and taken away in 1941 (along with almost all British milestones as preparation for a possible German invasion) and was probably re-sited to the church corner by the County Council around 1945. The stone was originally located on a gravel road, the Colnbrook turnpike, with at best an ill-defined footpath beside it. Tarred roads did not appear anywhere in Berkshire until the early 20th century and tarred footpaths even later. It has been lifted, moved and reset as the road around it changed. Hence the stone cannot be in its original context; it has been relocated several times to meet the changing situation around it. It is a fallacy to assume that the recent location is exactly its original or intended context.*
>
> *'The stone was required to denote mileages between towns. These were inevitably compromises (i.e. towns are never exact miles apart) and a leeway of a hundred yards might be expected. Hence it is just as relevant to have the 20-mile stone on the Green as on the corner. Changes in road layout mean that neither position is now exactly 20 miles from London (or Hyde Park Corner, the Standard for the Western Roads). However it is important to keep the stone on the same side of the road since the stone has an up-road and down-road side i.e. it is "handed".*
>
> *'Finally, I believe that the trustees of the turnpike and their surveyor would have taken a pragmatic view to siting milestones. They would wish the stone to be visible yet safe. At*

the time, a site opposite the church would have seemed to satisfy this but they would certainly have had no hesitation in moving a stone that was subject to damage. The replacement costs would have been so great that they would have moved the stone a short distance to where it could be seen better, would be safe from damage and would continue to fulfil its function as a distance marker.'

At the time, RBWM's Conservation Department and English Heritage both gave their consent for the milestone to be removed to a new, safer position on the village green. Datchet Parish Council initially approved the move but following a local election, the matter was discussed again. The owner of Church Cottage, also a councillor, was keen that the milestone should not be relocated and offered to pay for the work so that the expense would not be borne by the Parish Council. The milestone was taken away for conservation and replaced in the same position in 2006.

Photos: 2006

In 2018, the milestone was knocked over and further damaged by a van. It has been set back in place temporarily, using modern materials, while a decision is taken about its future.

The milestone no longer has its 'root' so very little of the stone sits below ground level. This makes it unstable and vulnerable to vehicular damage, however it is not possible to re-attach a root in its present location.

Advice on the positioning of milestones

The following information is taken from The Milestone Society website, see also Appendix 1:

- Milestones should be restored to the condition and position indicated by the earliest records.
- They should remain in public ownership with unrestricted public access and good visibility to travellers along the relevant road.
- The presumption is in favour of retaining the stone in its original position and condition, subject to proper research.
- Safety, access, visibility or road reconstruction may justify repositioning a milestone.

However, the Society recognises that these preferred outcomes may not always be possible or practicable and follows a hierarchical approach to assessing alternatives. The higher each case can be placed the better; a low option should not be pursued where a higher one is achievable. Where a stone enjoys statutory protection, alterations to position or character require consent (usually from the local authority) against an application with a rationale broadly following the precepts of this policy note.

The positional hierarchy

The milestone should be located on public ground, at a position in the descending order of preference:

1. at its precise original position, where the evidence allows (often where it was found),
2. at the earliest recorded map reference,
3. on the opposite side of the road to these positions if it is safer or more visible (provided the milestone is not "handed" so the inscription becomes incorrect),
4. within 25m of the original position but in a safer place,
5. within 100m of the original position but in a safer place with much better public access,
6. on an abandoned section of road provided travellers such as cyclists or walkers pass along the route,
7. on a new section of road at the closest distance, when the old road is no longer a through route for any type of traveller

8. outside a relevant public building or on public open space, provided it does not mislead,
9. inside a museum.

Factors such as loss of the original site due to redevelopment or road building, safe access for work, hazard to road-users, protection from the risk of vehicular impact, long term care or security, protection from serious soiling or excessive and constant water splash or tree drip may justify a lower option. If this is the case and alteration to the position or condition of the stone is accepted, the change should be recorded in the appropriate historic environment record (HER) together with the reasons for that change.

The Milestone Society website has also published guidance from Historic England, see Appendix 2. In 'A Guidance Note for the Conservation of Milestones, Stephen Parry, Dip Arch RIBA AABC, outlines the principles of best practice.

> *"Practical intervention should only be undertaken if the milestone or marker is suffering significant ongoing and disfiguring decay or is at real risk of damage or loss. It is important to understand that in attempting to restore a milestone to a former known state the accumulated patina of age will be destroyed and at worst, historically interesting features may be lost altogether or heavily masked. The present-day context of each stone should be carefully considered and reviewed before any action is taken; it may well be that a stone has 'grown old gracefully' and now sits so comfortably in its environment that any form of intervention would be unwelcome. Furthermore, it must be appreciated that some interventions, though well intended, will be irreversible and thereby change the stone or metal forever. Such actions are a last resort and should only be undertaken after all other options have been explored."*

In the guidance, Parry notes that, if the milestone is suffering significant ongoing and disfiguring decay, then a change of the local environment may be implemented. "*On heavily trafficked roads, salt and exhaust pollution can cause serious decay to natural stone. If possible, stones in this situation should be re-sited as far back from the carriageway as possible."*

Relocation

In its current site, close to the road edge, the milestone is "suffering significant ongoing and disfiguring decay". It is regularly splashed by rainwater and affected by exhaust pollution and salt. Its location and insecure fixing represent immediate, potential threats to the well-being of this milestone. It is at real risk of further damage from vehicular impact or loss.

Historic England recommends that stones in this situation should be re-sited as far back from the carriageway as possible, however, in this instance, it is not possible to set the milestone further back from the kerb. The Highways Department of RBWM (Royal Borough of Windsor and Maidenhead) has previously pointed out that there is a very large manhole beneath the pavement and hardly any solid ground between that and Church Cottage. They would not consider digging a new hole for the stone so near to a house wall. This also means it would not be possible to secure the milestone further by re-attaching a 'root'.

Taking the Milestone Society's hierarchy of positional preferences in turn:

1. The precise original position of Datchet's milestone is not known.
2. The position of the milestone indicated on the 1868 map corresponds approximately to its current position although, according to Alan Rosevear of the Milestone Society, it may have been moved several times.
3. Datchet's milestone is handed and so it cannot be positioned on the opposite side of the road. It has to be oriented correctly for the inscriptions to be relevant.
4. A safer site within 25m of the original position would be the village green. There is evidence on historical maps of the position of the toll house and toll gate in 1844, on the site of the present-day village Green.

Proposed site on the village green

As the milestone is handed, the relocation sites are limited. Datchet Parish Council, in consultation with Datchet Village Society, has located a potential site on The Green, close to the current position but in a much safer place, set back from the road edge.

The image from Google Maps, below, shows the current location, circled in blue, on the left and approximate proposed location on the right.

Benefits of the proposed site

- The proposed location is close to the position of the toll house and gate as identified in the 1844 map, providing a strong historical link between the milestone and the new site.
- The new site is further away from the roadside rainwater spray, salt spreading and exhaust pollution, and the milestone would not be in imminent danger of further damage by passing vehicles.
- This site allows the stone to remain oriented in the correct direction and be readable by passing traffic.
- Underground works would also be possible at this site. A 'root' could be re-attached to the milestone to secure it in position for the future. (The location of the old 'root' is not known.)
- There is also space to set the stone in a gravel breather margin to avoid wicking.
- If the milestone is moved, it may be possible to mark its previous site in some way.

Condition and conservation

The Milestone Society seeks to adhere to the founding principles of the Society for the Protection of Ancient Buildings. So far as they apply to the conservation of milestones these are to:

- Ensure that conservation/intervention work should be kept to a minimum, provided a good long-lasting result is achieved
- Use traditional techniques and 'breathable' materials in preference to modern plastic or cement-based solutions
- Carry out proper research, so that all decisions affecting the character of a milestone are evidenced and defensible.
- Where research is lacking, to conserve the stone as found and complete with its later overlays. These may reflect interestingly on changes in the way the stone has been used.

The condition hierarchy

The Milestone Society advises that any conservation should be mindful of and sympathetic to the following in descending order of preference:

1. the coating, lettering and colour indicated by old photographs or the residues on the milestone and the inscription of the original carving,
2. repairs involving pinning and gluing a large section of the original stone,
3. welding or bolting the original metal, painting in of eroded letters and making good eroded spots,
4. repairs involving replacement of larger sections of broken material, or recarving of inscriptions where it is clear that the original form can be replicated,
5. replacement of the monument with a new copy based on residues or similar markers in the series (this should indicate that it is a copy),
6. replacement with another marker that is not a true copy. (This should indicate that it is not the original marker).

Factors such as the need to retain the markers in a consistent, unbroken series, the requirement to have a readable inscription to give the marker context and the probability that the restoration will survive for a long period may justify a lower option.

Proposed conservation work

The advice of a stonemason has been sought. Andy Chalk of Architectural Heritage Conservation has worked at Windsor Castle and has already completed previous conservation work in Datchet; to the war memorial, Listed cemetery gates and an 18th-century tombstone.

The stonemason proposes that the missing lettering on the milestone from 'Windsor' and 'Colnbrook' should be replaced in the form of an indent (a replacement section of stone) with lettering. As the lower section of the milestone where it touches the pavement has suffered from salt spreading on the road and water spray, the stonemason recommends that the base should be replaced, in Portland stone.

The milestone would also be cleaned, the stone and letters repainted, and the stone relocated on the Green, where there is space to add a 'breather margin'.

There would also be a requirement to make good the pavement at the milestone's previous location. It might be possible to mark the previous location of the milestone in some way.

Datchet Village Society and Datchet Parish Council will continue to monitor the condition of the milestone.

Below: Google Maps view from London Road towards The Green. The milestone is in front of Church Cottage on the left of the image, opposite the churchyard on the right.

Photographic records

2004

2006

2017





2018



Milestone Society - Policy Note 1

Position & Conservation of Milestones

Milestones should be restored to the condition and position indicated by the earliest records.

Milestones should remain in public ownership with unrestricted public access and good visibility to travellers along the relevant road.

The presumption is in favour of retaining the stone in its original position and condition, subject to proper research.

Safety, access, visibility or road reconstruction may justify repositioning a milestone.

The Society recognises that these preferred outcomes may not always be possible or practicable and follows a hierarchical approach to assessing alternatives. The higher each case can be placed the better; a low option should not be pursued where a higher one is achievable. Where a stone enjoys statutory protection, alterations to position or character require consent (usually from the local authority) against an application with a rationale broadly following the precepts of this policy note.

The positional hierarchy – the milestone should be located on public ground, at a position in the descending order of preference;

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Factors such as loss of the original site due to redevelopment or road building, safe access for work, hazard to road-users, protection from the risk of vehicular impact, long term care or security, protection from serious soiling or excessive and constant water splash or tree drip may justify a lower option. If this is the case and alteration to the position or condition of the stone is accepted, the change should be recorded in the appropriate historic environment record (HER) together with the reasons for that change.

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- Where research is lacking, to conserve the stone as found and complete with its later overlays. These may reflect interestingly on changes in the way the stone has been used.

The Condition hierarchy –
Any conservation should be mindful of and sympathetic to the following in descending order of preference:

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Factors such as the need to retain the markers in a consistent, unbroken series, the requirement to have a readable inscription to give the marker context and the probability that the restoration will survive for a long period may justify a lower option.

The Milestone Society
This Version 2.0 edited by Alan Rosevear; 8th Dec 2009.

A GUIDANCE NOTE

FOR

THE CONSERVATION

OF

MILESTONES

Stephen Parry ***Dip Arch RIBA AABC***

2217
April 2006

INTRODUCTION

This document is intended to help the reader understand the fundamentals of conserving the ancient milestones, which play such an important part in maintaining links with our historic landscape in a rapidly changing world.

The advice is aimed at the amateur volunteer but is equally relevant as a starting point for the expert.

This document does not cover Safe Working Methods and Health and Safety in the use of products as these are addressed in separate papers issued by the Milestone Society (at www.milestone-society.co.uk).

THE PRINCIPLES OF BEST PRACTICE

Practical intervention should only be undertaken if the milestone or marker is suffering significant ongoing and disfiguring decay or is at real risk of damage or loss. It is important to understand that in attempting to restore a milestone to a former known state the accumulated patina of age will be destroyed and at worst, historically interesting features may be lost altogether or heavily masked. The present day context of each stone should be carefully considered and reviewed before any action is taken; it may well be that a stone has 'grown old gracefully' and now sits so comfortably in its environment that any form of intervention would be unwelcome. Furthermore, it must be appreciated that some interventions, though well intended, will be irreversible and thereby change the stone or metal forever. Such actions are a last resort and should only be undertaken after all other options have been explored.

In order to achieve the right outcome, the following processes should always be implemented before any work is undertaken:

1. Assess the local environment and note any obvious and immediate potential threats to the well being of the milestone.
2. Make a written and photographic record of the condition of the milestone.
3. Monitor masonry items at regular intervals over a period of at least 12-24 months.

During the assessment period the following actions should take place:

a) Establish the significance of the milestone by researching its history and liaise with the Local Authority, to check whether it is Listed (the majority are). Establish lines of communication so that any actions you wish to take can be properly authorised by the appropriate Department or landowner.

b) Carry out any simple and non-invasive tasks that might be needed to mitigate the threats identified at item 1 (e.g. removing ivy, saplings or annual vegetation growing against the marker or removing debris that may have collected around the marker).

c) Report any serious threats identified in item 1 above to the Local Authority (e.g. risk of damage from an unsafe wall against which a marker might be located).

d) It is highly likely that a stone marker will be host to a variety of lichens and the British Lichen Society can be contacted at www.britishlichensociety.org.uk to establish whether the site may contain any rare or important species that are protected as Special Scientific Interest (SSI).

At the end of the monitoring period, an informed decision can be made over the following issues:

- Is any intervention other than minor maintenance of the landscape around the milestone actually necessary?
- Is the milestone suffering 'significant ongoing and disfiguring decay'?
- What practical measures or on-going assessment are necessary?
- Who will undertake this work and monitor the condition to establish the need and frequency for future intervention?

RECOMMENDED CONSERVATION ACTIVITIES

If the milestone is in a sound condition, actions should be limited to the following:

- Keep any vegetation around the milestone under control, which if appropriate, can be assisted by the creation of a gravel margin around the base of the stone (see standard specification b in appendix).
- If disfigured by unsightly algae growth and loose dust and dirt layers, lightly clean using only a dilute solution of detergent and clean water and a medium - firm bristle brush. Do not scrape or abrade the surface and if old paint layers are present, seek to retain these as far as possible. Rinse down thoroughly with clean water on completion.

Light cleaning may be all that is necessary as this sample test using nothing more than a toothbrush and water demonstrates.

If the milestone is suffering significant ongoing and disfiguring decay, the following actions may be implemented:

A. Changing the local environment

1. Proximity to highway;
   On heavily trafficked roads, salt and exhaust pollution can cause serious decay to natural stone.
   If possible, stones in this situation should be re-sited as far back from the carriageway as possible (see standard specification 'a' in appendix).

2. Vegetation;
   The presence of excessive vegetation around the stone can be responsible for both surface decay and, by concealing the stone, lead to accidental mechanical damage. Overhanging branches of small trees should be cut back and any shrubs removed, particularly if roots are likely to disrupt the footing of the stone. Grass and annual vegetation should be cut back using a strimmer, taking care to avoid the milestone, and ivy etc removed completely. It is advisable to create a gravel margin around the stone to restrict the rate of encroachment of new growth (see standard specification 'b').

3. Paved areas;
   Decay of stones in paved areas can be caused by a 'wicking' effect, in which entrapped moisture around the footing is drawn up into the stone. This condition can be mitigated by forming a gravel 'breather' margin around the stone (see standard specification 'b').

4. Re-setting stones;
   Stones which have fallen or lean severely should be raised and re-set. Similarly, stones that have sunk or are largely obscured by a rise in the surrounding ground level should also be re-set (see standard specification 'a').

Lost in the undergrowth and severely tilted, this stone needs attention.

B. Treating the marker itself

1.0 Stone

1.1 In order to select the most suitable surface treatment for a given milestone, it is first necessary to ascertain the geological nature of the stone from which it had been made.

Unless there is already a record of other similar stones used for milestones in the locality, an identification exercise will be necessary. The geology of the British Isles is well known and a list of books and publications is included in the bibliography in the appendix to this document, together with a list of stone collections.

Professional stone identification services are also offered by a number of independent consultants who specialise in the assessment and selection of Stone. These can be located through the National Stone Directory, the Geological Society or the Institute of Quarrying. Further details are included in the appendix under 'useful contacts'.

1.2 Surface preparation;

- Clean the stone with a medium - firm bristle brush by working from the top downwards to avoid dirt being transferred on to an already cleaned surface using a dilute solution of detergent and remove with clean water. Avoid the use of wire brushes or metal tools and employ only wooden scrapers to dislodge well-adhered material; the intention is merely to remove organic material, friable paint and loose dirt. Ingrained blackening, which is particularly common to grit stone for example, cannot (and need not) be removed by this technique.
- Remove any remaining paint films using a suitable paint remover such as Nitromors Green Label or similar, making certain that the paint remover has as short a dwell time on the stone surface as possible and is fully neutralised on completion by thorough washing of the treated area with clean water.
- Apply a recognised conservation fungicide (see Appendix), working strictly to the manufacturer's instructions, and brush down with a medium - firm bristle brush to remove the remnants of organic growths once the stone is dry.

1.3 Surface treatment;

- Deep voids and cavities and any wide laminations or cracks can be filled with an appropriate conservation-grade filling medium. Rather than attempting to mix a suitable mortar using the basic ingredients of aggregates and binding medium, ready mixed proprietary mortars, based upon Natural Hydraulic Lime (NHL) and aggregates should be used. These products can be built up in layers to fill the deepest of cavities, with each successive layer keyed to improve adherence, while at the same time also allowing featheredge finishing.

Application of a conservation-grade filling medium around delaminating edges would greatly reduce the rate of decay in this stone.

These products will not affect the nature of the original stone and can be removed comparatively easily if necessary at any future stage (see guidance note 'e' in appendix).

The use of surface filler should be restrained and generally limited to deep voids only. Similarly, the temptation to rebuild missing areas or edges of the stone or to recreate missing features should also be avoided. Overuse of fillers will create a 'plastered' appearance to the surface of the stone, masking the patina of age and producing a finish quite unlike that of the original mason's work.

- The application of a microporous, silicate-based paint is an acceptable means of both consolidating the surface of the stone and producing a satisfactory decorative finish. These products are both safe and relatively quick and easy to apply and therefore lend themselves well to less skilled user or to working in very remote locations. General guidance for their use is given in standard specification 'd' in the appendix but each manufacturer will give more specific instructions. Pre-treatment with proprietary consolidants should be avoided. In opting to use a proprietary paint system, it must be recognised that one is departing from traditional methods and, in some cases, reversibility can be compromised.

- For all stones, except sandstones rich in silicates (see item 1.1 above), the application of limewash should be given consideration, as this will have been the traditional means by which surface protection and bright decorative finish were achieved. Nowadays prepared and tubbed products are becoming widely available and where successfully applied these provide a good sacrificial / protective coating which reinstates the historic appearance of a limewashed stone. Where the surface of a stone has become very friable, a graded fine aggregate can be added to the first and second coats. The manufacturer's literature will advise further in this regard. Limewash is strongly alkaline and should not therefore be used without a clear understanding of the Health and Safety implications and a careful assessment of the working conditions on any given site. Unlike masonry paints, successful limewashing can necessitate the application of numerous coats, particularly when a stone is highly porous. As the work proceeds, each successive coat also needs careful protection from the weather (including warm sunshine) in order to achieve a satisfactory result (see standard specification 'c' in appendix). The performance of limewash can be varied by the addition of materials such as casein or tallow, both of which are routinely used in the

This stone has developed an attractive patina of age which could easily be lost by 'over restoration'. It would be a good candidate for lime wash.

preparation of limewash for external application. The performance of limewash on such vulnerable objects as milestones in heavily trafficked and polluted locations has yet to be fully assessed but it is today being used successfully on road-side buildings in various parts of the country.

Without doubt, limewash lacks the convenience of silicate-based paints but once the techniques have been mastered, the end result can be very satisfying as it offers the user the opportunity to rediscover a traditional skill that, until recently, has been dying out. A large number of courses are available throughout the UK on the use of lime and limewash, details of which can be found on The Building Lime Forum website www.buildinglimesforum.org.uk.

- If so wished, lettering can be picked out in a microporous masonry paint. Re-cutting of letters should be avoided but where the reinstatement of a missing letter is needed to complete a word that would otherwise be unintelligible, careful tracing in and painting can achieve a satisfactory result. Where text is badly decayed or completely lost, the temptation to replicate in paint should be resisted, as the results are unlikely to be convincing and wording may be based on conjecture rather than clear evidence.

Obscured by shrubbery and heavily contaminated with algae, this hard limestone marker has been very successfully restored by cleaning and repainting with silicate based paint.

1.4 Major repairs;

The following conditions may be encountered occasionally, all require the services of an expert stonemason or stone conservator and repairs should not be attempted by the unskilled volunteer:

- Corroding iron staples, cramps and fixings: Iron cramps and fixings are often found in some larger mile markers, where they have been used either as a past repair to fractures or as a means of securing one element to another. If corrosion is severe and particularly if hair cracking is evident in the stone around the locating sockets, the cramps / fixings should be removed and replaced in bronze or stainless steel.

Corroding iron staples may cause fracturing. Removal is a task for an expert.

- Significant loss of stone: If the 'rust jacking' caused by corroding iron cramps / fixings or plate bolts has resulted in the fracture and separation of a piece of stone, the separated section should be salvaged and refixed in its original location. The exact specification for the repair will depend upon the nature of the break but the use of small stainless steel dowels set with lime (or occasionally epoxy or a polyester) grout may be necessary, followed by careful grouting and pointing with hydraulic lime mortar.

- Indenting stone: Rather than filling deep cavities with the mortar-based material specified at 1.3, an indent repair using natural stone could be considered. This however is a highly skilled task and such work should only be entrusted to suitable skilled and experienced masons.

- Severe delamination: If a stone is at risk of falling apart due to delamination, it may be possible to secure the laminating surfaces by drilling and inserting a number of small stainless steel pins set with epoxy mortar. Voids can then be bridged by syringe-injection of a grout composed of a diluted mixture of NHL 2 natural hydraulic lime and finely sieved silica sand and then surface-filled with the mortar repair described in section 1.3 above.

2.0 Cast Iron

2.1 Assessment;

The condition of both markers and marker-plates should be assessed to establish whether conservation work can take place insitu or removal to a workshop is necessary. Because cast iron is a brittle material that is easily fractured and difficult to repair, in-situ conservation is almost always the preferred option and removal should only be considered in the following circumstances:

- Severe corrosion, leading to complete perforation of the plate.

- Complete breakdown of plate fixings or stone sockets.
- Severe mechanical damage to a marker.
- All fixings are accessible and easily released.

In spite of its very damp location, this marker is surviving well. Repainting in situ is all that is required.

2.2 Repairs;

Welding of cast iron is possible but it is highly skilled work that is best carried out in a workshop and success cannot be guaranteed. However, modern epoxy adhesives can also be used and these produce excellent results if used with care and by properly following the manufacturer's instructions.

2.3 Fixings;

Existing fixings should be retained unless corroded to the point of failure or at serious risk of splitting a backing stone.

If fixings are to be replaced, replica items should be used, manufactured from stainless steel. The fitting of an inert (nylon or similar) washer between the bolt head and the cast iron is recommended.

This fixing is corroding severely and might best be replaced. Nuts on back of stone are easily accessible.

2.4 Re-painting in-situ;

- Remove as much paint as possible using a proprietary paint remover and scrapers. Make sure that the surface is thoroughly washed with clean water on completion.
- Carefully de-rust any corroded fixings with a scraper and wire brush. Where severe corrosion is present between bolts and backing plates, this should be carefully chipped out and the area treated with a proprietary 'rust converter' (available in most automotive stores).
- Wire brush the surface of the iron back to a bright surface and finish with steel wool.
- Mask the backing stone before painting a face plate.
- Apply the following paint specification:
  One coat of zinc rich primer followed by one coat of micacious iron oxide paint and finish with two coats of tractor enamel. Text can be picked out in black enamel.

2.5 Repainting in the workshop;
It would be advantageous to defer paint removal until the item is in the workshop. All faces can then be blast cleaned back to bright metal. **Note:** Precautions must be taken when removing old paint that may contain lead.

Redecoration can be carried out as given above but again, taking advantage of the workshop conditions, two pack epoxy paint can be used for the finishing coat to provide a more durable surface.

3.0 Replication

3.1 If a stone or cast iron item has been completely lost, it may well be justifiable to replace it with a replica.

There is no necessity to produce copies in like-for-like materials but a record should be made on site to inform the visitor of the change.

Stone may be reproduced in re-constituted stone or reinforced concrete. Cast iron plates or markers are best reproduced in cast iron or cast aluminium. Glass fibre could be used to replicate cast iron markers, however, it should be noted that the lightweight of glass fibre will necessitate secure fixing to a concrete foundation and the material is extremely vulnerable to physical damage in an outdoor environment.

Replication should only be carried out where all meaningful remains of the original marker have been lost and the Local Authority has given permission for the work.

3.2 Reinstatement of large pieces of a severely depleted stone marker is to be discouraged, as it will inevitably necessitate the removal of yet more original material in order to make a safe fixing for the new. In such instances, it would be preferable to erect a replica close to the original and provide suitable interpretation on site.

C. Recording and on-going maintenance

A written record should be kept of each stone that has been included in the conservation programme. The following information should be included, together with photographs:

- The condition prior to initial monitoring.
- The condition at the end of the monitoring period.
- What action, if any was initiated and why.
- The condition upon completion of any conservation work.

If a replica marker is erected, it should be fitted with an engraved plaque of stainless steel on the back face, informing the visitor of what has taken place and the date at which this occurred.

If so wished, renovations may also be recorded on site but in this instance nothing should be attached to the marker itself. The preferred solution is the fixing of the plaque horizontally at ground level on a small concrete footing, flush with the surrounding surface and as close as practicably possible to the marker. In urban setting a small wall-fixed plaque might also provide an acceptable solution, subject to appropriate permissions.

The care of markers is an on-going commitment and as well as routine 'ground maintenance'; a regime of regular 4-yearly inspection is recommended. This will allow accurate monitoring of decay and renovation to take place. The inspection should result in the production of a brief written record accompanied by photographs. It is likely that newly limewashed markers will need a fresh coat as part of the 4-year inspection. Paintwork may benefit from some remedial work also but this should last well enough to allow more extensive work only at the 8-year interval or more.

APPENDIX OF STANDARD SPECIFICATIONS AND PRODUCT GUIDANCE NOTES

Standard Specification 'a': Re-siting of stones

Lifting will generally require mechanical hoists - do not attempt without Health and Safety check. Use a contractor with appropriate skills and insurance cover.
Do not set in concrete. Back fill with selected on dug material (not top soil) well consolidated. Cobble packings may be used to improve consolidation if needed.

Standard Specification 'b': Forming gravel margins around stone

In areas of vegetation the purpose of the margin is to reduce the rate at which new vegetation colonises the ground around the stone. Therefore the margin needs to be as wide as possible, 900 mm from the face of the stone on all sides would be a good starting point if space is available. In paved areas the margin is intended as a 'breather zone' and 300 mm will be sufficient.

The margin should be excavated to a depth of 100 mm, exposing the natural substrate, lightly compacted. A treated timber edge board should be fixed on timber stakes to define the perimeter of the margin. The excavated area should be treated with weed killer and overlaid with a geotextile membrane. The margin should then be backfilled with clean pea gravel to the full depth of the excavation.

Standard Specification 'c': Application of limewash

Limewash is strongly alkaline, proper protection, such as goggles, gloves and long sleeved overalls should always be worn and manufacturers health and safety advice on their data sheets supplied with the product should be carefully followed throughout.

Limewash has different characteristics to modern paints and must be applied in a different fashion. The material is a calcium hydroxide suspension in water and as the water evaporates, the calcium hydroxide readily combines with carbon dioxide in the atmosphere to form calcium carbonate. As this process takes place, the limewash hardens and bonds with the substrate. In its natural state, limewash dries to a brilliant white but pigments can be added.

Limewash should be applied with a longhaired bristle brush making sure that it is thoroughly worked into the surface of the stone as evenly as possible. Finish by burnishing the coat using a dry brush in a light circular motion.

All limewash, whether pigmented or natural, will appear semi-transparent when first applied. Do not be tempted to overcome this by applying a thicker coating in one application. Always build up in a succession of evenly applied thin coats, allowing each to dry thoroughly before applying the next. If the stone surface is highly porous, the first coat should be thinned 50:50 with clean water.

Protect from strong winds, frost and direct sunlight after application until dry and do not use in very damp or wet conditions. The number of coats required will vary from stone to stone but a good result should be achieved in most cases by the application of 4 or 5 full coats over one or two thinned coats.

If any areas of a stone are crumbling badly, local treatment with limewash mixed to a creamy consistency with finely crushed limestone will serve to consolidate the surface before the finishing coats are applied. The addition of a small quantity of skimmed milk will help the coating to flow and enable it to be worked into the defective stone without dislodging fragments. Take care not to fill any engraving with this mixture.

Standard Specification 'd': Application of silicate-based paints

The following specification is issued for general guidance only, manufacturer's instructions may differ but the general principles should still be followed. It should be noted that the intention is to produce a surface finish that will resemble limewash as closely as possible, leaving the natural surface of the stone clearly visible under the paint.

Build up surface consolidation with 3 coats of clear potassium silicate diluted with clean water;

Coat 1 at 1:3 potassium silicate: water
Coat 2 at 1:1 potassium silicate: water
Coat 3 at 3:1 potassium silicate: water

Finish with one undiluted coat of potassium silicate with pigment added.

Note that silicate paints should not be applied directly to surfaces that contain residual lime.

Product Guidance Note: Preparatory Natural Hydraulic Lime Mortars

These are usually neutral white or pre coloured mortar based on Natural Hydraulic Lime and aggregates, supplied in 1Kg to 25Kg bags to which water is added to produce a workable filling medium.

The mortar can be mixed manually or mechanically by whisk for 3-5 minutes and by adding up to 180 ml water per kilogram of mortar.

The application surface must be clean and free from dust and oils. On porous surfaces, ensure that suction is controlled by pre-wetting and apply the mortar before this is fully dry. Never apply to surfaces that are over saturated or have standing water.

The minimum thickness is 5 mm and this can be dressed or cut back to a feather edge. If thickness of more than 40 mm is required, apply in layers of a maximum of 40 mm, with each one approximately 24 hours apart.

The mortar should be well pressed back in place and successful layers keyed to increase bonding between layers. If required, the mortar can be re-compacted by pressing after a couple of hours to avoid possible shrinkage marks due to suction of the water content into the background stone.

Shaping and forming of details can be carried out for up to 1 week after placing the mortar by scraping to profile or level with metal tools, such as the edge of a trowel, steel float or spatula however most shaping and finishing work can be done within 24 hours.

BIBLIOGRAPHY AND USEFUL CONTACTS

BIBLIOGRAPHY

British Geological Survey, 2001. *Building Stone Resources of the United Kingdom.*
A 1:1000 000 scale map showing the location of historic and operating building stone quarries superimposed on a basic geological map of the U.K.

British Geological Survey, *Regional Geology Guides.*
A series of 20 books providing an overview of the geology of different regions of the U.K. These contain references and the details of the 1:50 000 scale geological maps covering each of the regions. (also see web site)

Clifton-Taylor A & Ireson A S, 1983. *English Stone Building,* Victor Gollancz Ltd, London.
Although only discussing buildings, these were normally constructed from local stone and therefore provide some guidance on local materials. Covers stonemasonry and decorative work.

English Heritage, 2006. Identifying and Sourcing Stone for Historic Building Repair. English Heritage Publishing, London.
This guide discusses identifying stone as well as locating compatible replacement material. It contains a simple, non-technical guide to stone identification.

Howe J A, 1910. *The Geology of Building Stones.* Reprinted 2001, Donhead Publishing Ltd.
Written at a time when considerable use was still being made of building stone, this book covers many stones that were used up to the 19th century but have since been forgotten.

Schaffer R J, 1932. *The weathering of Natural Building Stones.* Department of Scientific and Industrial Research, Building Research special Report **18.** Reprinted 2000, Donhead Publishing Ltd.
This classic work, still valid today, describes the reasons and mechanisms for weathering and is therefore important when studying features constructed of stone.

In addition to these general works, there are numerous books and pamphlets covering the stone building materials of different counties and even towns and cities. For example:

Arkell W J, 1947. *Oxford Stone.* Faber and Faber Ltd. Reprinted by County History Reprints, S R Publishers Ltd.
Dean M, *A guide to the building stones of Huddersfield.* Holmfirth Adult Education Geology Group.
Gale A W, 1991. *The Building Stones of Devon.* The Devonshire Association.
Perkins J W, Brooks A T & Pearce A E McR, 1979. Bath Stone, a quarry history. Department of Extra-mural Studies, University College Cardiff.
Perkins J W, 1984. *The Buildings Stones of Cardiff.* University College Cardiff Press.
Purcell D, 1967. *Cambridge Stone.* Faber and Faber Ltd, London.
Scard M A, 1990. *The Building Stones of Shropshire.* Swan Hill Press.
Sutherland D S, 2003. *Northamptonshire Stone.* The Dovecote Press, Dorset.
Thomas J, 1998. *Stone Quarrying.* Discover Dorset Series. The Dovecote Press, Dorset.

USEFUL CONTACTS

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ACKNOWLEDGEMENTS

This note has been prepared with the kind assistance of English Heritage, Dr. David Jefferson, and the Milestone Society.