EXCAVATIONS AT ST BRIDE'S HAVEN, PEMBROKESHIRE, 2009-11

FINAL REPORT

Prepared for Cadw by Dyfed Archaeological Trust

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Gan / By

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Cadw

Llywodraeth Cynulliad Cymru
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SUMMARY

Following the evaluation of the site in 2009, The Dyfed Archaeological Trust (DAT) undertook a larger excavation at St Bride's Haven, Pembrokeshire (NGR SM 8021 1094) for four weeks in March and April 2011. Over 35 graves were excavated, however, due to acid soil conditions, bone preservation was extremely poor; some graves contained no bone, others only skull fragments and teeth. Some burials, however, were slightly better preserved.

Specialist analyses were undertaken in order to provide comparative data with other early medieval cemetery excavations undertaken in recent years. However, due to the poor condition of the bone assemblage, the results were disappointing. Only one bone sample yielded enough collagen to obtain a stable isotope value. This was also the only burial for which an AMS date could be obtained.

Despite the lack of useful osteological data, the form of the burials and the layout of the cemetery demonstrate several interesting characteristics for comparison with other sites investigated as part of the Pembrokeshire Early Medieval Cemeteries Project.

An iron knife and a lead bead-like object were found within separate burials.

Geophysical survey of the cliff top area was undertaken during the project, but the results were not clear enough to provide much information prior to the excavation. Geophysical survey was also undertaken in the vicinity of St Bride's Church. This suggested several enclosure ditches and some possible houses associated with burgage plots, located to the west and south of the present day churchyard.

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INTRODUCTION

Project background

The site lies at NGR SM 8021 1094 within the Pembrokeshire Coast National Park, close to the popular beach of St Bride's Haven. It is one of approximately 38 known or possible early medieval cemetery sites in Pembrokeshire.

In 2009, Dyfed Archaeological Trust was grant aided by Cadw and Pembrokeshire Coast National Park Authority (PCNPA) to undertake an archaeological evaluation of the site to clarify its nature, extent and survival. The main goal of the project was to obtain information on the extent, complexity and significance of the archaeological resource to inform the future management of the site.

Various options for mitigating the impacts of coastal erosion on the site were identified, with the preferred option being to excavate the cemetery to obtain as much information about it as possible in advance of its eventual destruction.

In 2011 a four week excavation was undertaken to excavate a significant proportion of the known extent of the cemetery, with the goal of recording its character and extent through a process of 'preservation by record', and thereby solving the problem of loss of cultural material to erosion for several decades, if not centuries.

In addition to the archaeological objectives, community engagement and involvement was an important aspect of the project. Local volunteers undertook the majority of excavation, under the supervision of DAT staff.

Site description

St Bride's Haven is a small, sheltered north-facing inlet on St. Bride's Bay (Figure 2 and 3; Plate 1; Photo 56). To the south of the inlet is a low-lying flat valley with two streams flowing into the inlet.

The excavation area is located immediately south of the low cliffs at the back of the beach, to the east of the restored lime-kiln, and to the north of the present church (Figures 4, 5 and 6). For several centuries, graves have been observed eroding out of the cliff face.

The eastern limit of the area is defined by a stone wall built around the edge of a former pond. Much of the site was formerly covered with gorse and brambles, but these were cleared to enable the geophysical survey and excavations to proceed. Two mature, 'wind-pruned' Ash trees located between the cliff edge and the car park area were left.

Historical and archaeological background

St Bride's church (see Photo 55) is dedicated to Saint Bridget (aka St Fraed, St Bridig), who is thought to have come from Ireland to Pembrokeshire *c*.550-600AD and possibly to have established a nunnery at St Bride's. St Bride's was possibly mentioned in an early 13th century source, as rendering a pension to Ewenny Priory, Glamorgan (Conway Davies, 336). There are no known earlier documentary references.

A Group I inscribed stone (PRN 46854), of probable 5th -7th century date (Edwards 2008) is recorded by or on behalf of Edward Lhuyd (in about 1698) as having been found 'On ye sea shore near St Bride's Pembrokeshire'. The record includes a sketch of the stone which appears to be a flat slab with vertical downwards lettering that appears to read 'Awaaos' or 'Avvaos'. The letters have no known meaning, but may be incomplete (Edwards 2008). The stone is now lost. The cemetery is traditionally associated with a medieval chapelry (PRN 3138) also

recorded by Edward Lhuyd in *c*.1698 (BL Stowe MS 1023, fo 23).

The extent and exact location of either an ecclesiastical or other settlement during the medieval period is unknown. The settlement was traditionally founded by a Norman, William de St Bride, who was shipwrecked off the coast in the 12th century (Ludlow 1995, 5)

Two sources suggest the remains of the chapel were later used as, or perhaps demolished to construct a salting-house. Fenton's early 19th century record suggests that that the chapel is no longer visible:

'*In the little creek which almost comes up to the churchyard wall there was in former days a great fishery of herrings; and close on the shore a little raised above the beach stood a small chapel, where the fishermen were used to put up their prayers for their success and averting the dangers of the sea, and round which they were buried, as to this day many stone coffins are seen peeping out of the crumbling earth, eaten away by the sea at high tides*.'. (Fenton 1903 edn)

Fenton also records that:

'*There is a tradition that out of the ruins of the chapel a salt-house for the convenience and use of the fishery was erected, and from that time the fishery failed, which occasioned the following distich:*

> *'When St Bride's chapel a salt-house was made,*
>
> *St Bride's lost the herring trade'. (Fenton 1903 edn)*

In 1833 Lewis appears to suggest that the remains of the chapel were still visible:

'…. *at the neck of a small inlet from the bay, which flows up almost to the churchyard, forming what is now called St Bride's Haven. A considerable herring fishery, which has been discontinued for many years, was formerly carried on here with very great advantage, and there are still remnants of an ancient chapel on the beach, which according to tradition, was subsequently appropriated as a salting-house for curing the fish. In the cemetery belonging to this chapel were numerous stone coffins, of which several have been washed away by the encroachment of the sea, which has here gained considerably on the shore, as was proved some years ago, during an extraordinary recess of the tide, by the discovery of several stumps of trees.*' (Lewis 1833)

These accounts have generally been understood to suggest that the chapel has long since been lost to erosion, but neither account definitively states that this is the case. It seems likely that various buildings and structures associated with the fishing industry, and later with the lime trade (a 'three-quarter circular' type limekiln with two rounded drawing arches is situated above the beach) would have been present at St Bride's Haven. These may have been built from, or incorporated the chapel walls, and it remains possible that the chapel location still survives somewhere behind the beach.

Another local tradition holds that the westernmost part of Cliff Cottage (to the north of the cemetery) was formerly a 'fisherman's chapel'. The building does indeed seem to be of some antiquity, and has an interesting blocked stone arched doorway and a small window on the seaward side (Photo 4). The base of the walls also have a distinct batter. The present owners say that they have a photograph of the house before it was pebble-dashed, in which it is possible to see arched window openings in the front elevation. Unfortunately, it has not yet been possible to see the photograph.

In 1985 two radiocarbon samples obtained from bones eroding from the cliff were processed at the department of Plant Sciences, University College Cardiff. Sample

CAR917, from a cist burial produced a date of 1000 +/- 70 b.p (810-1090 Cal AD at 2 sigma). Sample CAR931 from a simple dug burial, provided a date of 150 +/- 60 b.p. (*c*.1650 Cal AD at 2 sigma.) was obtained. The 17th century date may suggest that burial rights continued in the chapel cemetery after the later church was built, or that a tradition of sanctity was maintained there (Ludlow 2003).

The fabric of the church is probably 14th century at the earliest, but an 'Ecclesia de Sancta Brigida' was listed in the Taxatio of 1291 (Record Commission 1802). The church was always a rectory in the gift of the lord of the manor. The list of rectors begins 1377 (Green 1913 273-4) but the present rectory building appears to be primarily 18th century (Ludlow 1995, 6).

Further inland are the ruins of a manor house known as 'The Abbey' (PRN 3139). The bulk of the buildings are of post-medieval date, but at its core is a tower house of possible 15th century date. At St Bride's Green are the remains of ornamental fishponds (PRN 27983). These appear not to be of medieval origin, but to relate to the Kensington Estate. The site and extent of settlement at this time is again unknown, but by the 17th century the parish numbered 16 hearths (Ludlow 1995).

The tithe map and apportionment for St Brides Parish shows that by 1839 main the settlement consisted only of the rectory and a terrace of cottages built c.1800 (Ludlow 1995, 7).

The known history and archaeology of St Bride's therefore suggests that in the past there was likely to have been much more settlement, commerce, industrial and religious activity in the area than is apparent today.

In addition to occasional monitoring (Crane 2006; Crane 2003; Murphy 1997) and recording of the eroding burials (Ludlow 2005), two 'watching briefs' on groundworks undertaken in the vicinity have been carried out (Ludlow 1995 and Crane 2004). In both instances, no significant archaeological features were revealed.

Tithe maps, and the Ordnance Survey 1st and 2nd edition mapping do not depict any significant buildings or structures that are not still extant today. No other maps offering useful depictions of St Bride's Haven have been identified.

Methodology

Excavation

An excavation area of approximately 200 sq m was originally proposed. In the light of a variety of constraints, however, a smaller area was excavated, of irregular shape covering an area of approximately 85 sq m. A 'mini-digger' was used to remove turf and topsoil down to the top of archaeologically significant deposits. Due to the cliff-top location of the site and the involvement of volunteers, a 2m berm was preserved between the site and the cliff edge to allow a safe working area. The berm also prevented the excavation inadvertently exacerbating the process of coastal erosion, and minimised the visual impact of the excavation on the landscape, specifically upon the cliff face which is included in a SSSI partially for its geological significance.

Excavation of burials closer to the cliff face would require additional health and safety measures, and would potentially require specialist involvement in reinstatement to prevent damage to the SSSI and general appearance of the Haven. The excavation was limited to the north by the coastal pathway and a stone wall. To the south the excavation area was limited by an area of rough terrain and the presence of a lime kiln. Owing to these constraints, it was not

possible to open up a sufficiently large area to link the 2009 trenches with the 2011 excavation area.

All archaeological features were hand-excavated, and recorded using the standard system employed by Dyfed Archaeological Trust. Plans and section drawings were drawn at 1:20 scale and excavated features photographed in digital format. The majority of the excavation was undertaken by local volunteers under the supervision of DAT staff. The trench was backfilled at the end of the excavation.

Consent to work within the SSSI was obtained from CCW and an exhumation license was obtained from the home office prior to the start of the works.

Geophysical survey (and 5)

The excavation area had been the focus of a geophysical (magnetometer) survey prior to the 2009 excavations (see figure 4). In 2011, additional geophysical survey was undertaken in the field to the south and west of the present churchyard (Figure 5) and on the 'green' to the north of the walled garden (not illustrated).

Topographic survey

An additional topographic survey of the areas that were geophysically surveyed was made. The excavation area and its environs were also surveyed, as was the cliff face so that the extent and rate of future erosion can be assessed.

EXCAVATION RESULTS

Evaluation excavation

Four evaluation trenches were excavated in 2009 to characterise the archaeology at the site (Schlee 2009). A small cluster of burials at the east end of Trench 1 suggested that the cemetery was not completely filled with graves and burials may have been arranged in groups, or possibly rows, separated by areas devoid of burials. Ditch 017 in Trench 4 was the most likely candidate for a cemetery boundary since it was demonstrably earlier than the probable post medieval building revealed in Trench 4. The slate and mortar layer in Trench 1, and the building in Trench 4 (and other deposits visible in the cliff edge, all appear to lie directly on top of the natural shale geology, suggesting that the area had been stripped to this level in the post medieval period, perhaps to provide a solid working surface.

Trench 2, located close to the car park area, between the burials and the present churchrevealed part of a palaeochannel. Trench 3 contained postmedieval deposits and at lower levels became increasingly wet and silty suggesting that this was an area of wet land associated with the nearby watercourse and pond that has now been enclosed by a stone wall.

Open area excavation

The irregular shape of the excavation area was dictated by the various constraints and the presence of two walls within the trench. Over the majority of the excavation area all archaeological deposits were excavated down to natural geological deposits. In the eastern part of the site however, there are potentially several stratigraphically earlier graves that it was not possible to excavate during

the project. The results of the 2011 excavations are considered in combination with the results of the 2009 excavations.

Deposits removed by 'mini-digger'

The evaluation trenching in 2009 indicated that almost all the deposits overlying the natural shale had been disturbed or removed at some time, most likely to produce a stable working surface when the site was used for lime production and for the fishing industry. In 2011 therefore turf and topsoil were removed by machine down to the level at which burial cuts and other features first became apparent. The two walls (006 and 007) traversing the site were also revealed at this stage. These walls did not equate with wall 004 identified in Trench 1.

Hand excavated deposits

Following an initial hand clean across the entire site, different context numbers were allotted to the areas separated by the exposed walls (002, 003, 004, and 005). On the east side of the trench machining stopped at a level where significant quantities of animal bone were encountered. In the central portion machine excavation stopped when occasional flat lying stones were encountered and changes in soil colour were noted. In the western part of the site stones suggesting the presence of graves were encountered at a higher level to the south than in the north, so the trench was reduced to a greater depth in the northern part of the area.

Wall 006

Wall 006 was constructed mostly from angular shale slabs, each about 5cm thick, but varying in other dimensions and shapes. These were arranged to form an irregularly coursed but neatly constructed and faced wall with a rubble core 0.66m wide and surviving to a depth of 0.20m. The wall did not appear to be constructed in a foundation cut, and it rose up to the south, respecting the local topography. As a result, its southern extent was less well preserved, apparently having been damaged by ploughing or other ground disturbance. The wall was built on top of a shale-rich clay silt soil horizon overlying the natural shale clay silt. Several burials ran below the wall line, and although their cuts could not be discerned, these are assumed to predate the soil horizon on which the wall is constructed. Disturbed portions of this wall were removed to reveal underlying burials, but elsewhere the wall was left *in situ*.

Wall 007

Wall 007 was substantial and carefully constructed from large (sometimes very large) boulders on its outer faces, with a core of smaller stones. The wall was 0.75m wide and survived to a height of 0.60m. The stone appeared to be mostly some form of grit stone. The stone was not dressed, and was irregularly shaped and randomly coursed. Whether as a result of quarrying or naturally, most stones had at least one roughly flat face, which was oriented to form roughly even wall faces. Some rounded beach rocks were also incorporated in the wall. It was noted that this stone was not the same as the stone bedrock exposed on the beach and nearby cliffs.

The wall did not appear to have been constructed within a foundation trench and did not appear to be part of a structure. It was constructed directly upon what appeared to be the top of natural weathered shale and clay silt. In places, the

west face of the wall had slumped, and collapsed stone appeared to lie at the base of the wall directly above the natural.

Animal bone and pottery fragments recovered during the cleaning of the wall and removal of the collapsed stone, suggest it was an extant feature in the post medieval period, but it perhaps had 'the feel' of having earlier origins. Evidence of two burials beneath the line of the wall indicate that it post-dates at least part of the cemetery. The projected alignment of the wall (which was not entirely straight) runs approximately north-south, on a similar but different alignment to wall 006. It was not apparent as a surface feature and did not appear to respect any extant walls or other archaeological features in the area. The exposed structure was left intact.

Stone faced bank 004 (2009)

Part of this feature was revealed in Trench 1. It appears to have been the disturbed remnant of a stone faced bank built directly upon the shale geology. No evidence of this feature was revealed in the open area excavation, suggesting that it either terminated or changed direction between the two areas of excavation, or was removed by later activity in the area.

Building - Walls 013 and 014 (2009)

During the evaluation excavations in 2009, the foundations of a stone building were partially revealed in Trench 4 (walls 013 and 014). It was not possible to ascertain the dimensions of the building. The walls were 0.60m wide roughly coursed and crudely faced insubstantial stones. There was no foundation cut and no evidence of occupation deposits. At the north end of the building was slight evidence of a possible surface of small rounded pebbles and compacted heat affected clay. Both the floor and walls appeared to be directly on top of the natural shale bedrock. Although tempting to imagine that this building could be the remains of a chapel, it was not on an east-west alignment and was not constructed on substantial footings.

Small fragments of post-medieval glazed pottery were recovered during cleaning of the interior of the building.

Just to the south of the apex of Trench 1 a spread of mortar and roofing slate was revealed, lying directly above the natural shale bedrock. The slates may be associated with another building or structure lying beyond the excavated area.

Further evidence of buildings was reportedly encountered when posts were set into the ground by PCNPA on the edge of the tarmac, to the south of the excavation area.

Ditch 017

This backfilled u-shaped linear ditch (0.70m wide and 0.40m deep) was on an approximately east-west alignment running across the interior of the building and under the walls. Its full extent could not be ascertained. No dating evidence was recovered from the fill of ditch 017. A possible terminus to this ditch was identified in 2009 at the apex of Trench 1. Since no burials were revealed on either side of this ditch it may mark the southern limit of the cemetery, although it has not been possible to confirm this.

Graves

Thirty-four graves were entirely excavated, with evidence of at least another ten further graves occurring partially within the excavation area. There was evidence for 26 cist graves and at least 15 dug graves.

With the possible exception of two infant burials, all the cist graves had lintel slabs. With the possible exception of one infant burial, none of the cist graves had basal slabs. Two graves had lintel slabs but no side slabs. Three graves had lintel slabs and at least some stones along one side of the grave. Two lintel graves appeared to have significant piles of rock carefully arranged over the cist.

Over half the excavated cemetery population was buried in stone cist graves. The remainder were buried in plain earth cut graves. There appear to be more cist graves than dug graves in the west part of the excavation area, with the possibility that stratigrapgically earlier graves are less likely to have lintel stones.

Burial 001

A plain cut grave (the stones below the skull remnants are part of an unexcavated earlier cist grave). Surviving bones suggest a possible 18+year old adult.

Fill 008
Cut 009

Photo 1: Burial 001 facing west

Burial 002

Plain cut grave (to right of 50cm scale). Partial mandible present of a possible young middle adult aged 25-35 years. This grave cut may be part of a group of similarly aligned and closely packed graves including 022, 004, 042, 044, 003 and 009.

Fill 010

Cut 011

Photo 2: Burials 009. 042 and 002 facing east

Burial 003/045/046

Partial cranium (frontal, left temporal, vault fragments), partial mandible; right (?) femur midshaft 10-12 years (older juvenile); right tibia midshaft; left femur mid to distal third shaft; tibia midshaft. These skeletal remains represent more than one individual and were reassigned numbers during post excavation analysis. The attribution of bones to specific grave cuts remains uncertain.

Fill 012
Cut 013

Photo 3: Burial 003/045/046 facing east

Burial 004

Grave 004 (in foreground). Partial cranium suggests this is the burial of a possible adult of 18+ years. Difficulty in defining grave cut may suggest an earlier grave in the vicinity or a change in the natural geology.

Fill 014
Cut 015

Photo 4: Burial 004 facing south

Burial 005

A cist grave with Lintel stones and side slabs but no basal slabs. Side slabs tapered at east end rather than having an end slab. Only teeth were present, representing an older juvenile 8½-10½ years, although the grave is only 1.0m long.

Fill 016
Cut 017
Structure 018

Photo 5: Burial 005 facing south before Excavation

Photo 6: Burial 005 facing south (lintel stones removed)

Burial 006

A well-constructed cist grave with side and end slabs but no basal slabs. Lintel slabs carefully positioned over side slabs. Partial cranium survived representing a possible 12-17 years? adolescent?

Fill 019
Cut 020
Structure 021

Photos 7 and 8: Burial 006 facing west before and after excavation

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Burial 007

Plain cut grave (to left of .5m scale) cutting/cut by grave 002. Cranial fragments of a possible adolescent or young adult aged 12-25 years? Although attribution of bones to grave cuts remains uncertain. Difficulty in defining grave cut may suggest an earlier grave in the vicinity or a change in the natural geology.

Fill 024
Cut 023

Photo 9: Burials 004. 007, 002 and 042 facing south

Burial 008

Burial 008 facing west facing south

Unusual cist grave with no basal slabs and roughly coursed stonework of beach cobbles along the south edge only. The lintel stones were capped with carefully placed additional stones giving the capping a raised appearance. Partial bone survival representing a probable adult of 18+ years.

Fill 027
Cut 028
Structure 029

Burial 008 before excavation

Photos 10 and 11

Burial 009

Unusual cut grave with stonework at east end only. May represent a partially completed cist, or a 'robbed out' cist. One lintel slab, but no end slab present. Only fragments of tooth enamel present. Skull 046 found overlying the single lintel slab is probably redeposited and not associated with this grave.

Fill 030
Cut 031
Structure 032

Photos 12 and 13: Burial 009 facing west before and after removal of lintel stone

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Burial 010 (no photo)

Mandible remnants only. Located partially beneath wall 007. No discernible grave cut. N.B. Teeth from more than one individual present (recorded as Skeleton 010A and 010B) representing one possible young adult of 25 years and one possible older juvenile or adolescent 9-17 years. This was not apparent during excavation. Skeletal remains may therefore have been redeposited from elsewhere when wall 007 was constructed.

Fill 033;

Burial 011

Plain cut grave on a similar alignment to Grave 001. Only the eastern portion was within excavated area. Poorly preserved leg bones present, representing an adult of 18+ years.

Fill 038
Cut 039

Photo 14: Burial 011 facing west

Burial 012

A carefully constructed cist grave with end slabs and tapered side slabs but no basal slabs. Partial lintel slabs (probably disturbed) (0.5m scale). Partial cranium fragments representing a younger juvenile c. 1-2 years old present.

Fill 040
Cut 041
Structure 042

Photo 15: Burial 012 facing south (lintel stones removed)

Burial 013

A simply constructed tapered cist grave with side slabs but no end slabs, and no basal slabs or lintel slabs. Partial cranium fragments representing a younger juvenile c. 1.5 -3.5 years old. (0.5m scale)

Fill 043
Cut 044
Structure 045

Photo 16: Burial 013 facing west

Burial 014

An unusual grave consisting of large lintel slabs but no side slabs, end slabs or basal slabs. Partial cranium fragments representing a possible young adult female of 18-25 years.

Fill 046
Cut 047
Structure 048

Photo 17: Burial 014 facing west

Burial 015

Burial 015 facing west
(lintel slabs removed)

A well constructed cist grave with partially collapsed lintel slabs, side slabs but no end or basal slabs. The west end of the cist has been incorporated into a later cist burial 026). Surviving leg bones represent an adult or adolescent of 12+ years. No other bones survived, but may have been disturbed when Burial 026 was constructed.

Fill 049
Cut 050
Structure 051

Burial 015 facing north before excavation

Photos 18 and 19

Burial 016

Burial 016 facing east
before excavation

Burial 016 facing west
after excavation

A relatively well-constructed cist grave with substantial lintel stones, side slabs but no end or basal slabs. Relatively well preserved bones represent a possible middle adult of 25-45 years of Indeterminate sex.

Fill 052
Cut 053
Structure 054

Photos 20 and 21

Burial 017

Burial 017 before excavation, facing west

An unusual grave. Instead of a side slab lining to the grave cut, the backfilled grave cut appears to have been fringed with stone slabs (partially surviving) with the interior capped with stones including numerous white quartz beach pebbles. No bone was preserved.

Fill 055
Cut 056
Structure 057

Burial 017 after excavation, facing north

Photos 22 and 23

Burial 018

Burial 018 before excavation, facing south

A partially built/disturbed fairly well constructed cist grave with lintel slabs, side slabs, an end slab but no basal slabs. No bone survival, but based on its proportions, presumably an infant grave.

Fill 058
Cut 059
Structure 060

Burial 018 after excavation, facing south

Photos 24 and 25

Burial 019

Burial 019 facing west before excavation

A carefully constructed cist grave (to right) with lintel slabs obviously carefully placed and giving the capping a raised appearance. No basal slabs or end slabs. Surviving teeth suggest a younger juvenile of c. 4-6 years. The style and juxtaposition of this grave and Grave 038 (to left) may suggest they were built together.

Fill 061
Cut 062
Structure 063

Burial 019 facing west after excavation

Photos 26 and 27

Burial 020

Burial 020 facing west before and after excavation

An unusual partial cist grave (overlain by Grave 038, bottom left). An initial narrow grave cut appears to have been widened to create a ledge to support lintel slabs (with chocking stones on south side). Only the western half of the grave has been covered with lintel slabs, but this appears to be intentional rather than the result of stone robbing. No basal or side slabs present. No bone survival.

Fill 064
Cut 065
Structure 066

Photos 27 and 28

Burial 021

A simple cut grave. Partial cranium fragments suggest an adult or adolescent of 12+ years. A possible grave marker at its east end? (bottom of photograph). Uncertain stratigraphic relationships with graves 024 and 025.

Fill 067
Cut 068
Structure 069

Photo 29: Burial 021 after excavation

Burial 022

Burial 022 after excavation facing west

A cist grave constructed from substantial lintel stones but no basal or side slabs. Partial cranium fragments suggest a possible young adult aged 18-25 years.

Fill 074
Cut 075
Structure: lintel stones 076

Burial 022 before excavation facing north

Photos 30 and 31

Burial 023

Cist grave lintel slabs and side slabs. Not excavated but appears to be tapered without end slabs.

Structure: Cist grave 100

Photo 32: Burial 023 (bottom left) facing east

Burial 024

Plain cut grave no bone survival. Uncertain stratigraphic relationship with burials 021 and 024

Fill 101
Cut 102

Photo 33: Burial 024 facing west

Burial 025

Plain cut grave (west end below bottom end of scale. Uncertain stratigraphic relationship with burials 021 and 024. Bone fragments suggest an adult or adolescent of 12+ years.

Fill 103
Cut 104

Photo 34: Burial 025 facing west

Burial 026

Well constructed cist grave with partially collapsed lintel slabs partially supported by side slabs of grave 015. Side slabs of 026 incorporate side slabs of Grave 015 at western end. No basal slabs. Relatively well preserved bones suggest this is the grave of a possible young adult of 18-25 years. A radiocarbon date of 768-895 cal AD89.4% probability at 2 sigma was obtained from this burial. This was the only datable bone recovered during the excavation. A lead bead was recovered from the skull during post excavation cleaning.

Fill 083
Cut 087
Structure 088

Burial 026 before excavation facing east

Burial 026 after excavation facing east (left) and west (right)

Photos 35, 36 and 37

Burial 027

Cist grave with no lintel stones (possibly disturbed?) side and end slabs and possible basal slabs. No bone was preserved, but size of grave suggests an infant.

Fill 078
Cut 079
Structure 080

Photo 38: Burial 027 facing south

Burial 028 (No photo)

A plain cut grave. No bone survival. Iron knife recovered from fill towards east end of the grave cut.

Fill 097
Cut 098

Burial 029 (No photo)

Possible cist grave (Not excavated). See figure 6 for location.

Burial 030 (No photo)

Plain cut grave partially within excavation area. Partial cranium (occipital?, right temporal), partial mandible 25-35 years? (possible young middle adult).

Fill 081

Cut 082

Burial 031

Side slab cist grave (no basal slabs or lintel slabs). Femur midshaft, possibly right side 6-16 years? (older juvenile or adolescent?). The skeleton appears to have been buried facing west, and to have slumped into the grave from above, since did not fit into the size of grave. Skeleton now assigned to Burial 034.

Fill 084
Cut 085
Structure 086

Photo 39: Burial 040 (with bones of 034)

Burial 032

Irregularly constructed cist grave with side slabs and lintel slabs at west end, but no side slabs and irregularly placed lintel slabs to the east. No basal slabs. Partial bone survival (skull only) suggests a possible middle adult Male of 25-45 years.

Fill 089
Cut 090
Structure 091

Photo 41: Burial 032 facing west

Photos 42 and 43: Burial 032 during and after excavation, facing west

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Burial 033

Probable cist grave remnant, but no other surviving evidence of cut or fill identified during removal.

Structure 099

Photo 44: Burial 033 facing south

Burial 034

Burial originally thought to be contained within Grave 031, but now appears to have been in a plain cut grave that has slumped into underlying grave 031.

Burial 035

Partial cist grave. Not excavated. Probable infant burial.

Structure 105

Photo 45: Burial 035 facing south

Burial? 036 (no photo)

Two flat stones resembling lintel stones, but no cut or burial apparent.

Structure 106

Burial 037

Lintel cist grave Not excavated.

Fill 107
Structure 108

Photo 46: Burial 037 (bottom right) before excavation

Burial 038

Lintel cist grave (no basal slabs) No bone survived. This grave is possibly paired with adjacent grave 019, based on alignment, proximity and mounded appearance of lintel capping. Grave 020, (beneath 038) does not appear to have been disturbed by the construction of 038, and does not therefore account for the absence of lintel stones in the eastern half of Grave 020.

Fill 109

Structure 110

Photos 47 and 48: Burial 038, facing west before and after excavation

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Burial 039

Well constructed cist grave (bottom left) with lintel stones (removed in photo), side and end stones. Grave not excavated so presence of basal stones not known (but unlikely).

Fill 038
Structure 039

Photo 49: Burial 039 (bottom left)looking west

Burial 040 (No photo)

Possible cist grave truncated by later burials. not excavated. See Figure 6 for location.

Burial 041 (No photo)

Possible infant burial. Grave not excavated.

Burial 042

Plain cut grave (left side of scale). No bone survived.
Fill 113
Cut 114

Photo 50: Burial 042 facing east

Burial 043

Lintel cist grave partially within trench. Not excavated.

Structure 015

Photo 51: Burial 043 (bottom right)

Burial? 044

Originally thought to be a cut grave, earlier or later than grave 009 the cut for burial 044 now seems more likely to be the upper part of the cut for grave 009. For comparison see Graves 020 and 022.

Photo 52: Burial 044 (cut immediately to the right of the scale on left side of grave 009) facing east

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Burial 045 (No photo)

Unexcavated probable plain cut grave partially within the excavation area. No photograph.

Burial 046 (No photo)

Burial 046 comprises bones of an 18+ years old possible adult thought to be part of Skeleton 003 during excavation and reattributed during analysis.

Grave markers

At the west end of burial SK020, the stub of a shattered stone slab grave marker (context 116) set in a shallow pit (context 117) was a clear example of a grave marker. Several graves appear to have been constructed in such a way as to suggest they may have been visible at the ground surface: 019, 038 and 008 had sufficient stones overlying the lintel stones to suggest they may have formed an extant mound on the ground surface. The numerous white quartz pebbles associated with Grave 017 may also have been visible at the ground surface. If, however, these burials were intended to be seen above ground level, there must have been little topsoil soil coverage within the cemetery. In contrast, the lintel stones of some of the graves were clearly set down below the level of the natural geology, suggesting they would not have been visible at the ground surface.

Grave marker 116 looking west

Grave marker 116 looking south

Photos 53 and 54

Grave stratigraphy

Clusters of intercutting graves were identified in the northeast corner of the trench and at the southernmost edge of the trench (see Figure 4). It was often not possible to ascertain the sequence in which the burials occurred. In several instances, however, it was possible to demonstrate that infant burials were later in the stratigraphic sequence. It has not been possible to obtain stratified dating evidence from these burials. The single carbon date obtained from burial SK026 which cuts into an earlier burial.

Grave alignment and cemetery layout

Neither of the extant masonry walls are cemetery boundaries. Burials were identified running under both, and no burials appear to have been contained by the walls.

The burials appear to become more concentrated to the west, and although there is no direct archaeological evidence, it is possible that ditch 017 marks the western limit of the cemetery. Alternatively, the greater concentration of burials

to the west, may suggest that this was a more desirable burial location, perhaps nearer to the chapel or some other focal structure.

Based solely upon alignment and spatial distribution it is perhaps possible to discern groups of burials (see Figure 7). These clusters may equate to family groups or multiple burial events. There are also at least two possible paired graves (adult and infant buried in adjacent graves): 027/014 and 019/038. However, in the absence of dating evidence, and clear stratigraphic relationships, and good bone preservation, which might offer additional support for the groupings, they remain conjectural.

Skeletal material

Skeletal material was recovered from 26 burials. In some instances this amounted to little other than a few badly preserved fragments of bone or teeth. Skull bones and teeth were the most frequent survivals. Occasionally long bone fragments were also present. Only two individuals had moderate or good bone preservation. The remainder exhibited poor, very poor or extremely poor preservation. In three graves it was possible to identify voids where the skull had previously been present.

All the skeletal material was severely or extremely fragmented and only two individuals were more than 20% complete.

Although teeth were sometimes the only skeletal element to survive, they were also very poorly preserved. In many instances, tooth roots and dentine had completely dissolved, leaving only enamel.

Fifteen excavated burials contained no surviving bone at all.

The differential bone preservation may be a consequence of different burial dates, drainage and protection by cist structures, but is perhaps most likely to be due to localised variation in soil acidity.

Eight of the 26 excavated skeletons were non-adults. Thirteen were adults or probable adults. Five were adults aged 18 or older.

An estimate of sex was made for three of the adults. One was possibly female, two possibly male, the surviving evidence however displayed a mix of male and female diagnostic traits.

Evidence of childhood anaemia, reparatory tract infection and osteoarthritis, dental decay, abscess and childhood stress (indicated by tooth enamel defects) was observed in the population group.

The full skeletal analysis is presented in Appendix 3.

Only one skeleton (026) had sufficient collagen surviving within its bones to enable a carbon date to be obtained. The results from the single sample are consistent with data obtained from similar sites in South Wales (see Appendix 1), but unfortunately do not provide interpretable data.

GEOPHYSICAL SURVEY RESULTS

The geophysical survey was undertaken in the field located to the south and west of the present rectangular churchyard (PRN 27990). The survey has indicated a variety of intriguing features which are difficult to interpret, and may represent a combination of several different phases of activity.

Part of an apparently curving cropmark (PRN 13294) visible in this field on an aerial photograph (see Plate 1 and Figure 4) could possibly be an early medieval enclosure.

Part of an apparently curving cropmark feature (PRN 13294) visible in this field on an aerial photograph (Plate 1), has been interpreted as a possible early medieval enclosure (Ludlow 2003 PRN13294). The cropmark appears to equate with feature A on the geophysical survey, but the topography in this location, where a large proportion of the enclosed area is a west-facing slope down to low lying ground does not seem a particularly likely location for an early medieval settlement enclosure. Without dating evidence the significance of this feature remains uncertain.

Immediately to the north of feature A are at least one (probably two) rectangular anomalies that are suggestive of house sites (Features B). To the north of these are several linear features that appear to form rectilinear enclosures (Feature C). These could be burgage plots associated with the house sites.

To the south of the churchyard is what appears to be the curved corner of a substantial rectilinear enclosure (Feature D). Although a direct association cannot be demonstrated, it is possible that this feature is related in some way to the post-medieval or medieval phases of 'The Abbey'.

Between feature A and feature D is a slightly curving linear anomaly (Feature E). It is uncertain whether this is an archaeological feature or not. Further excavation would be required to characterise and to establish the dates of the archaeological features indicated by the geophysical survey.

Geophysical survey was also undertaken within the walled garden, on part of 'the green' and across the excavation area, but no features of obvious archaeological significance were apparent.

DISCUSSION

Cemetery date

The presumed early origins of the cemetery (A Group I inscribed stone of probable 5th -7th century date is believed to have been recovered from the site), and the two early medieval radiocarbon dates obtained from the site: Cal AD 904-1225 (CAR-917) and Cal AD 717-937 (SUERC-43666) suggest that the cemetery could have been in continuous use until the early 13th Century. Together this evidence suggests St Bride's is likely to be broadly contemporary with the other recently excavated cemetery sites (see Figure 1).

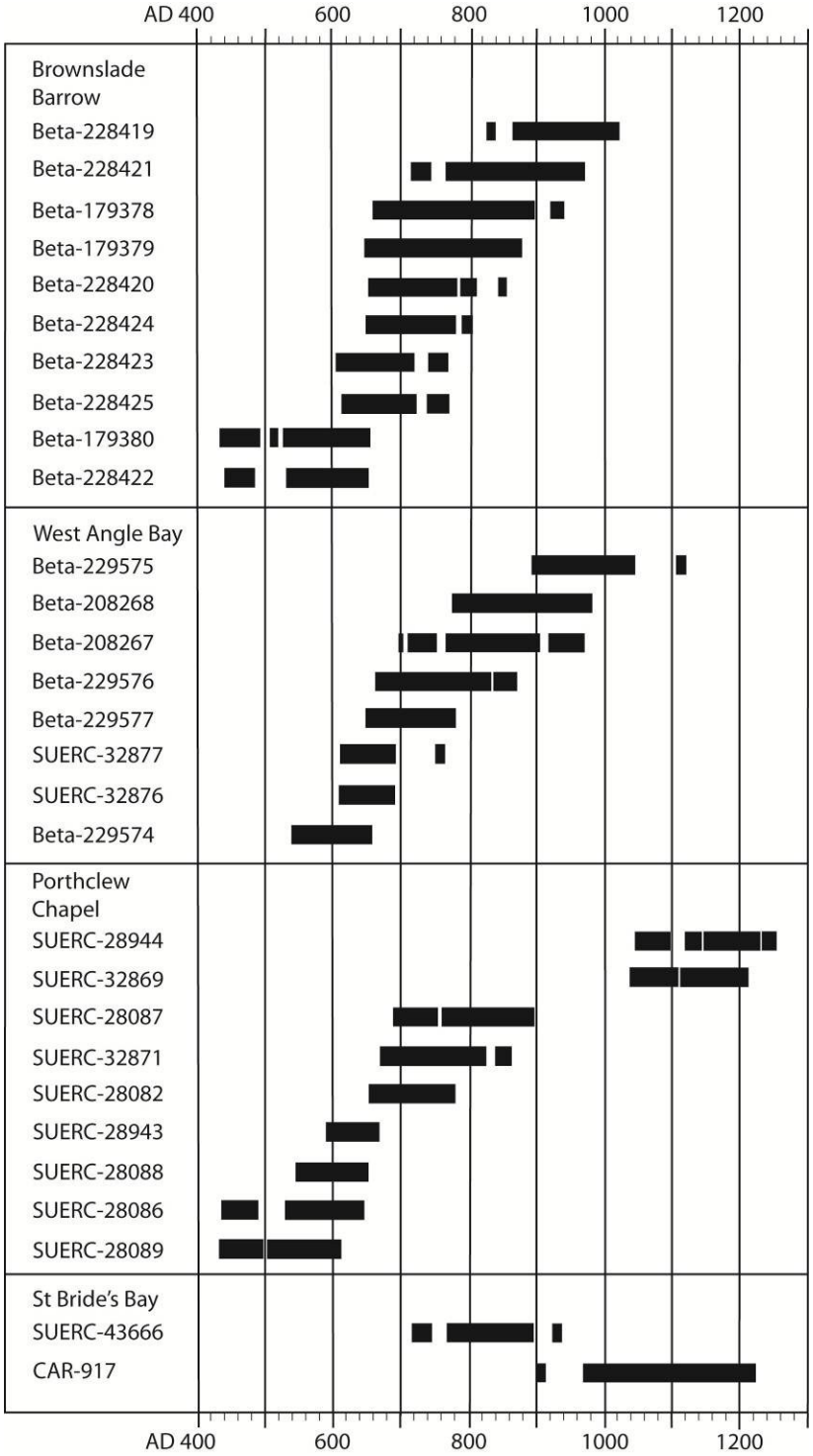


Figure 1: Table of carbon dates from early medieval cemetery excavations

The dates from each of the sites are broadly contemporary with each other, however the extent to which the dates reflect the different settlement histories of each site is uncertain, since at each site little is known about what archaeology lies beyond the excavated areas.

At West Angle Bay (Schlee 2008) and Brownslade Barrow (Groom 2011) the latest possible dates are in the 11th century. At West Angle Bay this hiatus probably reflects the establishment of the Anglo-Norman settlement of Angle, about 1km inland to the east. The community using the Brownslade Barrow cemetery may also have established a new settlement elsewhere in the Anglo-Norman period.

Porthclew (Schlee 2009; 2010) and St Bride's have produced C14 dates that suggest settlement and/or cemetery use potentially as late as the 13th century. Perhaps suggesting the settlements associated with the cemeteries may have continued for longer in more or less the same locations.

A radiocarbon date of Cal AD 1650+ (CAR-931) obtained from a bone eroding from the cliff face (DRF 7606) would seem to suggest that burial was still occurring in the cemetery in the late 17th century. Although this is not impossible, it seems unlikely since the church of St Brigid and churchyard are most likely to have been the normal focus for burial by this time.

Although a diversity of grave types were revealed within the excavated area, and a significant degree of intercutting graves was apparent in places, in terms of grave style and bone preservation, the excavated evidence does not suggest that the cemetery is likely to have been in use for as much as 1000 years. An alternative explanation for the 17th century (or later) carbon date should probably therefore be sought. Several animal bones were revealed in post-medieval deposits within the excavation trench close to the cliff edge. It is possible that such a bone may have inadvertently been sampled for carbon dating, although the 'well preserved' bone was considered by the excavator to have been within a grave cut (K Murphy pers. Comm.).

Cemetery form

No definite boundaries to the early medieval cemetery have been identified. Ditch 017 (in Trench 4) could form a southern boundary to the cemetery, since no burials are apparent on the western side of the ditch, or are visible in the cliff face at this point. However, neither were burials present on the east side of ditch 017 within Trench 4. Burials appear to become more sparse in the eastern part of the excavated area, but at least initially were not enclosed by wall 007. Wall 007 could have been built to create an enclosed burial area after the initial establishment of an unenclosed cemetery, but if so, burial did not continue long enough for this to become apparent in the archaeological record. From the available evidence therefore it is most likely that the early medieval cemetery was unenclosed, and none of the walls revealed in the excavations are cemetery boundaries.

Excavation evidence suggests that the early medieval cemeteries at Porthclew and Brownslade were also unenclosed. At Brownslade, no potential cemetery enclosure features were identified, while at Porthclew stratigraphic and carbon dating evidence suggests the concentric enclosure ditches are later than most if not all the excavated burials. Petts (2002, 25) has suggested that most if not all early medieval cemeteries were unenclosed until the 8th century at the earliest.

West Angle Bay appears to be a clear example of an 8th century enclosed cemetery. A large rectangular enclosure with an eroded northern edge, has a

concentration of burials in what is now its northwest corner. Evaluation trenching elsewhere within and beyond the rectangular enclosure does not suggest burials are present beyond this location. Carbon dating from one of these burials suggests a date of AD 650-780.

Also within the West Angle Bay enclosure is an egg-shaped enclosure containing many more burials, and geophysical evidence of a possible chapel structure of unknown date. Although the available dating evidence is inconclusive, it seems likely that burial shifted from the rectangular enclosure to the egg-shaped enclosure, although exactly when and why this may have happened is uncertain. Carbon dating evidence from a stratigraphically late burial within this enclosure suggests a date between AD893- AD1043, although other carbon dates from the enclosure suggest it may have earlier origins.

Cemetery organization

The ways in which burials are organised or managed is sometimes considered to demonstrate different phases of cemetery development. Late Roman period and early medieval cemeteries often exhibit a greater degree of organisation than later phases of burial.

At Porthclew, limited evaluation trenching in the main cemetery area could not reveal clear evidence of grouping, clustering or formal management.

At West Angle bay, within the egg-shaped enclosure too small an area was excavated to allow any organisation to be identified. However, the density of graves, evidence of intercutting and the fact that they appeared to respect the curve of the cemetery boundary rather than a strict east-west alignment, suggest that any initial order to the graves was lost as space for burial within the enclosure became scarcer.

Only at Brownslade and St Bride's was sufficient excavation possible to establish whether burials appeared to be organised or managed. At Brownslade, there is little if any evidence to suggest a formal 'managed' phase of burial in rows. Two general clusters of burials have been suggested (Groom 2011, 142), although several smaller alternative groupings, could also be conjectured.

At St Bride's, there is clearer evidence of cemetery management, with small groups of aligned graves, and possible pairs of graves being discernible. There is also a general impression of a greater concentration of graves in the western part of the excavated area, and of later burials being less organised and on a slightly different alignment. Unfortunately, due to the lack of clear stratigraphy and dating evidence, it is not possible to ascertain whether the organised graves are indeed of earlier origin.

The small burial clusters may represent family groups buried at different times in a defined location, or several unrelated burials interred at the same time.

Grave structures

Cist graves are traditionally considered to be characteristic of the early medieval period but examples of cist graves are also known in the later medieval period (Ludlow 2003). Since the terminology of 'dug graves' and 'lintel graves' was established by Charles Thomas (Thomas 1971, 49), new variants of burial style, in which one or more elements of stone lining (base, sides, ends and lintels) are absent, have been distinguished in Wales. Some of this variation in form may be attributed to later disturbances to graves or the loss of evidence for timber elements to grave linings (Longley 2009, 108) but there are many examples of graves in west Wales that incorporate some element of stone lining or capping,

but do not fit the strict definition of a 'cist'. The recent Pembrokeshire cemetery excavations have made a significant contribution to an appreciation of this diversity of grave styles.

At St Bride's Haven grave structures include examples that are not represented at the other cemetery excavations. Two graves had lintel slabs but no side slabs. Three graves had lintel slabs and at least some stones along one side of the grave. Two lintel graves appeared to have significant piles of rock carefully arranged over the cist.

Another unusual grave at St. Brides is a partial cist (burial 020) in which lintel stones (without side slabs or basal slabs) only cover the upper half of the burial. The only recorded graves similar to this are from Bangor (Hughes 1924). This grave also had a stone slab grave marker at its west end. The grave marker and the unusual form of the grave may suggest the occupant was in some way notable. Another unusual grave (burial 017) appears to have had a rectangular stone kerb in-filled with numerous white quartz pebbles built over the cut grave. Again, the unusual form of the grave may suggest the occupant was in some way notable.

At St Bride's 26 cist graves were identified. All but three (including two infant burials from which lintels may have been lost) had lintel slabs. At least 15 plain dug graves were identified. At Brownslade Barrow, there were four cists with lintels, thirteen without lintels and 14 plain dug graves. At Porthclew, although only a small number of graves were excavated, of those identified, only two had lintel stones. The ratio of plain dug graves to graves with side slabs is unknown. At West Angle Bay, the majority of identified graves appeared to have some element of stonework most probably had lintels but due to plough damage this was not always clear.

Attempts have been made to define and classify different grave characteristics with the aim of trying to discern patterns of change through time, or other links between age, sex, and status and grave type. However, the incomplete cemetery populations, the vagaries of bone preservation and post depositional processes, lack of stratigraphic relationships and paucity of dating evidence, all conspire to make such classifications and inferences unreliable. As yet, an exception can be found to almost every distinguishing feature suggested as being characteristic of one trait or another.

Instead of focussing on the minutiae of typological classifications, it may be more useful to focus on the general effect that people may have been trying to achieve in constructing a grave in the way they did. The variation is perhaps more likely to reflect the concerns and circumstances of the living than those of the dead.

Within a cemetery, the diversity of grave forms is in all probability a consequence of a varying degree of adherence to earlier or newly adopted burial traditions rather than in each case being the result of following strictly prescribed burial rituals for different members of a community in different periods. The variation perhaps suggests an absence of direct ecclesiastical control of the burial rite, or an element of self-expression or *ad hoc* or improvisation in fulfilling the rites. The recent evidence for geographical diversity in early medieval populations (Hemer 2010), may also suggest a degree of regional tradition in choice of grave form.

The quantity of cist graves at St Bride's that are in some way 'different' from the range of grave styles represented at the other recent cemetery excavations, may suggest that the St Bride's community was itself in some way different. Perhaps its coastal location meant the community had closer links with people from further afield, with differing burial traditions. Alternatively, the relative frequency of cist graves may reflect a more localised tradition perhaps associated with an ecclesiastical community.

Various hierarchies of settlement type including high status defended settlements, undefended high status sites, religious settlements and trading settlements have been suggested for the early medieval period in west Wales based on excavated material evidence (Campbell and Lane 1993). However, with the general absence of material culture and absence of clear-cut archaeological evidence for early medieval settlement at any of the recent cemetery excavations, the different characteristics of grave assemblages within and between cemeteries may at the moment be the best indicator of potential differences between types of communities.

That each of the cemeteries excavated so far is in some way distinctive, suggests that there is still more diversity and variation in cemetery populations to be discovered, and that this diversity may reflect different communities and settlement types.

Burials with artefacts

Of the four cemeteries considered here, only at Porthclew and St Brides were there clear examples of artefacts associated with burials. Burials containing artefacts are generally considered to have ceased at the end of the Roman period in Wales. However, examples of items within later burials are known (Petts 2009, 110). The dates of the burials containing objects at St Bride's are not known, but at Porthclew a decorative pin was recovered from a burial dated Cal AD 547 – 649.

The absence of such items in the majority of the burials, might suggest that individuals buried with objects were in some way different from the majority, but the low intrinsic value of the objects may suggest they are perhaps more likely to be items of personal adornment only coincidentally included in the burial, or were perhaps included for intangible reasons similar to those that dictated the choice of grave style.

Populations

The recent cemetery excavations undertaken in Pembrokeshire have only excavated a part of the likely full extent of the burials at each site. In addition, at West Angle Bay and St Bride's, unknown proportions of the cemeteries have been lost to erosion. The excavation results and skeletal analyses can therefore tell us little with certainty about the population size and make-up of the early medieval communities represented. Reliance on carbon dating also means it is uncertain that we know the full time span over which the cemeteries were used.

Although only a small proportion of the oval cemetery enclosure at West Angle bay was excavated, a large proportion of the excavated skeletal material was of non-adults. At St Brides, of the 26 burials which contained surviving bone, 8 were non adults. At 30.8% this is consistent with the typical proportion of non-adults expected in archaeological cemeteries (see Appendix 3). At Brownslade, 20 of the 52 burials (46%) were non adults. At Porthclew too few burials were excavated to provide meaningful statistics.

The isotope analysis of some of the burials from Brownslade, West Angle Bay and Porthclew (Hemer 2010) have identified a number of individuals in those communities who may originally have been born in the extreme western coasts of Ireland, northwest Scotland or even the Mediterranean Basin.

The ogham alphabet is thought to have been adopted in Wales during the 5th to 7th centuries (Edwards 2001). Ogham stones in Pembrokeshire and historical

accounts of an Irish presence in Pembrokeshire (Ó Cróínín 1995: 18) may therefore suggest a zone of contact with southern Ireland dating from this time.

The importation of pottery to southwest Wales through trade with the Byzantine Empire is generally thought to have decreased after the mid-6th century following a series of epidemic plagues (Campbell 2007:132). However, given the possibility of individuals of Mediterranean origin at Brownslade and Porthclew during the 7th and 8th centuries, the connections established centuries earlier may have survived longer than previously thought.

At St Bride's isotopic data could only be recovered from one individual. This is unfortunate since isotopic data may well have provided important comparative evidence.

The chapel

The tradition that a chapel once stood at St Bride's Haven is not unreasonable, but its date of origin is unknown. Considering the presence of the early medieval cemetery, it is likely, but not essential that an early medieval chapel was also present at the site.

Stone-built chapels are generally considered not to have been built in west Wales until the Anglo-Norman period, with the early medieval period, instead being characterised by wooden chapel structures. However, these assumptions are based on extremely limited archaeological evidence. In Wales it has not yet been possible either to identify archaeological evidence of a wooden building as being a chapel, or to prove that stone built chapels were not founded in the early medieval period (Pritchard, 2009, 246).

St Bride's was possibly mentioned in an early 13th century source, as rendering a pension to Ewenny Priory, Glamorgan (Conway Davies 1946, 336). Presumably there was a church or chapel at St Bride's at this time, but there is no evidence as to its location or whether it was an Anglo-Norman period establishment or was of early medieval origin. The present church is thought to probably be 14th century at the earliest (Ludlow 2003).

The uncertainty about the longevity of the cemetery and the multiplicity of suggested chapel sites has led some to hypothesise that St Bride's might be an example of a polyfocal chapel site (Ludlow 2003;Petts 2012,74). However, the available evidence is as yet, insufficient to provide much support for this suggestion.

In the absence of clear documentary evidence for the location of the chapel or the extent to which it may or may not have survived in later years, it remains as likely (if not more likely) that the chapel now forms part of Cliff Cottage, than that it is, or was, located anywhere else.

At Brownslade, Historic maps identify two buildings, and field names suggest one or the other of these could be a chapel site (Groom 2011, 136). Partial excavation of one of these structures, exposed in the edge of an area of quarrying to the north of the cemetery did not produce any evidence to confirm whether or not this was a chapel (Groom 2011, 145).

At Porthclew, the standing remains of a chapel survive at the site of an early medieval cemetery. Archaeological evidence suggests that the chapel is more likely to be associated with a 13th century settlement at the same site, rather than with the early medieval burials. But the proximity to the chapel of apparently secular domestic dwellings of a similar date seems unusual. The site

still has the potential to contain clear evidence of the transition from early medieval cemetery to an Anglo-Norman chapel and settlement site.

Likewise, geophysical evidence of a chapel within the egg-shaped cemetery enclosure at West Angle Bay offers the possibility of revealing evidence the transition and development of an early medieval cemetery to a potentially Anglo-Norman chapel site.

Settlement and post-medieval activity

Due to the effects of the present land use and landscaping the geophysical survey results in the area of the Green and between the church and the beach at St Bride's Haven were inconclusive. However, the presence of the limekiln and evidence of walls and other buildings revealed during the excavations, points to a significant amount, possibly several phases of post-medieval activity in the cliff top area. Medieval ceramics lying directly above the top of the shale bedrock and the absence of buried soil beneath the slate spread and the absence of foundation cuts for several of the walls may all suggest that the area was stripped of topsoil, in the post medieval period, either through natural erosion or perhaps to provide a stable working surface.

To the south of the early medieval cemetery, the geophysical survey results to the west of the present church yard potentially show evidence of house sites and burgage plots suggesting that settlement in the medieval and post medieval periods may have extended from there to the east and northeast between the church, the beach and 'the Abbey'.

Although the curved cropmark feature PRN 13294 also appears on the geophysical survey, its date and its relationship with other features visible on the geophysics survey is unknown. The features need not be (and probably are not) of the same period, or archaeological phase. Excavation would need to be undertaken to ascertain whether or not is of early medieval origin, and what it might have enclosed.

St Bride's was mentioned in an early 13th century source, as rendering a pension to Ewenny Priory, Glamorgan (Conway Davies 1946, 336). Presumably there was a church or chapel at St Bride's at this time, but there is no evidence as to its location or whether it was an Anglo-Norman period establishment or was of early medieval origin. The present church is thought to probably be 14th century at the earliest (Ludlow 2003), but there is no evidence of an earlier church or chapel within the fabric of the building or nearby.

On the tithe map and apportionment of circa 1839, the earliest available mapping of the site, No buildings other than Cliff Cottage are represented on the cliff tops around St Bride's Haven.

CONCLUSIONS

In the absence of good bone preservation little can be said about the characteristics of the burial community at St Bride's Haven. Although no definitive evidence of the extent of the cemetery, the character of its boundaries or the location of an associated chapel was revealed, the excavations have nevertheless revealed significant evidence about other aspects of the cemetery.

The layout of the cemetery and the characteristics of the grave cuts suggest that the development of the cemetery and the nature of the St Bride's community may have been different from the communities represented at the other recent early medieval cemetery excavations in Pembrokeshire.

It has not been possible to get good evidence of how long the cemetery at St Bride's Haven was in use. Documentary records of an inscribed stone of probable 5th -7th century date, possible early cemetery characteristics such as organised grave alignment, and possible examples of artefacts buried with bodies, all suggest the cemetery may have origins relatively early in the early medieval period.

The characteristics of the graves at St Bride's, with a large majority having some form of cist or stone lining, are different to the graves revealed at Porthclew, West Angle Bay and Brownslade, may suggest the community itself was distinctive, perhaps ecclesiastical in nature, or perhaps influenced by burial traditions elsewhere.

Two carbon dates suggest burial probably continued into the 9th century and possibly as late as the late 12th century. A bone yielding a carbon date of 1650 AD or later is probably misleading. Burial is very unlikely to have continued this late within the cemetery. Instead, the focus of burial and settlement is likely to have moved to the site of the present church during the 12th -14th centuries following the abandonment of an earlier chapel and the early medieval graveyard. Medieval and possibly early medieval settlement appears most likely to have been in this location as well.

A similar sequence may have occurred at Porthclew, where a chapel and settlement probably dating to the 12-13th centuries, overlies a possible high status or ecclesiastical early medieval settlement and cemetery, although there is no evidence of burial later than the 10th century.

At West Angle Bay and Brownslade Barrow a similar shift of settlement and cessation of burial appears to have occurred, but there may have been a greater separation distance between the old and new settlements. At West Angle Bay, a large rectangular enclosure may have been used for both settlement (either ecclesiastical or secular?) and burial during the early medieval period. It is uncertain whether the site continued in use as a chapel and/or burial site after the Anglo-Norman settlement and church was established further inland at Angle.

At Brownslade barrow, burial appears to have ceased by the end of the 10th century. Although no direct evidence of an associated early medieval settlement, or a later medieval settlement was identified within the excavated area, both are likely to have existed nearby.

The limited extent of the excavations at each of the Pembrokeshire cemetery sites makes it difficult to be certain that we have a correct understanding of the nature of the communities represented and the developmental histories of their associated settlements. However, each of these sites still has good potential to provide additional evidence that could further enlighten our understanding of early medieval communities in West Wales.

SOURCES

Campbell, E 2007, Continental and Mediterranean imports to Atlantic Britain and Ireland, AD 400-800. York: Council for British Archaeology Research Report 157.

Conway Davies, J. (ed.), 1946 *Episcopal Acts relating to the Welsh Dioceses*, 1066-1272, Vol. I (Cardiff, Historical Society of the Church in Wales No. 1).

Crane, P. 2003. *Intertidal zone coastal survey.* Unpublished Cambria Archaeology report PRN 48116.

Crane, P. 2004 *'The footpath at St Bride's, a watching brief*.' Unpublished Cambria Archaeology report PRN 50459.

Crane, P. 2006 '*Archaeological monitoring of the intertidal and coastal zone, Pembrokeshire 2004-5*'. Unpublished Cambria Report PRN 52686.

Edwards N and Lane, A. (eds.)*,* 1992 *The Early Church in Wales & West* (Oxford, Oxbow Monograph 16)

Edwards, N. 2001 'Early medieval inscribed stones and stone sculpture in Wales: context and function'. *Medieval Archaeology* 45. 15–39.

Edwards, N. 2008 *Corpus of Early Medieval Inscribed Stones and Stone Sculpture in Wales, Vol. 2, The South West*.

Edwards, N. 2009 (ed) *The Archaeology of the Early Medieval Celtic Churches.* Society for Medieval Archaeology Monograph 29: Maney.

Fenton, R., 1903 edn. *A Historical Tour Through Pembrokeshire*

Green, F (ed).1913 Transactions of the West Wales Historical Society. 273-4

Groom, P. et al. 2011, 'Two Early Medieval Cemeteries in Pembrokeshire: Brownslade Barrow and West Angle Bay'. *Archaeologia Cambrensis* 160. 133-203

Hemer, K. A., 2010 In the realm of saints: a reconstruction of life and death in early medieval Wales and the Isle of Man'. Unpublished PhD thesis, University of Sheffield.

Hughes, H. 1924 'An ancient burial ground at Bangor' *Archaeologia Cambrensis* (7th series)

Lewis, S., 1833 *A Topographical Dictionary of Wales* (London).

Longley D, 2009, Early Medieval Burial in Wales, in Edwards, N. 2009 (ed) *The Archaeology of the Early Medieval Celtic Churches.* Society for Medieval Archaeology Monograph 29: Maney.

Ludlow, N. D., 1995 '*Archaeological Watching brief at St. Bride's Green*', unpublished Dyfed Archaeological Trust Report PRN 27982.

Ludlow, N. D., 2000 '*The Cadw Historic Churches Project: Pembrokeshire*', unpublished Cambria Archaeology report.

Ludlow, N. D., 2003 '*The Cadw Early Medieval Ecclesiastical Sites Project: Pembrokeshire*', unpublished Cambria Archaeology report.

Murphy K and Allen B. 1997 '*Coastal Survey 1996-97, Strumble Head to Ginst Point'*. unpublished DAT report. PRN 33470

Ó Cróínín, D 1995: *Early Medieval Ireland, 400-1200. Longman History of Ireland. Longman*

Petts, D. 2002. 'Cemeteries and boundaries in western Britain'. In Lucy, S. & Reynolds, A *Burial in early medieval England and Wales*. Leeds: Society for Medieval Archaeology **17.** Maney. 24-46.

Petts, D. & Turner, S. 2009. 'Multiple church complexes on early medieval ecclesiastical sites in Western Britain'*. In* Edwards, N. 2009 (ed) *The Archaeology of the Early Medieval Celtic Churches.* Society for Medieval Archaeology Monograph **29**: Maney.

Petts, D. 2009. The Early Medieval Church in Wales. History Press.

Pritchard A, 2009. 'The origins of ecclesiastical stone architecture in Wales' in Edwards, N. 2009 (ed) *The Archaeology of the Early Medieval Celtic Churches.* Society for Medieval Archaeology Monograph 29: Maney.

Schlee, D.E 2006 **'**The Pembrokeshire Cemeteries Project. Excavations at West Angle Bay, Pembrokeshire, 2006. Unpublished Dyfed Archaeological Trust Report

Schlee, D.E 2008 'The Pembrokeshire Cemeteries Project. Excavations at West Angle Bay, Pembrokeshire, 2005-6. Unpublished Dyfed Archaeological Trust Report no. 2008/34

Schlee, D. E., 2009 (a) 'The Pembrokeshire Cemeteries Project, Excavations at St Bride's Haven 2009'. Unpublished Dyfed Archaeological Trust Report PRN 94896

Schlee, D.E 2009 (b) **'**The Pembrokeshire Cemeteries Project. Excavations at Porthclew Chapel, Freshwater East, Pembrokeshire, 2008 Interim Report. Unpublished Dyfed Archaeological Trust. Report no. 2009/17

Schlee, D.E 2010 (a) 'West Angle Bay, Angle, Pembrokeshire, Arfordir Excavation 2010. Unpublished Dyfed Archaeological Trust Report no. 2010/58

Schlee, D.E 2010 (b) **'**The Pembrokeshire Cemeteries Project. Excavations at Porthclew Chapel, Freshwater East, Pembrokeshire, 2009 Second Interim Report. Unpublished Dyfed Archaeological Trust. Report no. 2010/20

Schlee, D.E 2011 (a) **'**The Pembrokeshire Cemeteries Project. Excavations at St Bride's Haven, Pembrokeshire, 2011. Unpublished Dyfed Archaeological Trust Report no. 100746

Thomas C 1971, The Early Christian Archaeology of North Britain, Oxford University Press, London. P 49

Arial photographs

James TA. 1987. AP87.150.33

Cartographic sources

Ordnance Survey 1:25,00, First Edition, Sheet XXXII.1.

Ordnance Survey 1:25,00, Second Edition, Sheet XXXII.1.

Parish of St Bride's Tithe Map, 1839.

APPENDIX 1

REPORT ON COLLAGEN ANALYSIS OF BONE SAMPLES FROM ST BRIDE'S HAVEN, WALES.

BY A. LAMB AND J. EVANS

Introduction

Skeletal material from a number of individuals was received at NIGL in early 2012 for bone collagen (carbon and nitrogen analysis) and tooth enamel (strontium and oxygen analysis).

The preservation of the material was poor and the tooth enamel was soft and unsuitable for analysis and so it was decided not to attempt the enamel analysis. Collagen was extracted from seven bone samples as described below.

Collagen Extraction and C & N analysis

Collagen was extracted following the method of (Brown et al., 1988) and M.P. Richards (pers. com.). Approximately 0.5-1.0g of each bone was cleaned thoroughly in distilled water and placed in polypropylene test tubes with 8 ml of 0.5 M HCl in the fridge for at least 48 hours to demineralise. The demineralising solution was discarded and the remaining solid collagen was rinsed 3 times in deionised water, placed into glass test tubes and solubilised in a solution of pH3 HCl at 70ºC in a hot block for 48 hours. The solutions were filtered using an 8µm Ezze filter to remove solids before freeze drying. Two aliquots from each collagen sample were weighed into small tin capsules for analysis. Analysis of carbon and nitrogen isotopes was by Continuous Flow Isotope Ratio Mass Spectrometry (CFIRMS). The instrumentation is comprised of an Elemental analyser (Flash/EA) coupled to a ThermoFinnigan Delta Plus XL isotope ratio mass spectrometer via a ConFlo III interface. $\delta^{13}C$ and $\delta^{15}N$ ratios were calibrated using an in-house reference material M1360p (powdered gelatine from British Drug Houses) with expected delta values of –20.32‰ (calibrated against CH7, IAEA) and +8.12‰ (calibrated against N-1 and N-2, IAEA) for C and N respectively. The 1 σ reproducibility for mass spectrometry controls in this batch of analysis were $\delta^{15}N$ = ± 0.06‰ and $\delta^{13}C$ = ± 0.07‰. The results are given below.

bone	Identifier 1	Amt%C	Amt%N	C/N at	d13C	d15N	yield %
SB11	SK016	37.5	11.8	3.7	-21.6	11.2	0.4
SB11	SK026	42.4	14.9	3.3	-20.2	11.3	7.3
L. Femur	SK001	51.6	15.4	3.9	-21.2	12.6	0.8
R. Femur	SK003	31.7	8.6	4.3	-21.6	11.2	0.3
Femur	SK008	34.7	3.1	13.0	-24.6	10.2	0.2
L. Femur	SK011	13.4	2.3	6.9	-24.3	10.0	0.3
L. Femur	SK015	20.2	11.2	2.1	-21.2	11.4	0.5

The only sample that gave a successful collagen yield is the L. femur of SK026. This is also the only sample to have a C/N ratio within the expected range for well preserved collagen (2.9-3.6; DeNiro, 1985). This suggests that there is overall degradation of the collagen and hence inaccurate/unobtainable/unusable data.

The results from the single sample are consistent with data obtained from similar

sites in South Wales (Hemer, 2010).

References

Brown, T. A., Nelson, D. E., Vogel, J. S., and Southon, J. R., 1988. Improved collagen extraction by modiefied Longin method. . *Radiocarbon* **30**, 171-177.

DeNiro, M.J., 1985. Postmortem preservation and alteration of in vivo bone collagen isotope ratios in relation to paleodietary reconstruction. Nature, 317: 806–809.

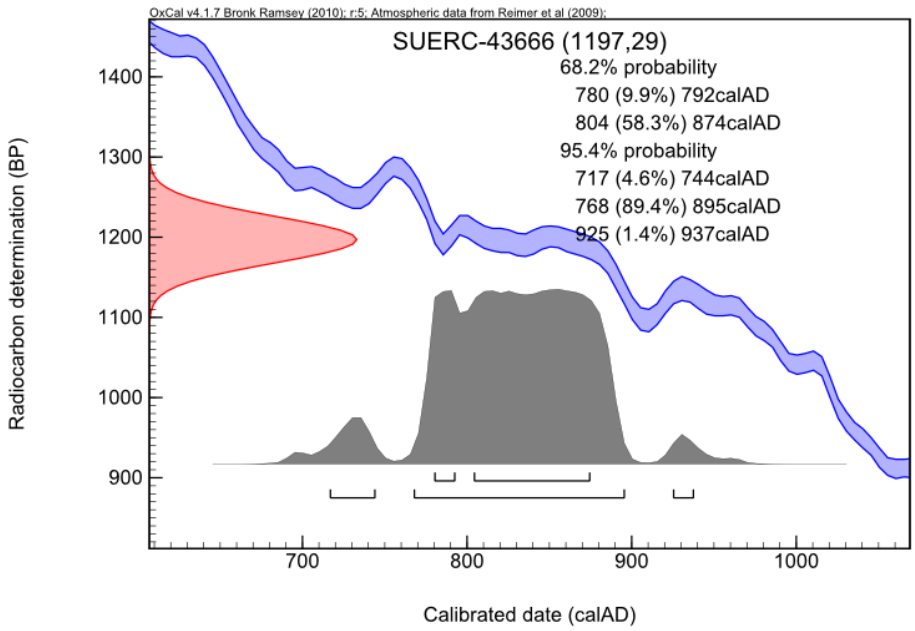
Hemer, K., 2010. In the Realm of Saints: A Reconstruction of Life and Death in Early Medieval Wales and the Isle of Man., Sheffield.

APPENDIX 2

Carbon dating

Owing to the poor bone preservation, specifically the absence of survival of collagen, it was only possible to obtain one carbon date from the skeletal assemblage

Laboratory Code	SUERC-43666 (GU29010)
Submitter	Duncan Schlee Dyfed Archaeological Trust Shire Hall, Carmarthen St Llandeilo Carmarthenshire SA19 6AF
Site Reference	SBB11 St Brides Bay
Context Reference	83
Sample Reference	083-026-1
Material	Bone : Human
$\delta^{13}C$ relative to VPDB	-20.8 ‰
$\delta^{15}N$ relative to air	11.3 ‰
C/N ratio (Molar)	3.3
Radiocarbon Age BP	1197 ± 29



APPENDIX 3

Osteological Analysis

Anwen Caffell and Malin Holst

Summary

York Osteoarchaeology Ltd was commissioned by Dyfed Archaeological Trust Ltd to carry out the osteological analysis of 26 human skeletons and disarticulated remains recovered from a medieval cemetery at St. Bride's Haven, Pembrokeshire (NGR SM 80211094). The cemetery may have originated in the early medieval period, but two existing radiocarbon dates of AD 810-1090 and c. AD 1650 suggest that the cemetery may have been in use for a long period. Graves had been arranged in rows with evidence for grave markers, but some intercutting of burials did occur. Where burial position and orientation could be determined, almost all individuals were inhumed in an extended, supine position with their head to the west. One adult had been interred in the opposite direction. Over half the individuals were buried in cists, while the remainder were buried in simple earth-cut graves.

Preservation of the skeletons was extremely poor, with most burials being less than 10% complete, having suffered extensive fragmentation and surface erosion. Nonetheless, it appeared that a cross-section of the population was buried at St. Bride's. Around a third of the burials were those of children, with a high proportion being under six years of age. Although most of the adults appeared to be young, this may be a result of preservation bias. Two potential males and one potential female were identified, but it was impossible to determine the sex of the remaining adults.

There was evidence that the population had suffered childhood stress, in the form of *cribra orbitalia* and enamel hypoplasia. One young child had enamel hypoplasia of their deciduous teeth implying the health of the mother was poor. Other pathological conditions identified included maxillary sinusitis, and osteoarthritis of the neck. Dental conditions included dental calculus, tooth decay, dental abscesses, periodontal disease, and loss of teeth during life. Although the frequency of these conditions appeared to be low, this was likely a result of preservation bias. Two individuals had developmental anomalies of their teeth that may have been genetic.

1.0 INTRODUCTION

In May 2012 York Osteoarchaeology Ltd was commissioned by Dyfed Archaeological Trust Ltd (DAT) to carry out the osteological analysis of 26 human skeletons and disarticulated human remains recovered from a medieval cemetery at St. Bride's Haven, Pembrokeshire (NGR SM 80211094). The location of the cemetery close to the cliff edge made it vulnerable to coastal erosion. Consequently, it was decided to excavate the site in advance of its eventual destruction. The excavations were funded by Cadw, and volunteers undertook much of the excavation of the site.

The cemetery is believed to be of early medieval date, but burial apparently continued into the post-medieval period. Two burials exposed by erosion in 1985 gave radiocarbon dates of AD 1000 (± 70 b.p.) from a cist burial, and c. AD 1650 (± 60 b.p.) from an earth cut grave (Schlee 2011, 4).

Because of the poor preservation and intercutting or proximity of the graves, on occasion mixing of skeletons may have occurred. During analysis Skeleton 010 was found to contain teeth from at least two individuals. These were divided into Skeleton 010A and 010B. During excavation, cranial fragments initially ascribed to Skeleton 002 were later thought to belong to Skeleton 007; these fragments were duly recorded as Skeleton 007. Long bones recorded as part of Skeleton 003 during excavation were found on analysis to represent the articulated legs of an additional individual, which was recorded as Skeleton 046. A disarticulated skull from Context 026 was found in the vicinity of Skeletons 003 and 046, and it is possible that this was part of Skeleton 046. However, this was not certain and so it was recorded as a separate context.

1.1 AIMS AND OBJECTIVES

The aim of the skeletal analysis was to determine the age, sex and stature of the skeletons, as well as to record and diagnose any skeletal manifestations of disease and trauma.

1.2 METHODOLOGY

The skeletons were analysed in detail, assessing the preservation and completeness, calculating the minimum number of individuals present as well as determining the age, sex and stature of the individuals. All pathological lesions were recorded and described. Two contexts containing potential disarticulated bone were also recorded as if they were articulated burials.

2.0 OSTEOLOGICAL ANALYSIS

Osteological analysis is concerned with the determination of the identity of a skeleton, by estimating its age, sex and stature. Robusticity and non-metric traits can provide further information on the appearance and familial affinities of the individual studied. This information is essential in order to determine the prevalence of disease types and age-related changes. It is crucial for identifying sex dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society. Summaries of the osteological and palaeopathological data are given in **Error! Reference source not found.** (for the articulated skeletons) and **Error! Reference source not found.** (for the disarticulated remains), with detailed catalogues provided in Appendices A and B.

Table 1 Summary of osteological and palaeopathological data of the articulated skeletons

Sk No	C (%)	SP	F	Age	Age Group	Sex	Stature (cm)	Dental Pathology	Pathology
001	<10%	5	ext	18+?	a?	?	-	-	-
002	<10%	5	ext	25-35?	yma?	?	-	Calculus	-
003	c. 10%	5	sev	10-12	j	-	-	Calculus; DEH	Cribra orbitalia
004	<5%	2	sev	18+?	a?	?	-	-	-
005	<10%	5	ext	8½-10½	j	-	-	Calculus; DEH	-
006	<10%	5	sev	12-17?	ad?	-	-	-	-
007	<10%	5+	ext	12-25?	ad/ ya?	?	-	-	-
008	c. 10%	5	sev	18+?	a?	?	-	-	-
009	<5%	5+	ext	?	?	?	-	-	-
010A	<10%	5	ext	18-25?	ya?	?	-	Calculus	-
010B	<10%	5	ext	9-17?	j/ ad?	-	-	-	-
011	c. 10%	4	ext	18+	a	?	-	-	-
012	<10%	4	sev	1-2	j	-	-	DEH	-
013	<10%	3	sev	1½-3½	j	-	-	-	-
014	<10%	5	ext	18-25?	ya?	F??	-	Calculus	-
015	<10%	5+	sev	12+?	ad/ a?	?	-	-	-
016	20-30%	4	sev	25-45?	yma/ oma?	?	-	AMTL; calculus; caries; PD?; abscess	Maxillary sinusitis; OA of atlas
019	<10%	4	ext	4-6	j	-	-	-	-
021	<10%	5+	ext	12+?	ad/ a?	?	-	-	-
022	<10%	5+	ext	18-25?	ya?	?	-	DEH; unusual morphology upper canines	-
025	<5%	5	ext	12+?	ad/ a?	?	-	-	-
026	30-40%	5	sev	18-25?	ya?	?	-	AMTL/ developmental absence central incisors	-
030	<10%	5	ext	25-35?	yma?	M??	-	Calculus	-
032	10-20%	5+	sev	25-45?	yma/ oma?	M??	-	AMTL; calculus; caries	Maxillary sinusitis; cribra orbitalia
033	<10%	4	sev	6-16?	j/ ad?	-	-	-	-
046	c. 10%	5	sev	18+?	a?	?	-	-	-

Key: SP = Surface preservation: grades 0 (excellent), 1 (very good), 2 (good), 3 (moderate), 4 (poor), 5 (very poor), 5+ (extremely poor) after McKinley (2004a); C = Completeness; F = Fragmentation: min (minimal), sli (slight), mod (moderate), sev (severe), ext (extreme)

Non-adult age categs: f (foetus, <38weeks *in utero*), p (perinate, c. birth), n (neonate, 0-1m), i (infant, 1-12m), j (juvenile, 1-12y), ad (adolescent 13-17y)

Adult age categs: ya (young adult, 18-25y), yma (young middle adult, 26-35y), oma (old middle adult, 36-45y), ma (mature adult, 46+y), a (adult, 18+y)

Table 2 Summary of osteological and palaeopathological data of the disarticulated remains

Sk No	C (%)	SP	F	Age	Age Group	Sex	Dental Pathology	Pathology
026	<10%	4	ext	25/30+	a	?	-	-
077	<10%	5+	ext	12+?	ad/ a?	?	-	-

Key: SP = Surface preservation: grades 0 (excellent), 1 (very good), 2 (good), 3 (moderate), 4 (poor), 5 (very poor), 5+ (extremely poor) after McKinley (2004a); C = Completeness; F = Fragmentation: min (minimal), sli (slight), mod (moderate), sev (severe), ext (extreme)

Non-adult age categs: f (foetus, <38weeks *in utero*), p (perinate, c. birth), n (neonate, 0-1m), i (infant, 1-12m), j (juvenile, 1-12y), ad (adolescent 13-17y)

Adult age categs: ya (young adult, 18-25y), yma (young middle adult, 26-35y), oma (old middle adult, 36-45y), ma (mature adult, 46+y), a (adult, 18+y)

2.1 PRESERVATION

Skeletal preservation depends upon a number of factors, including the age and sex of the individual as well as the size, shape and robusticity of the bone. Burial environment, post-depositional disturbance and treatment following excavation can also have a considerable impact on bone condition (Henderson 1987, Garland and Janaway 1989, Janaway 1996, Spriggs 1989). Preservation of human skeletal remains is assessed subjectively, depending upon the severity of bone surface erosion and post-mortem breaks, but disregarding completeness. Preservation is important, as it can have a large impact on the quantity and quality of information that it is possible to obtain from the skeletal remains.

Surface preservation, concerning the condition of the bone cortex, was assessed using the seven-category grading system defined by McKinley (2004), ranging from 0 (excellent) to 5+ (extremely poor). Excellent preservation implied no bone surface erosion and a clear surface morphology, whereas extremely poor preservation indicated heavy and penetrating erosion of the bone surface resulting in complete loss of surface morphology and modification of the bone profile. Surface preservation could be variable throughout an individual skeleton, so the condition of the majority of bones in the skeleton was taken as the preservation grade for the whole skeleton. The degree of fragmentation was recorded, using categories ranging from 'minimal' (little or no fragmentation of bones) to 'extreme' (extensive fragmentation with bones in multiple small fragments). Finally, the completeness of the skeletons was assessed and expressed as a percentage: the higher the percentage, the more complete the skeleton.

By far the majority of the skeletons had experienced severe damage to the bone surfaces, with half exhibiting very poor surface preservation (Grade 5) and 23.1% exhibiting extremely poor surface preservation (Grade 5+). Most of the remainder (19.2%) had poor surface preservation (Grade 4), and moderate or good preservation was only seen in two individuals (**Error! Reference source not found.** and **Error! Reference source not found.**). The latter included skeletons where only bone from the inside of the cranial vault was preserved, which tended to show better surface preservation, probably as they were more protected than the external surfaces. The bone from contexts (026) and (077) followed the same trend as the articulated burials: (026) was poorly preserved (Grade 4), and (077) was extremely poorly preserved (Grade 5+).

Figure 1: Surface preservation

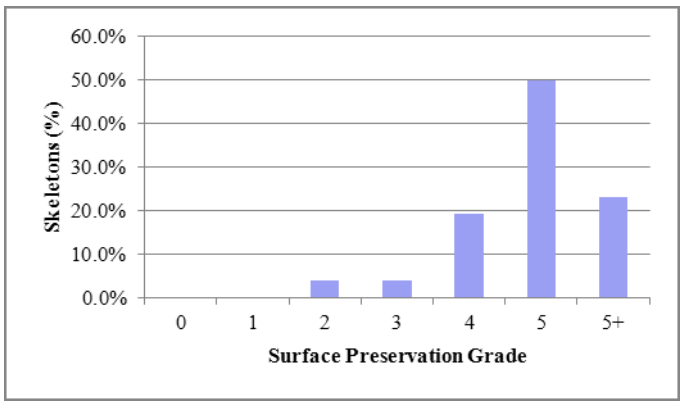
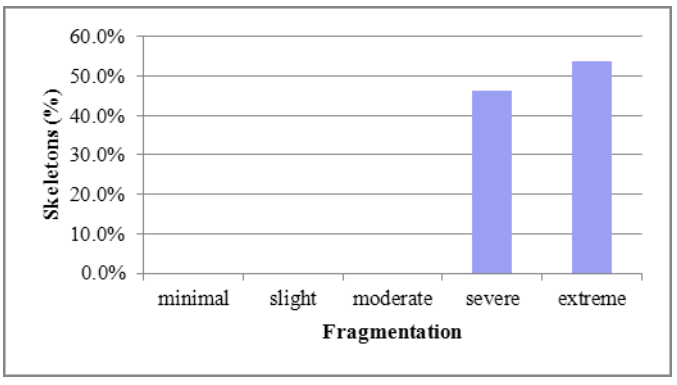


Table 3: Surface preservation

SP Grade	n	%
0	0	0.0%
1	0	0.0%
2	1	3.8%
3	1	3.8%
4	5	19.2%
5	13	50.0%
5+	6	23.1%
Total	**26**	

The skeletons had all experienced severe or extreme fragmentation, with over half being considered extremely fragmented (**Error! Reference source not found.** and **Error! Reference source not found.**). The bone from contexts (026) and (077) was also extremely fragmented.

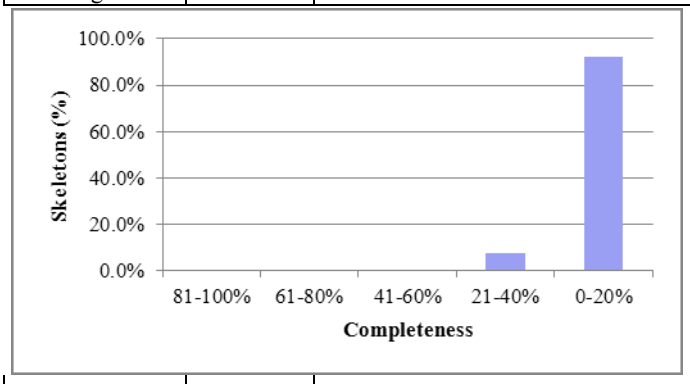
Figure 2



Fragmentation

Table 4 Fragmentation

Fragmentation	n	%
minimal	0	0.0%
slight	0	0.0%
moderate	0	0.0%
severe	12	46.2%
extreme	14	53.8%
Total	**26**	



The majority of skeletons were less than 20% complete (**Error! Reference source not found.** and **Error! Reference source not found.**). Of these, one was between 10-20% complete (Skeleton 032) and the rest were less than 10% complete. Only two skeletons were between 21-40% complete (Skeletons 016 and 026). Bone from contexts (026) and (077) was also less than 10% complete.

Figure 3 Completeness

Table 5 Completeness

Completeness	n	%
81-100%	0	0.0%
61-80%	0	0.0%
41-60%	0	0.0%
21-40%	2	7.7%
0-20%	24	92.3%
Total	**26**	

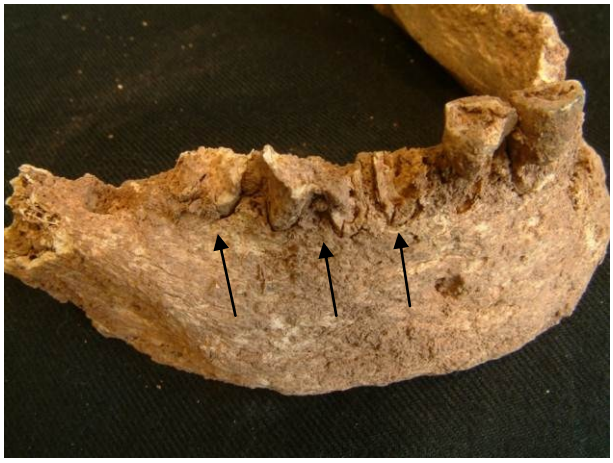


Plate 1 Tooth crowns broken off leaving roots in the sockets (Skeleton 032)

Overall, the skeletons were very poorly preserved. Bones were extremely fragmented and their surfaces had been eroded considerably with the resulting loss of almost all surface detail and some modification of the shape of the bone. In some areas, the cortex had been completely destroyed. Bone was so friable that it had not been washed, instead having been dry-brushed (Schlee 2011, 18). The teeth had also suffered extensively: tooth crowns had broken away from the roots (**Error! Not a valid bookmark self-reference.**), and in many skeletons tooth roots and dentine had been lost post-mortem leaving just the enamel surviving. Without the support of the dentine, the enamel in turn was beginning to crack and fragment. The lack of completeness was probably largely due to the loss of bone through taphonomic processes, with the larger and more robust bones more likely to survive. Indeed, fifteen of the excavated graves contained no surviving bone at all (not included in the above analysis), demonstrating the extent of the bone destruction possible at this site. The lack of completeness, degree of surface erosion and amount of fragmentation all hindered the amount of information it was possible to gain from analysis of the skeletons.

2.2 MINIMUM NUMBER OF INDIVIDUALS

A count of the 'minimum number of individuals' (MNI) recovered from a cemetery is carried out as standard procedure in osteological reports on inhumations in order to establish how many individuals are represented by the articulated and disarticulated human bones (without taking the archaeologically defined graves into account). The MNI is calculated by counting all long bone ends, as well as other larger skeletal elements recovered. The largest number of these is then taken as the MNI. The MNI is likely to be lower than the actual number of skeletons which would have been interred on the site, but represents the minimum number of individuals which can be scientifically proven to be present.

The minimum number of individuals present was thirteen, based on thirteen right and thirteen left petrous portions of the temporal bone (ear area of the skull). This is half the number of skeletons (26) identified archaeologically.

2.3 ASSESSMENT OF AGE

Age was determined using standard ageing techniques, as specified in Scheuer and Black (2000a; 2000b) and Cox (2000). For non-adults age is usually estimated using the stage of dental development (Moorrees *et al.* 1963a; 1963b), dental eruption (Ubelaker 1989), measurements of long bones and other appropriate elements, and the development and fusion of bones (Scheuer and Black 2000b). In all non-adults from St. Bride's, it was only possible to use dental development and (in some individuals) dental eruption. When only the teeth survived and the surrounding bone was lost, it was difficult to determine whether or not the teeth had erupted, unless there was evidence for wear on the tooth crowns. Even dental development age determination was problematic, as frequently the tooth roots and dentine had been destroyed. In these

circumstances, it was only possible to observe the stage of development of the crowns, and if the crowns had completed development this only provided a minimum age as it was not always clear whether the roots were not present because they had not begun to form, or whether they were not present because they had been destroyed post-mortem. Correct identification of teeth was also made more challenging by the poor preservation.

In adults, the most reliable methods for estimating age are based on stages of bone development and degeneration in the pelvis (Brooks and Suchey 1990, Lovejoy *et al.* 1985) and ribs (modified version of methods developed by İşcan *et al.* 1984; 1985 and İşcan and Loth 1986 provided in Ubelaker 1989). These methods are usually supplemented through examination of patterns of dental wear (Brothwell 1981, Miles 1962). At St. Bride's, the only method of age estimation available was dental wear, as the relevant parts of the pelvis and ribs were never preserved. The problem with dental wear is that it is influenced by diet. Individuals consuming a coarse, gritty diet will experience greater degrees of dental wear (and so appear older) than individuals consuming a fine, soft diet (who will appear younger). Since the St. Bride's population was mostly medieval, it is likely that the degree of wear experienced was reasonably comparable with the populations on which the age estimation methods were developed.

The individuals were divided into a number of age categories. Non-adults were subdivided into 'foetus' (f: where the age estimate clearly fell below 38-40 *weeks in utero*), 'perinate' (p: where the age estimates converged around birth), 'neonate' (n: where the age estimate suggested 0-1 month), 'infant' (i; 1-12 months), juvenile (j; 1-12 years), and adolescent (ad; 13-17 years). Adults were divided into 'young adult' (ya; 18-25 years), young middle adult (yma; 26-35 years), old middle adult (oma; 36-45 years), and mature adult (46+ years). A category of 'adult' (a) was used to designate those individuals whose age could not be determined beyond the fact that they were eighteen or older. However, it is important to note that several studies (for example Molleson and Cox 1993, Molleson 1995, Miles *et al.* 2008) have highlighted the difficulty of accurately determining the age-at-death of adults from their skeletal remains, with age-at-death frequently being underestimated for older individuals. The categories defined here should be taken as a general guide to the relative physiological age of the adult, rather than being an accurate portrayal of the real chronological age.

Eight (30.8%) of the 26 skeletons were non-adults. These included five juveniles, a probable adolescent, and two individuals who were probably older juveniles or adolescents (**Error! Reference source not found.**). Three of the juveniles were under six years of age, and the remaining two were between eight and twelve years old.

Table 6 Non-adult age distribution

Age Group	Age Range	n	%
f/p/n	<1m	0	0.0%
i	1-12m	0	0.0%
yj	1-6y	3	37.5%
oj	6-12y	2	25.0%
ad	12-17y	1	12.5%
j/ad	6-17y	2	25.0%
	Total	**8**	

f/p/n = foetus/perinate/neonate; i = infant; yj = younger juvenile; oj = older juvenile; ad = adolescent; j/ad = juvenile/adolescent

Thirteen (50.0%) of the individuals were adults or probable adults. Four were probably young adults (aged 18-25 years), two were probably young middle adults (aged 26-35 years), and two were probably young or old middle adults

(26-45 years). The remaining five skeletons (38.5% of 13) were adults aged eighteen years or older (**Error! Reference source not found.**). The lack of old middle and mature adults is probably an artefact of preservation. Since the only age estimation method that could be used was dental wear, this depends on the tooth crowns being intact enough to observe the extent of wear. Frequently the dentine had been lost completely, leaving just the enamel behind. In this situation, unworn and slightly worn teeth (with minimal loss of enamel) from younger individuals would be more likely to survive intact. In contrast, in heavily worn teeth the cusps are worn away completely, exposing the dentine across the whole occlusal (biting) surface, and leaving just a ring of enamel around the edge of the crown. Once the dentine is lost, the ring of enamel has nothing to support it and it fragments. This means that the teeth of older individuals would be less likely to survive in a condition where the amount of wear could be assessed.

Table 7 Adult age distribution

Age Group	Age Range	n	%
ya	18-25	4	30.8%
yma	26-35	2	15.4%
yma/oma	26-45	2	15.4%
oma	36-45	0	0.0%
ma	46+	0	0.0%
a	18+	5	38.5%
	Total	**13**	

ya = young adult; yma = young middle adult; oma = old middle adult; ma = mature adult; a = adult

One of the remaining five individuals was probably an adolescent or a young adult (Skeleton 007). Three were probably adults, but could have been adolescents, and one (Skeleton 009) was so poorly preserved (consisting of a handful of tooth enamel fragments) that it was not even possible to tell whether the individual was an adult or a non-adult.

The disarticulated skull (026) was that of an adult, probably aged over 25/30 years of age at the time of death (based on the fusion of the jugular growth plate, Scheuer and Black 2000b, 59). The disarticulated bone from Context (077) was probably from an adult or adolescent.

2.4 SEX DETERMINATION

Sex determination was carried out using standard osteological techniques, such as those described by Mays and Cox (2000). Assessment of sex involves examination of the shape of the skull and the pelvis and can only be carried out once sexual characteristics have developed, during late puberty and early adulthood. Evidence from the pelvis is favoured as its shape is directly linked to biological sex (the requirements of childbirth in females) whereas the shape of the skull can be influenced by factors such as age (Walker 1995). Measurements of certain bones were used to supplement the morphological assessment (Bass 1987).

Unfortunately, the extent of post-mortem damage to, and loss of skeletal elements meant that it was impossible to estimate the sex of most of the adult individuals. None of the skeletons had relevant parts of the pelvis preserved, and in all individuals sex estimation had to be based on fragments of skull. Given the amount of surface erosion, it was difficult to assess shape even when the relevant parts were present. Bearing this in mind, the sex estimates provided should be viewed with caution.

An estimate of sex was made for three adults. One (Skeleton 014) was possibly

female, and two (Skeletons 030 and 032) were possibly male. Unfortunately, although estimates of sex were attempted for the two best-preserved skeletons (Skeletons 016 and 026), both displayed a mix of male and female traits. Given the absence of the pelvis, and lack of familiarity with the sexual dimorphism in this population, it was not possible to determine sex for these two individuals.

It was not possible to determine sex for the disarticulated bone from contexts (026) and (077).

2.5 METRIC ANALYSIS

Unfortunately, the amount and severity of fragmentation meant that very few measurements could be taken. It was not possible to calculate stature for any of the individuals, nor was it possible to calculate cranial indices.

2.5.1 Platymeric and Platycnemic Indices

Leg measurements obtained from the femora and tibiae are used to calculate the shape and robusticity of the femoral shaft (*platymeric* index) and the tibial shaft (*platycnemic* index; Bass 1987). It was possible to calculate the *platymeric* index for the right femur of Skeleton 016 and the left femur of Skeleton 026. It was not possible to calculate the *platycnemic* index of any individual.

The right femur of Skeleton 016 (possible middle adult) had a *platymeric* index of 73.08, which fell into the *platymeric* (flattened) range. The left femur of Skeleton 026 (possible young adult) had a *platymeric* index of 85.93, which fell into the *eurymeric* (rounded) range.

2.6 NON-METRIC TRAITS

Non-metric traits are additional sutures, facets, bony processes, canals and foramina, which occur in a minority of skeletons and are believed to suggest hereditary affiliation between skeletons (Saunders 1989). The origins of non-metric traits have been extensively discussed in the osteological literature and it is now thought that while most non-metric traits have genetic origins, some can be produced by factors such as mechanical stress (Kennedy 1989) or environment (Trinkhaus 1978). A total of thirty cranial (skull) and thirty post-cranial (bones of the body and limbs) non-metric traits were selected from the osteological literature (Buikstra and Ubelaker 1994; Finnegan 1978; Berry and Berry 1967) and recorded.

2.6.1 Cranial Non-Metric Traits

It was only possible to record the presence/absence of at least one cranial non-metric trait in seven individuals: six adults and one non-adult. The frequencies of the cranial non-metric traits observed in the adult skeletons are provided in **Error! Reference source not found.**. The poor state of preservation can be observed from the number of parts present, where the largest number of observations possible was four (right *auditory torus* and right *mandibular torus*). For most traits, their presence or absence could only be observed in one or two individuals, and many traits could not be observed at all.

Most of the non-metric traits observed occurred in Skeleton 016 (middle adult?), who had many *ossicles* (small additional bones) in the sutures of their cranium. These included an *ossicle at lambda*, *ossicles* in both *lambdoid sutures*, and an *ossicle at asterion* on the left side. Their *mastoid foramen* (small hole in the area behind the ear) was outside the occipitomastoid suture (*extrasutural*) on the left side, but inside the suture (*sutural*) on the right side. Skeleton 016 and Skeleton

032 (middle adult male?) both had a *parietal foramen* (small hole towards the back of the head), which occurred on the right side in Skeleton 016 and on the left side in Skeleton 032. Skeleton 026 (young adult?) had an *ossicle* at the *parietal notch* on the right side, and Skeleton 014 (young adult female?) had an *accessory supraorbital foramen* (additional small hole above the orbit) on the right side. Finally, Skeleton 003 (10-12 year old juvenile) had a metopic suture, where the suture at the midline of the frontal bone fails to fuse during early childhood.

Table 8 Cranial non-metric traits (adults)

Midline Traits	Trait Present	Part Present	%
Ossicle at Lambda	1	2	50.0%
Ossicle at Bregma	-	0	-
Metopic Suture	0	2	0.0%
Palatine Torus	0	2	0.0%
Precondylar Tubercle	0	1	0.0%

Paired Traits	Right			Left		
	Trait Present	Part Present	%	Trait Present	Part Present	%
Highest Nuchal Line	0	2	0.0%	0	2	0.0%
Lambdoid Ossicle	1	1	100.0%	1	2	50.0%
Coronal Ossicle	0	1	0.0%	-	0	-
Ossicle at Asterion	0	1	0.0%	1	1	100.0%
Ossicle at Parietal Notch	1	2	50.0%	0	1	0.0%
Ossicle at Pterion	-	0	-	-	0	-
Parietal Foramen	1	2	50.0%	1	2	50.0%
Auditory Torus	0	4	0.0%	0	2	0.0%
Foramen of Huschke	0	2	0.0%	0	2	0.0%
Mastoid For. Extrasutural	0	1	0.0%	1	1	100.0%
Sutural Mastoid Foramen	1	1	100.0%	0	1	0.0%
Open Post. Condylar Canal	-	0	-	-	0	-
Double Condylar Facet	-	0	-	-	0	-
Double Ant. Condylar Canal	0	1	0.0%	0	2	0.0%
For. Ovale Incomplete	0	2	0.0%	0	1	0.0%
Open For. Spinosum	0	1	0.0%	0	1	0.0%
Access. Less. Palat. For.	-	0	-	-	0	-
Maxillary Torus	0	1	0.0%	0	1	0.0%
Mandibular Torus	0	4	0.0%	0	3	0.0%
Staphne's Defect	0	1	0.0%	0	1	0.0%
Zygomatic. Facial For. Abs.	0	2	0.0%	0	1	0.0%
Access. Infra-orb. For.	-	0	-	-	0	-
Access. Supraorbital For.	1	2	50.0%	0	1	0.0%
Bridging Supraorbital Notch	0	2	0.0%	0	1	0.0%
Anterior Ethmoid For. Ex.	-	0	-	-	0	-
Posterior Ethmoid For. Ex.	-	0	-	-	0	-

2.6.2 Post-Cranial Non-Metric Traits

It was only possible to record the presence/absence of at least one post-cranial non-metric trait in two adults. The frequencies of the post-cranial non-metric traits observed are provided in **Error! Reference source not found.**. It is

immediately apparent that the preservation of the post-cranial remains was worse than the cranial remains, as the majority of traits could not be observed at all (no parts survived). Where traits could be observed, they could only be observed in one individual.

The only post-cranial non-metric trait observed was an *acetabular crease* (small linear depression in the joint surface) in the left acetabulum of Skeleton 026 (young adult?).

Table 9 Post-cranial non-metric traits

Midline Traits	Trait Present	Part Present	%
Sternal Foramen	-	0	-

Paired Traits	**Right**			**Left**		
	Trait Present	Part Present	%	Trait Present	Part Present	%
Lateral Atlas Bridging	-	0	-	0	1	0.0%
Double Atlas Facet	-	0	-	-	0	-
Posterior Atlas Bridging	-	0	-	0	1	0.0%
Transverse For. Bipartite	-	0	-	-	0	-
Suprascapular Foramen	-	0	-	-	0	-
Accessory Acromial Facet	-	0	-	-	0	-
Circumflex Sulcus	-	0	-	-	0	-
Supracondyloid Process	-	0	-	-	0	-
Septal Aperture	-	0	-	-	0	-
Accessory Sacral Facet	-	0	-	-	0	-
Acetabular Crease	-	0	-	1	1	100.0%
Allen's Fossa	-	0	-	-	0	-
Poirier's Facet	-	0	-	-	0	-
Plaque	-	0	-	-	0	-
Hypotrochanteric Fossa	-	0	-	0	1	0.0%
Exostosis in Troch. Fossa	-	0	-	-	0	-
Third Trochanter	-	0	-	0	1	0.0%
Emarginate Patella	-	0	-	-	0	-
Vastus Notch	-	0	-	-	0	-
Vastus Fossa	-	0	-	-	0	-
Med. Tib. Squatting Facet	-	0	-	-	0	-
Lat. Tib. Squatting Facet	-	0	-	-	0	-
Peroneal Tubercle	-	0	-	-	0	-
Double Ant. Calc. Facet	-	0	-	0	1	0.0%
Absent Ant. Calc. Facet	-	0	-	0	1	0.0%
Double Inf. Talar Facet	-	0	-	0	1	0.0%
Med. Talar Facet	-	0	-	-	0	-
Lat. Talar Extension	-	0	-	-	0	-
Os Trigonum	-	0	-	-	0	-

2.7 CONCLUSION

Unfortunately, the skeletons from St. Brides Haven had suffered taphonomic processes that had led to severe fragmentation, pronounced surface erosion, and

the loss of most skeletal elements. This had a large impact on the osteological analysis, as it was difficult to determine the age and sex of the individuals, and impossible to calculate stature and most other metric indices. Recording of non-metric traits was also severely hampered by the poor state of preservation.

Nonetheless, it was possible to determine that almost a third of the cemetery population comprised non-adults. These included three children who had died before the age of six years, two older children, an adolescent, and two juveniles or adolescents. Half the population were almost certainly adults, including one possible female and two possible males. The apparent bias towards younger adults may well be a result of the preservation, as age estimation was based on dental wear and the heavily worn teeth of older individuals would be more prone to complete destruction. One individual was probably an adolescent or young adult. The age of the remaining four individuals was less certain, but it is likely that three were probably adults or adolescents.

3.0 PATHOLOGICAL ANALYSIS

Pathological conditions (disease) can manifest themselves on the skeleton, especially when these are chronic conditions or the result of trauma to the bone. The bone elements to which muscles attach can also provide information on muscle trauma and excessive use of muscles. All bones were examined macroscopically for evidence of pathological changes.

3.1 METABOLIC CONDITIONS

3.1.1 *Cribra Orbitalia*

Cribra orbitalia is a term used to describe fine pitting in the orbital roof which develops during childhood and often recedes during adolescence or early adulthood. Until recently, iron deficiency anaemia was the accepted cause of these lesions (Stuart-Macadam 1992), but a strong case has been made by Walker *et al.* (2009) for different types of anaemia as the causative factor. These include megaloblastic anaemia in the New World, suggesting a diet deficient in Vitamin B_{12} (i.e. plant-based and lacking in animal products) and/or folic acid. Such dietary deficiency could have been exacerbated through poor sanitation leading to infection and infestation with gut parasites (*ibid*). In malarious areas of the Old World, haemolytic anaemia (e.g. sickle cell anaemia and thalassemia) may be important in the development of *cribra orbitalia* (*ibid*). However, for areas such as northern Europe they have proposed that *cribra orbitalia* may be more likely related to conditions such as scurvy (Vitamin C deficiency) or chronic infections (*ibid*). *Cribra orbitalia* is often used as an indicator of general stress (Lewis 2000, Roberts and Manchester 2005) and is often found associated with agricultural economies (Roberts and Cox 2003).

At least one orbital roof could be observed in five individuals, including four adults and one child. One of the adults had *cribra orbitalia* (Skeleton 032, middle adult male?), as did the child (Skeleton 003, 10-12 year old juvenile). The proportion of adults affected was therefore 25.0% (1/4), and the proportion of individuals overall was 40.0% (2/5). The proportion of adult orbits affected was 16.7% (1/6), and the overall proportion of orbits affected was 28.6% (2/7). In comparison, Roberts and Cox (2003, 186-187, 234-235) report a true prevalence of 24.6% for the early medieval period, and a crude prevalence of 10.8% on average for the later medieval period.

3.2 INFECTIOUS DISEASE

Infectious disease can involve the skeleton, but since bone cannot respond

quickly only evidence for chronic, longstanding infections can be observed in archaeological skeletal remains (Roberts and Manchester 2005, 167). Acute conditions, where the patient either recovers or dies within a short space of time will not be seen. Initial bone formation in response to infection is disorganised (woven bone), but with time, as healing takes place, woven bone is remodelled and transformed into lamellar bone. Consequently, woven bone presence indicates an infection that was active at the time the person died, whilst lamellar bone indicates an infection that had healed; a combination of both suggests a recurring or longstanding infection (*ibid*). Although specific diseases may cause new bone to be deposited on the skeleton, it is almost always impossible to diagnose these from the bones alone. Hence, evidence for infection is discussed as 'non-specific' infection.

The degree of surface erosion seen in the St Bride's skeletons meant that it was unlikely that woven bone or lamellar bone would survive on most exposed bone surfaces.

3.2.1 Maxillary Sinusitis

Infection of the maxillary sinuses can result from upper respiratory tract infections, pollution, smoke, dust, allergies, or a dental abscess that has penetrated the floor of the sinus cavity (Roberts and Manchester 2005, 174-176). In the early medieval period, the cold and damp climate, occupation (cereal processing, metalworking and textile production), indoor pollution and dental disease have all been implicated in the development of maxillary sinusitis (Roberts and Cox 2003, 173). Sources of atmospheric pollution detailed for the late medieval period include burning wood and sea-coal for heating and cooking, lime-burning associated with building works, and smoke produced as a result of industrial activities such as metalworking (Roberts and Cox 2003, 233).

The maxillary sinuses could only be observed in two individuals, a possible middle adult male, (Skeleton 032) and a middle adult of unknown sex (Skeleton 016), both of whom were affected with sinusitis. In Skeleton 032 both sinuses were affected, whereas in Skeleton 016 the right sinus was affected but it was not possible to observe the left sinus. Skeleton 016 had a possible dental abscess that had penetrated the floor of the right maxillary sinus (**Error! Reference source not found.**), and the sinusitis may have been secondary to the abscess (although the strands of lamellar bone were observed c. 10mm to the posterior and medial of the potential abscess). In the early medieval period 1.3% of individuals and 3.1% of sexed adults were found to have suffered from sinusitis (crude prevalence rates, Roberts and Cox 2003, 173). In the late medieval period, the crude prevalence of sinusitis was reported to be 13.3% (individuals affected, Roberts and Cox 2003, 233).

3.3 JOINT DISEASE

The term joint disease encompasses a large number of conditions with different causes, which all affect the articular joints of the skeleton. Factors influencing joint disease include physical activity, occupation, workload and advancing age, which manifest as degenerative joint disease and osteoarthritis. Alternatively, joint changes may have inflammatory causes in the *spondyloarthropathies*, such as septic or rheumatoid arthritis. Different joint diseases affect the articular joints in a different way, and it is the type of lesion, together with the distribution of skeletal manifestations, which determines the diagnosis (Rogers 2000; Roberts and Manchester 2005, 133, 136).

3.3.1 Osteoarthritis

Osteoarthritis (OA) is a degenerative joint disease of synovial joints characterised by the deterioration of the joint cartilage, leading to exposure of the underlying bony joint surface. The resulting bone-to-bone contact can produce polishing of the bone termed 'eburnation', which is the most apparent expression of OA. Other features associated with degeneration of the joint include osteophytes (bone formation) on the surface or around the margins, porosity on the surface, and the development of cysts (Rogers 2000; Roberts and Manchester 2005, 135-138). OA is frequently associated with increasing age, but can be the result of mechanical stress and other factors, including lifestyle, food acquisition and preparation, social status, sex and general health and body weight (Larsen 1997; Roberts and Manchester 2005, 138). OA was recorded as present when at least two of the features associated with OA were present (e.g. osteophytes and porosity); eburnation, even if occurring alone, was always considered to be indicative of OA (Roberts and Manchester 2005, 136-138).

Only three adults had any of their spine preserved, with Skeleton 026 (young adult?) having the largest number of joint surfaces. Even this individual only had one cervical apophyseal facet (of a possible 28), five thoracic apophyseal facets (of a possible 48), and six lumbar apophyseal facets (of a possible 20). Skeletons 008 and 016 each had three cervical apophyseal facets between them. None of these facets were affected with osteoarthritis.

Skeleton 016 (middle adult) had developed osteophytes and porosity of the atlas facet for the dens. The atlas is the vertebra at the top of the spine which bears the skull, and the dens is the 'peg' of the second cervical vertebra around which the atlas swivels. This joint allows the head to turn from side to side. Unfortunately, the dens itself was badly eroded, and none of the rest of the spine was preserved. This joint was not preserved in any other skeleton so the true prevalence rate could not be calculated.
Five skeletons and the skull from context (026) had at least one extra-spinal joint surface preserved, but none showed any evidence for joint disease.

3.4 CONCLUSION

It seems likely that evidence for pathology has probably been lost due to the poor preservation of the skeletons. However, traces of pathological conditions were observed, including evidence that some individuals had possibly experienced anaemia during childhood. Two adults had developed an upper respiratory tract infection, possibly caused by dental disease in one of the individuals. The evidence for joint disease was limited by the fact that most joint surfaces did not survive, but one middle adult had osteoarthritis in one of their neck vertebrae.

4.0 DENTAL HEALTH

Analysis of the teeth from archaeological populations provides vital clues about health, diet and oral hygiene, as well as information about environmental and congenital conditions (Roberts and Manchester 2005). All teeth and jaws were examined macroscopically for evidence of pathological changes.

Ten adults and one adolescent/young adult (Skeleton 007) had at least some teeth or partial jaws surviving (ten with teeth surviving and six with tooth positions surviving). Between them, they had 121 identifiable teeth (not counting those where only the roots survived) and 84 tooth positions (**Error! Reference source not found.**). Six teeth had been lost post-mortem (7.1%). Considering that each individual originally had 32 tooth sockets and potentially 32 teeth, **Error! Reference source not found.** illustrates the amount of post-mortem damage to the jaws: only two individuals (Skeletons 016 and 032) approach a

complete dentition. Given the poor preservation and difficulty with determining age and sex, the skeletons were not divided into age and sex groups.

Table 10 Dental disease summary (adults)

Sk No	Teeth	Sockets	Lost PM		Lost AM		Calculus		Caries		Abscess		DEH	
			n	%	n	%	n	%	n	%	n	%	n	%
002	4	3	0	0.0%	0	0.0%	2	50.0%	0	0.0%	0	0.0%	0	0.0%
007	2	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
008	0	1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
010A	27	0	0	0.0%	0	0.0%	3	11.1%	0	0.0%	0	0.0%	0	0.0%
014	5	0	0	0.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%
016	24	29	0	0.0%	6	20.7%	5	20.8%	2	8.3%	1	3.4%	0	0.0%
022	15	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	20.0%
026	20	18	1	5.6%	2*	11.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
030	4	4	0	0.0%	0	0.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%
032	13	29	5	17.2%	3	10.3%	1	7.7%	1	7.7%	0	0.0%	0	0.0%
046	7	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**121**	**84**	**6**	**7.1%**	**9** **11**	**10.7%** **13.1%**	**13**	**10.7%**	**3**	**2.5%**	**1**	**1.2%**	**3**	**2.5%**

* possible developmental absence rather than AMTL

Seven non-adults had teeth preserved. These included three young juveniles, with 22 deciduous teeth and 25 unerupted permanent teeth; two older juveniles, with two deciduous teeth, sixteen unerupted (or probably unerupted) permanent teeth, and nineteen erupted (or probably erupted) permanent teeth; and two probable adolescents with thirteen erupted permanent teeth and two unerupted permanent teeth between them. Overall, there were 24 deciduous teeth, 43 unerupted permanent teeth, and 32 erupted permanent teeth from non-adults (**Error! Reference source not found.**).

Table 11 Dental disease summary (non-adults)

Sk No	Sockets	Deciduous	Unerupted Permanent	Erupted Permanent	Total Permanent	Calculus (perm)*		DEH (decid)		DEH (perm)†	
						n	%	n	%	n	%
Younger Juveniles											
012	0	9	5	-	-	-	-	8	88.9%	1	20.0%
013	0	4	4	-	-	-	-	0	0.0%	0	0.0%
019	0	9	16	-	-	-	-	0	0.0%	0	0.0%
Total	0	22	25	-	-	-	-	8	36.4%	1	4.0%
Older Juveniles											
003	3	1	8	10	18	1	10.0%	0	0.0%	3	16.7%
005	11	1	8	9	17	2	22.2%	0	0.0%	4	23.5%
Total	14	2	16	19	35	3	15.8%	0	0.0%	7	20.0%
Adolescents											
006	0	-	0	6	6	0	0.0%	-	-	0	0.0%
010B	0	-	2	7	9	0	0.0%	-	-	0	0.0%
Total	0	-	2	13	15	0	0.0%	-	-	0	0.0%
Total	**14**	**24**	**43**	**32**	**50**	**3**	**9.4%**	**8**	**33.3%**	**8**	**16.0%**

* proportion of erupted permanent teeth; † proportion of total permanent teeth

4.1 CALCULUS

If plaque is not removed from the teeth effectively (or on a regular basis) then it can mineralise and form concretions of calculus on the tooth crowns or roots (if these are exposed), along the line of the gums (Hillson 1996, 255-257).

Mineralisation of plaque can also be common when the diet is high in protein (Roberts and Manchester 2005, 71). Calculus is commonly observed in archaeological populations of all periods, although poor preservation or damage caused during cleaning can result in the loss of these deposits from the teeth (Roberts and Manchester 2005, 64).

Calculus was seen on the teeth of six adults (60.0% of the ten individuals with teeth surviving). Overall, the proportion of teeth with calculus was 10.7% (see **Error! Reference source not found.**). The latter figure was low in comparison with the 39.2% of teeth with calculus in the early medieval period, and 54.0% of teeth with calculus in the late medieval period (Roberts and Cox 2003, 194, 262). It is highly likely that traces of calculus had been lost from the teeth at St. Bride's through post-mortem damage and erosion. Furthermore, the presence of soil on the teeth may have obscured the presence of calculus, but attempts to remove the soil would also have removed any existing calculus. When calculus was observed it was present as slight deposits or flecks.

Calculus was also observed on the permanent teeth of the two older juveniles (40.0% of non-adults with erupted permanent teeth). The proportion of erupted permanent teeth affected (9.4%, see **Error! Reference source not found.**) was similar to the adult prevalence of 10.7%.

4.2 PERIODONTAL DISEASE

Calculus deposits in-between and around the necks of the teeth can aggravate the gums leading to inflammation of the soft tissues (gingivitis). In turn, gingivitis can progress to involve the bone itself, leading to resorption of the bone supporting the tooth, and the loss of the periodontal ligament that helps to anchor the tooth into the socket (Roberts and Manchester 2005, 73). It can be difficult to differentiate between periodontal disease and continuous eruption (whereby the teeth maintain occlusion despite heavy wear) in skeletal material, since both result in exposure of the tooth roots (Roberts and Manchester 2005, 74).

The post-mortem damage to the bone at St. Bride's made it difficult to assess whether periodontal disease was present, and this was only possible in three individuals (albeit tentatively). Skeleton 016 (middle adult) possibly had moderate periodontal disease of the mandible, although it is possible that the root exposure was due in part to continuous eruption. The socket for the mesial root of the lower first molar had been completely resorbed, although the root was still present (**Error! Reference source not found.**). This could have been due to localised severe periodontal disease. The remaining two individuals were apparently unaffected by periodontal disease. Periodontal disease was reported to affect 27.0% of early medieval individuals and 37.5% of late medieval individuals (Roberts and Cox 2003, 194, 261).

4.3 DENTAL CARIES

Dental caries (tooth decay) forms when bacteria in the plaque metabolise sugars in the diet and produce acid, which then causes the loss of minerals from the teeth and eventually leads to the formation of a cavity (Zero 1999). Simple sugars can be found naturally in fruits, vegetables, dried fruits and honey, as well as processed, refined sugar; since the latter three contain the most sucrose they are most cariogenic. Complex sugars are usually less cariogenic and are found in carbohydrates, such as cereals. However, processing carbohydrates, including grinding grains into fine powders or cooking them, will usually increase their cariogenicity (Moynihan 2003).

Two individuals had potential cavities in their teeth, both of whom were considered to be middle adults (Skeletons 016 and 032). The proportion of individuals affected was therefore 20.0% (of the ten with teeth surviving). Three teeth were affected, giving a prevalence of 2.5% (see **Error! Reference source not found.**), which was low compared to the frequency of dental caries reported for the early (4.2%) and late (5.6%) medieval periods (Roberts and Cox 2003, 191, 259). This may be related to preservation, as tooth roots at St. Bride's were vulnerable to post-mortem damage and erosion, particularly in the area around the neck of the tooth. Indeed, it was not uncommon to find the tooth crowns had broken away from the roots completely. This made it difficult to determine whether carious lesions were present around the necks of the teeth, which is a common location for tooth decay in the early and late medieval periods (Moore and Corbett 1971; 1973). In teeth where only the enamel survived, a cavity would have made the tooth crown more likely to fragment post-mortem.

4.4 ABSCESSES

Dental abscesses occur when bacteria enter the pulp cavity of a tooth causing inflammation and a build-up of pus at the apex of the root. Eventually, a hole forms in the surrounding bone allowing the pus to drain out and relieve the pressure. They can form as a result of dental caries, heavy wear of the teeth, damage to the teeth (e.g. fractures), or periodontal disease (Roberts and Manchester 2005).

A potential dental abscess was observed in Skeleton 016 (middle adult), in the floor of the maxillary sinus at the apex of the upper right first molar. This tooth had been lost ante-mortem, so it was not possible to comment on the potential cause of the abscess. The development of sinusitis may have been secondary to the dental abscess. Dental abscesses had affected 16.7% of the skeletons (of the six with tooth positions present), and 1.2% of the tooth sockets (see **Error! Reference source not found.**). This is lower than the frequency of dental abscesses observed in the early (2.8%) and late (3.1%) medieval periods (Roberts and Cox 2003, 192, 260).

4.5 ANTE-MORTEM TOOTH LOSS

Ante-mortem tooth loss (AMTL), or the loss of teeth during life, can occur as a result of a variety of factors, including dental caries, pulp-exposure from heavy tooth wear, or periodontal disease (occurring when inflammation of the gums, gingivitis, spreads to the underlying bone). Gingivitis can result when deposits of calculus on the teeth aggravate the gums. Once the tooth has been lost, the empty socket is filled in with bone (Roberts and Manchester 2005, 73-74).

Two individuals (both middle adults) had definite AMTL, and a third had possible AMTL. The latter individual (Skeleton 026) was missing both their lower central incisors, and it was not clear whether this was due to loss of these teeth ante-mortem or to a developmental absence or impaction. The proportion of individuals with AMTL was therefore either 50.0% (3/6) or 33.3% (2/6). The number of teeth lost ante-mortem was either nine (10.7%) or eleven (13.1%; see **Error! Reference source not found.**). This was slightly higher than the frequency reported for the early medieval period (8.0%, Roberts and Cox 2003, 193), but lower than the frequency of 19.4% reported for the late medieval period (Roberts and Cox 2003, 263).

4.6 DENTAL ENAMEL HYPOPLASIA

Dental enamel hypoplasia (DEH) is the presence of lines, grooves or pits on the surface of the tooth crown, and occurs as a result of defective formation of tooth

enamel during growth (Hillson 1996). Essentially, they represent a period when the crown formation is halted, and they are caused by periods of severe stress, such as episodes of malnutrition or disease, during the first seven years of childhood. Involvement of the deciduous (milk) teeth can indicate pre-natal stress (Lewis 2007). Trauma can also cause DEH formation, usually in single teeth.

DEH was observed in one individual (Skeleton 022, young adult?), affecting 10.0% of the ten individuals with surviving teeth. Three teeth were affected, providing a prevalence of 2.5% (see **Error! Reference source not found.**). This was lower than the average frequency of 7.4% observed in the early medieval period (Roberts and Cox 2003, 188), and well below the frequency observed in late medieval Britain (35.4%, Roberts and Cox 2003, 264).

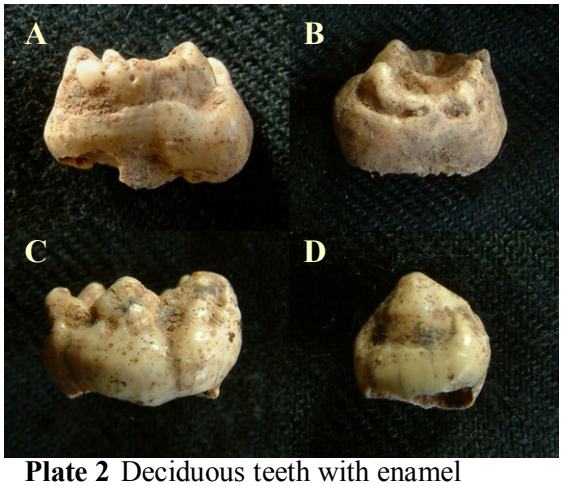


Plate 2 Deciduous teeth with enamel defects (Skeleton 012): upper left second molar (A and B), lower right second molar (C); upper right canine (D)

DEH also affected the permanent teeth of three of the non-adults (42.9% of individuals with permanent teeth present), including both older juveniles (Skeletons 003 and 005) and one of the younger juveniles (Skeleton 012). Overall, 16.0% of all non-adult permanent teeth were affected (see **Error! Reference source not found.**), which was considerably higher than the prevalence of DEH seen in the adult teeth. Notably, almost all the deciduous teeth of Skeleton 012 (1-2 year old child) also had severe enamel hypoplasia, with the tips of the cusps surrounded by pronounced pits and grooves in the enamel (**Error! Reference source not found.**). The overall frequency of DEH in the deciduous teeth was 33.3% (see **Error! Reference source not found.**).

4.7 DENTAL ANOMALIES

Skeleton 026 (young adult?) was missing both their lower central incisors. It is possible these were congenitally absent or impacted, but they could also have been lost during life (see Section 4.5). Lower central incisors are the fourth most likely tooth to fail to develop, and there may be a genetic component to congenitally absent teeth (Hillson 1996, 113-114).

The upper canines of Skeleton 022 (young adult?) had a pronounced buttress on the labial side of the crown, which ran vertically from the tip of the incisive surface to the neck of the tooth. It is likely this was an inherited variation in crown shape.

4.8 DENTAL CONCLUSIONS

As with other aspects of the analysis, the poor preservation had a detrimental impact on the data on dental disease it was possible to collect. Deposits of calculus were observed on the teeth of both adults and children, but at lower frequencies than normal, possibly due to loss of the calculus through post-mortem damage. Tooth decay was observed in a couple of the adults, but again the low frequency of the condition at St. Bride's could be due to biases in preservation. One adult had developed a dental abscess that had penetrated the maxillary sinus, and another had possibly suffered from periodontal disease. Loss of teeth during life had affected at least two middle-aged adults, but it was difficult to determine whether the missing incisors of a young adult were due to

AMTL or through failure of the teeth to develop. Evidence for childhood stress was present in the form of enamel defects, seen in the deciduous and permanent teeth of one young child, and the permanent teeth of two older children and a probable young adult. The involvement of the deciduous teeth suggests maternal health may have been poor.

5.0 FUNERARY ARCHEOLOGY

The cemetery of St. Bride's Haven is located close to the shore of St. Bride's Bay. There is tentative evidence that St. Bridget may have established a nunnery at St. Bride's in the latter half of the sixth century AD (Schlee 2011, 3). However, it is not clear whether this cemetery was associated with such an institution, and although an early date has been proposed, the two existing radiocarbon dates obtained from skeletal material provide later dates of c. AD 810-1090 and c. AD 1650 (Schlee 2011, 4). The existing 14th century church is located around 50m to the south of the cemetery, although there are historical references to an earlier church (Schlee 2011, 3, 13). It seems that the cemetery was associated with a medieval chapelry, which had been lost to coastal erosion by the early 19th Century (Schlee 2011, 3). A summary of the funerary data for the analysed skeletons is provided in **Error! Reference source not found.**.

Table 12 Funerary archaeology summary

Sk No	Age	Age Group	Sex	Cist	Orientation	Body Position	Arm Position
001	18+?	a?	?	N	W-E	Extended, supine	?
002	25-35?	yma?	?	N	W-E?	Extended, supine?	?
003	10-12	j	-	N	W-E	Extended, supine?	?
004	18+?	a?	?	N	W-E?	?	?
005	8½-10½	j	-	Y	W-E	Extended, supine?	?
006	12-17?	ad?	-	Y	W-E	Extended, supine?	?
007	12-25?	ad/ ya?	?	N	SW-NE	?	?
008	18+?	a?	?	Y	W-E	Extended, supine	?
009	?	?	?	Y	?	?	?
010A	18-25?	ya?	?	N	?	?	?
010B	9-17?	j/ ad?	-	N	?	?	?
011	18+	a	?	N	W-E	Extended, supine	?
012	1-2	j	-	Y	NW-SE	Extended, supine?	?
013	1½-3½	j	-	Y	W-E	Extended, supine?	?
014	18-25?	ya?	F??	Y	W-E	Extended, supine?	?
015	12+?	ad/ a?	?	Y	W-E	Extended, supine?	?
016	25-45?	yma/ oma?	?	Y	W-E	Extended, supine	R hand over pelvis?
019	4-6	j	-	?	?	?	?
021	12+?	ad/ a?	?	?	?	?	?
022	18-25?	ya?	?	Y	W-E	Extended, supine?	?
025	12+?	ad/ a?	?	?	?	?	?
026	18-25?	ya?	?	Y	W-E	Extended, supine	Either side of torso?
030	25-35?	yma?	M??	N	NW-SE	Extended, supine?	?
032	25-45?	yma/ oma?	M??	Y	W-E	Extended, supine	?
033	6-16?	j/ ad?	-	?	?	?	?
046	18+?	a?	?	N	E-W	Extended, supine	?

It is clear that the full extent of the original cemetery was not excavated, as burials extend beyond the trench edges to all sides. Excavation was restricted to the north, as a certain distance had to be maintained from the cliff edge for safety and to avoid contributing to further coastal erosion. The graves were more densely packed towards the western part of the excavated area, and were

arranged in discernible rows. There was some degree of intercutting, despite evidence that grave markers had been used (e.g. three possible post holes, a stone slab grave marker, and the possibility that piles of stones were constructed over the graves or to support wooden grave markers; Schlee 2011, 7).

The majority of burials (57.7%) were arranged in a west-east orientation, with the heads to the west (**Error! Reference source not found.** and **Error! Reference source not found.**). A small percentage varied slightly from this pattern, with heads placed more to the northwest or southwest. One burial (Skeleton 046) had the head to the east. The orientation of the remaining burials could not be determined.

Table 13 Grave orientation

Orientation	n	%
W-E	15	57.7%
NW-SE	2	7.7%
SW-NE	1	3.8%
E-W	1	3.8%
?	7	26.9%
Total	**26**	

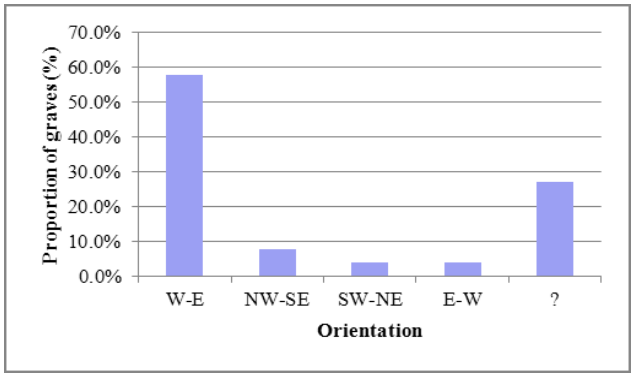


Figure 4 Grave orientation

It was not possible to determine the burial position of nine of the individuals (34.6%), but the remainder had all probably been buried in an extended and supine position. It was only possible to infer possible arm position in two of the burials: Skeleton 016 (middle adult) had possibly been buried with the right hand over their pelvis, and Skeleton 026 (young adult?) had possibly been buried with their arms either side of their torso.

There was no information on the form of the grave for four of the burials. Of the remaining 22 individuals, twelve had been buried in stone cists (54.5%) and ten were buried in simple earth-cut graves (45.5%). Grave type was known for six of the non-adults, and two-thirds had been buried in cists (4/6, 66.7%). This included the two youngest individuals recovered (Skeletons 012 and 013, aged 1-2 years and 1½-3½ years respectively), one of the two older juveniles (Skeleton 005, aged 8½-10½ years), and the probable adolescent (Skeleton 006). Grave type was known for all thirteen adults, and just under half (6/13, 46.2%) had been buried in cists. Of the remaining five individuals (four of whom were probably adults or adolescents), grave type was known for three, and two had been buried in cists. Even if these individuals are assumed to be adults, then half the adults were buried in cists (8/16, 50.0%). Therefore, it seems that non-adults might be more likely to receive a cist burial than adults. However, the possibility that the cist stones helped to protect the bones inside should also be considered. If adult bones are more likely to survive outside a cist than non-adult

bones, then it is possible that a disproportionate amount of evidence for non-adult burials in simple graves has been lost. In general, it can be noted that the skeletons recovered from cists were more likely to have an age or sex estimate than were individuals buried in simple graves, which suggests that preservation was indeed slightly better among the cist burials.

Given the paucity of data on the sex of the adults it was not possible to analyse cist provision based on sex. However, one of the possible males and the possible female were both buried in cists.

6.0 DISCUSSION AND SUMMARY

Unfortunately, the taphonomic conditions at St. Bride's Haven had led to a considerable amount of erosion of the bone surfaces with resulting loss of detail, severe fragmentation of the bone, and complete destruction of many bone elements leaving most skeletons less than 10% complete. All these factors had had a huge impact on the amount of data it was possible to record during analysis. However, given the general lack of survival of human remains from Wales, the fact that any human bone was preserved at all was fortunate, and despite the poor preservation it was possible to gain some insight into the burial population.

Osteological analysis determined that both non-adults and adults had been buried at St. Bride's. The proportion of non-adults at St. Brides (30.8%) is consistent with the typical proportion of non-adults (c. 30%) expected in archaeological cemeteries (Lewis 2007, 22). Children under five years of age are frequently under-represented in early medieval pre-Christian cemeteries, but usually make up a larger proportion of the population from other types of cemetery (Lewis 2007, 22-23). At St. Bride's, 37.5% of the non-adults were under six years of age, which is consistent with expected higher mortality in this age group. In an analysis of post-medieval 'bills of mortality', Roberts and Cox (2003, 304) found that around 40% of all deaths (adults included) occurred before the age of five. However, the lack of individuals under twelve months of age at St. Bride's suggests that infants, neonates, perinates and foetuses were under-represented in the sample, a pattern also found in other archaeological populations (Lewis 2007, 22). Whether this is an artefact of preservation (with complete destruction of the bones of babies under twelve months of age), or due to a cultural choice not to bury these individuals in this cemetery (or the part of the cemetery that was excavated) is not known. Two older children (aged between 8-12 years), and a probable adolescent were also present at St. Bride's.

Due to preservation issues, the only means by which the age of adults could be estimated was dental wear. This method is influenced by diet, and the extent of damage to the teeth also meant that relatively unworn teeth from younger individuals were more likely to survive. The latter could explain the apparent bias towards younger adults, and the lack of evidence for mature adults observed at St. Brides. Sex estimation was also problematic due to the lack of pelvic bone survival, but two adults were possibly males and one was possibly female. Therefore, it can be suggested that the cemetery served a general population, with adults and children, males and females, being buried there.

Evidence for pathological conditions was limited as a result of the poor preservation. However, there was a reasonable amount of evidence to suggest that the population had suffered episodes of poor nutrition or ill health during childhood. *Cribra orbitalia* of the orbit roofs was seen in one adult and one of the older children, and had affected over a quarter of the surviving orbits. Enamel defects were also seen in the permanent teeth of three children and a young adult, and the frequency of the condition was much higher among the children.

The youngest child (Skeleton 012, 1-2 years old) had severe defects in most of their deciduous (milk) teeth. Since these teeth develop while the baby is in the womb, this suggests that the health of the mother was so poor that she was unable to supply sufficient nutrients to the developing baby (Lewis 2007, 105). This implies that poor nutrition and disease also affected the adult population at St Bride's.

Two of the adults had suffered sinusitis, one of whom probably developed the condition following penetration of the sinus by a dental abscess. Other causes of sinusitis include air pollution, whether in the living or working environment. One middle-aged adult had developed osteoarthritis of a joint in the neck, a condition probably associated with advancing age.

Data on oral health was also affected by the preservation, as teeth had begun to disintegrate and evidence for dental disease had no doubt been lost. For example, dental calculus (suggestive of poor oral hygiene) is a frequent finding in most archaeological populations, yet was not particularly prevalent at St. Bride's. It is likely that most of the deposits had been destroyed through taphonomic processes. However, limited calculus deposits were observed on the teeth of both adults and children. Tooth decay was also infrequent, which is in keeping with the early and late medieval periods where sources of sugar for most of the population were limited to those naturally available in vegetables, fruits and honey. Imported sugary foods, such as cane sugar, dates and raisins, were expensive and beyond the means of the majority (Moore and Corbett 1971; 1973; Dyer 1989). However, preservation had probably also influenced the data on dental caries, as teeth with cavities were more likely to have been destroyed and the tooth roots were particularly vulnerable to erosion. One adult had developed a dental abscess that had penetrated the maxillary sinus, but since the associated tooth had been lost during life it was not possible to comment on the likely cause of the abscess. Another adult had possibly suffered from periodontal disease that had exposed part of a tooth root. It is likely that the tooth would have eventually been lost during life had the person lived. Loss of teeth during life had affected at least two middle-aged adults, but it was difficult to determine whether the missing incisors of a young adult were due to AMTL or through failure of the teeth to develop. Another adult had unusually shaped canine teeth that were probably a congenital anomaly.

Within the cemetery, the graves were arranged in rows and there was some evidence for the use of grave markers. Despite this, intercutting of graves did occur. Graves in the Roman to post-Roman cemetery of Cannington, Somerset were partially arranged in rows, and it was suggested that the graves were marked (Rahtz *et al.* 2000, 110-111). Likewise, compact rows of graves were observed at the post-Roman cemetery of Filton, South Gloucestershire (Cullen *et al.* 2006, 57-58). Late medieval cemeteries were frequently organised with the graves in rows, and graves were marked, but intercutting usually occurred as the cemetery filled up and there was increasing pressure on space (Daniell 1997, 145-147).

Over half of the population at St. Bride's had been buried in stone cists, whilst the remainder had been interred in simple earth-cut graves. There was some evidence to suggest that children may have been more likely to receive a cist burial than were adults, but the impact of cists on preservation must also be considered. Some of the individuals at Cannington had been buried in partially stone-lined graves, and it was suggested that stone lined graves may have been an early Christian practice (Rahtz *et al.* 2000, 104-105). However, cist burials were widespread in the south west of Britain during the Iron Age (Hope 1999, 45), so it is possible that stone lined graves were a retention of a traditional burial practices in some regions.

Where enough of the skeleton survived to infer burial position and orientation, the majority had been buried on their backs with legs extended with their heads to the west. A small percentage deviated slightly from this orientation, with head placed more to the northwest or southwest. One adult had been buried in the inverse orientation, with their head to the east. Extended, supine burial in a west-east orientation was the predominant burial position and orientation in the early and late medieval period across much of Britain, and has become associated with a 'normal' Christian burial (Daniell and Thompson 1999, 67-68, 85; Daniell 1997, 148-149). This was certainly the burial position and orientation observed at Filton (Cullen *et al.* 2006, 57). Occasionally individuals were interred in the opposite direction, and reasons proposed include: accidental placing of the body in the inverse orientation (perhaps if the body was buried in a hurry), and deliberate burial in this orientation as some form of punishment (Daniell 1997, 149-150).

7.0 FUTURE RECOMMENDATIONS

It is recommended that skeletons are selected for AMS radiocarbon dating. Targeted radiocarbon dating would provide accuracy in assigning the skeletons to a period. This would allow a better understanding of the development and use of the cemetery. It would also mean that the osteological and palaeopathological data could be compared to that from other skeletons from the same period.

References

Bass, W. M. 1987. *Human Osteology: A Laboratory and Field Manual* (Columbia)

Berry, A. C. and Berry, R. J. 1967. 'Epigenetic variation in the human cranium' *Journal of Anatomy* 101: 361-379

Brooks, S. T. and Suchey, J. M. 1990. 'Skeletal age determination based on the os pubis: a comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods' *Human Evolution* 5: 227-238

Brothwell, D. R. 1981. *Digging Up Bones* (New York)

Buikstra, J. E. And Ubelaker, D. H. (eds) 1994. *Standards for Data Collection from Human Skeletal Remains* (Fayetteville)

Cox, M. 2000. 'Ageing adults from the skeleton', in M. Cox and S. Mays (eds), *Human Osteology in Archaeology and Forensic Science* (London): 61-82

Cullen, N. Holbrook, M. Watts, A. Caffell and M. Holst, 2006. 'A Post-Roman cemetery at Hewlett Packard, Filton, South Gloucestershire: Excavations in 2005', in M. Watts (ed) *Two Cemeteries from Bristol's Northern Suburbs*, Bristol and Gloucestershire Archaeological Report No. 4 (Cirencester): 51-96

Daniell, C. 1997. *Death and Burial in Medieval England: 1066-1550* (London)

Daniell, C. and Thompson, V. 1999. 'Pagans and Christians: 400-1150', in P. C. Jupp and C. Gittings (eds) *Death in England: An Illustrated History* (Manchester): 65-89

Dyer, C. 1989. *Standards of Living in the Later Middle Ages: Social Change in England c. 1200-1520* (Cambridge)

Finnegan, M. 1978. 'Non-metric variation of the infracranial skeleton' *Journal of Anatomy* 125: 23-37

Garland, A. N. and Janaway, R. C. 1989. 'The taphonomy of inhumation burials', in C. A. Roberts, F. Lee and J. Bintliff (eds) *Burial Archaeology: Current Research, Methods and Developments. British Archaeological Reports British Series* 211 (Oxford): 15-37

Henderson, J. 1987. 'Factors determining the state of preservation of human remains', in A. Boddington, A. N. Garland and R. C. Janaway (eds) *Death, Decay and Reconstruction: Approaches to Archaeology and Forensic Science* (Manchester): 43-54

Hillson, S. 1996. *Dental Anthropology* (Cambridge)

Hope, V. M. 1999. 'The Iron and Roman Ages: c. 600 BC to AD 400', in P. C. Jupp and C. Gittings (eds) *Death in England: An Illustrated History* (Manchester): 40-64

İşcan, M. Y. and Loth, S. R. 1986. 'Determination of age from the sternal rib in white females: a test of the phase method' *Journal of Forensic Sciences* 31: 990-999

İşcan, M. Y., Loth, S. R. and Wright, R. K. 1984. 'Age estimation from the rib by phase analysis: white males' *Journal of Forensic Sciences* 29: 1094-1104

İşcan, M. Y., Loth, S. R. and Wright, R. K. 1985. 'Age estimation from the rib by phase analysis: white females' *Journal of Forensic Sciences* 30: 853-863

Janaway, R. C. 1996. 'The decay of buried human remains and their associated materials', in J. Hunter, C. A. Roberts and A. Martin (eds) *Studies in Crime: An Introduction to Forensic Archaeology* (London): 58-85

Kennedy, K. A. R. 1989. 'Skeletal markers of occupational stress', in M. Y. İşcan and K. A. R. Kennedy (eds) *Reconstruction of Life from the Skeleton* (New York): 129-160

Larsen, C. S. 1997. *Bioarchaeology: Interpreting Behaviour from the Human Skeleton. Cambridge Studies in Biological and Evolutionary Anthropology* (Cambridge)

Lewis, M. E. 2000. 'Non-adult palaeopathology: current status and future potential', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 39-57

Lewis, M. E. 2007. *The Bioarchaeology of Children: Perspectives from Biological and Forensic Anthropology* (Cambridge)

Lovejoy, C. O., Meindl, R. S., Pryzbeck, T. R. and Mensforth, R. P. 1985. 'Chronological metamorphosis of the auricular surface of the ilium: a new method for the determination of adult skeletal age at death' *American Journal of Physical Anthropology* 68: 15-28

Mays, S. and Cox, M. 2000. 'Sex determination in skeletal remains', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 117-130

McKinley, J. I. 2004. 'Compiling a skeletal inventory: disarticulated and co-mingled remains', in M. Brickley and J. I. McKinley (eds) *Guidelines to the Standards for Recording Human Remains. IFA Paper No. 7* (Southampton and Reading): 14-17

Miles, A. E. W. 1962. 'Assessment of the ages of a population of Anglo-Saxons from their dentitions' *Proceedings of the Royal Society of Medicine* 55: 881-886

Miles, A., Powers, N., Wroe-Brown, R. and Walker, D. 2008. *St Marylebone Church and Burial Ground in the 18th to 19th Centuries: Excavations at St Marylebone School, 1992 and 2004-6* (London)

Molleson, T. 1995. 'Rates of ageing in the eighteenth century', in S. R. Saunders and A. Herring (eds) *Grave Reflections: Portraying the Past Through Cemetery Studies* (Toronto): 199-222

Molleson, T. and Cox, M. 1993. *The Spitalfields Project. Vol 2. The Anthropology: The Middling Sort*, CBA Research Report 86 (York)

Moore, W. J. and Corbett, M. E. 1971. 'Distribution of caries in ancient British populations I: Anglo-Saxon period', *Caries Research* 5: 151-168

Moore, W. J. and Corbett, M. E. 1973. 'Distribution of caries in ancient British populations II: Iron Age, Romano-British and Mediaeval periods', *Caries Research* 7: 139-153

Moorrees, C. F. A., Fanning, E. A. and Hunt, E. E. 1963a. 'Formation and resorption of three deciduous teeth in children' *American Journal of Physical Anthropology* 21: 205-213

Moorrees, C. F. A., Fanning, E. A. and Hunt, E. E. 1963b. 'Age variation of formation stages for ten permanent teeth' *Journal of Dental Research* 42: 1490-1502

Moynihan, P. 2003. 'Diet and dental caries', in J. J. Murray, J. H. Nunn and J. G. Steele (eds) *The Prevention of Oral Disease* (Oxford): 9-34

Roberts, C. A. and Cox, M. 2003. *Health and Disease in Britain* (Stroud)

Roberts, C. A. and Manchester, K. 2005. *The Archaeology of Disease (third edition)* (Stroud)

Rogers, J. 2000. 'The palaeopathology of joint disease', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 163-182

Saunders, S. R. 1989. 'Non-metric variation', in M. Y. İşcan and K. A. R. Kennedy (eds) *Reconstruction of Life from the Skeleton* (New York): 95-108

Scheuer, L. and Black, S. 2000a. 'Development and ageing of the juvenile skeleton', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 9-22

Scheuer, L. and Black, S. 2000b. *Developmental Juvenile Osteology* (San Diego)

Schlee, D. 2011. *The Pembrokeshire Cemeteries Project: Excavations at St Bride's Haven, Pembrokeshire, 2011*, Dyfed Archaeological Trust Unpublished Report 2011/29

Spriggs, J. A. 1989. 'On and off-site conservation of bone', in C. A. Roberts, F. Lee and J. Bintliff (eds) *Burial Archaeology: Current Research, Methods and Developments. British Archaeological Reports British Series* 211 (Oxford): 39-45

Stuart-Macadam, P. 1992. 'Anemia in past populations', in P. Stuart-Macadam and S. Kent (eds) *Diet, Demography and Disease: Changing Perspectives of Anemia* (New York): 151-170

Trinkhaus, E. 1978. 'Bilateral asymmetry of human skeletal non-metric traits' *American Journal of Physical Anthropology* 49: 315-318

Ubelaker, D. H. 1989. *Human Skeletal Remains; Excavation, Analysis, Interpretation* (Washington)

Walker, P. L. 1995. 'Problems of preservation and sexism in sexing: some lessons from historical collections for palaeodemographers', in S. R. Saunders and A. Herring (eds) *Grave Reflections: Portraying the Past Through Cemetery Studies* (Toronto): 31-47

Walker, P. L., Bathurst, P. R., Richman, R., Gjerdrum, T. and Andrushko, V. A. 2009. 'The causes of porotic hyperostosis and cribra orbitalia: a reappraisal of the iron-deficiency-anemia hypothesis' *American Journal of Physical Anthropology* 139: 109-125

Zero, D. T. 1999. 'Dental caries process' *Dental Clinics of North America* 43: 635-664

APPENDICES

Appendix A: Osteological and Palaeopathological Catalogue – Articulated Skeletons

Full descriptions of pathological lesions can be found in the skeletal recording forms.

Skeleton Number	**001**
Preservation	Very poor (Grade 5), extreme fragmentation
Completeness	<10% Partial cranium (temporal bones, right parietal, occipital, part sphenoid); 6 long bone fragments found with skull (possibly humerus?); mid-shafts both femora
Age	18+ years? (possible adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 1 fragment of molar tooth crown (enamel only; specific tooth unidentifiable). Wear probably slight to medium (3 or 4)

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**002**
Preservation	Very poor (Grade 5), extreme fragmentation
Completeness	<10% Partial mandible N.B. Cranial fragments originally thought to be part of Skeleton 002 later thought to be part of Skeleton 007 and recorded as such here
Age	25-35 years? (possible young middle adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	3 tooth positions, 4 identifiable teeth present (2 teeth in situ and complete, 1 fairly complete but crown broken off at root, 1 crown only); 1 partial tooth crown (possibly upper molar), 4 enamel fragments Calculus ?upper molar wear = 4

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	P	P	P	P	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	S l	F l	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	4	6	4	5	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**003**
Preservation	Very poor (Grade 5), severe fragmentation
Completeness	c. 10% Partial cranium (frontal, left temporal, vault fragments), partial mandible; right(?) femur midshaft N.B. Long bones marked as B, C, D & E on the context sheet not part of this skeleton, recorded as Skeleton 046
Age	10-12 years (older juvenile)
Sex	-
Stature	-
Non-Metric Traits	Metopic suture
Pathology	Cribra orbitalia (left orbit)
Dental Health	3 tooth positions; 18 permanent tooth crowns (most roots completely destroyed, only crowns surviving: 2 teeth in sockets, 1 with partial socket, rest all loose); Ldm_2 present? Calculus; pronounced DEH lines in all three canines

	Right Dentition								Left Dentition								
Present	-	-	P(L)	P(L)	P(L)	P(L)	-	P(L)	-	-	-	P(L)	P(L)		P(L)	P(L)	-
Calculus	-	-	S b	-	-	-	-	-	-	-	-	-	-		-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	-	-	-		-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Wear	-	-	2	1	1	1	-	3	-	-	-	1	1		2	1	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**		**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**e**	**5**	**6**	**7**	**8**
Present	-	P(E?)	P	P(E)	P(L)	P(L)	-	-	-	-	P(L)	-	P(L)	P(L)	P(L)	P(L)	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	2	1	1	1	-	-	-	-	1	-	7	1	2	1	-

Skeleton Number	**004**
Preservation	Good (Grade 2), severe fragmentation
Completeness	<5% Partial cranium (temporal bones)
Age	18+ years? (possible adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**005**
Preservation	Very poor (Grade 5), extreme fragmentation
Completeness	<10% Partial mandible
Age	8½-10½ years (older juvenile)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	11 tooth positions; 3 fragmented and incomplete deciduous teeth (2 crowns broken off); 9 erupted permanent teeth; 6 definitely unerupted/erupting permanent teeth; 2 probable unerupted permanent teeth Calculus; DEH

	Right Dentition								Left Dentition							
Present	-	P(L)	P(L)	-	-	-	P(L)	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	2	-	-	-	2	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	P(L)	P	P(U)	P(U)	P	P	P	P	P	P(E)	P(E)	P(U)	P	P(U)	-
Calculus	-	-	S l	-	-	-	-	-	-	-	-	-	-	S l	-	-
DEH	-	-	-	-	L	L	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	3	1	1	1	2	2	2	2	1	1	1	3	1	-

	Right Dentition					Left Dentition				
Present	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**

Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	P	P(B)	-	-	-	-	-	-	-	P(B)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	5	-	-	-	-	-	-	-	-	-

Skeleton Number	**006**
Preservation	Very poor (Grade 5), severe fragmentation
Completeness	<10% Partial cranium (frontal, right parietal)
Age	12-17 years? (adolescent?)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 1 upper premolar crown (possibly right side), 1 upper left molar crown (possibly LM^2), 4 lower molar crowns (2 left, 2 probably right), premolar crown fragment Tooth roots and dentine lost post-mortem, only enamel survives

	Right Dentition								Left Dentition							
Present	-	-	-	-	P?	-	-	-	-	-	-	-	-	-	P?	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P?	P?	-	-	-	-	-	-	-	-	-	-	-	P?	P?	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	-	-	-	-	-	-	-	-	-	-	-	3	1	-

Skeleton Number	**007**
Preservation	Extremely poor (Grade 5+), extreme fragmentation
Completeness	<10% Partial cranium (temporal bones, vault fragments) N.B. Cranial fragments originally thought to be part of Skeleton 002 later thought to be part of Skeleton 007 and recorded as such here
Age	12-25 years? (possible adolescent or young adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 1 upper left molar crown (LM^2 or LM^3?), 1 partial upper

				right(?) molar crown (RM^2 or RM^3?), 1 partial premolar crown, 1 partial molar crown, 26 enamel fragments Tooth roots and dentine lost post-mortem, only enamel survives Premolar wear = 2													
	Right Dentition								Left Dentition							
Present	-	P?	-	-	-	-	-	-	-	-	-	-	-	-	P?	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number				**008**													
Preservation				Very poor (Grade 5), severe fragmentation													
Completeness				c. 10% Partial cranium (temporal bones, vault fragments), partial mandible; part atlas; left femur midshaft; 1 fragment of talus?													
Age				18+ years? (probable adult)													
Sex				Unknown													
Stature				-													
Non-Metric Traits				-													
Pathology				-													
Dental Health				1 tooth position containing lower right molar roots (RM_2 or RM_3?), crown broken off post-mortem													
	Right Dentition								Left Dentition								
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Present	-	P?(B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**009**
Preservation	Extremely poor (Grade 5+), extreme fragmentation

Completeness				<5% 10 fragments of tooth enamel													
Age				Unknown													
Sex				Unknown													
Stature				-													
Non-Metric Traits				-													
Pathology				-													
Dental Health				0 tooth positions; 10 fragments of tooth enamel – 1 fragment possibly molar crown													
	Right Dentition								Left Dentition								
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Skeleton Number				**010A**													
Preservation				Very poor (Grade 5), extreme fragmentation													
Completeness				<10% Partial cranium (temporal bones) N.B. Teeth from more than one individual present, recorded as Skeleton 010A and 010B; given state of preservation it is not certain that the correct teeth have been recorded together, but the set recorded here were consistent in general shape characteristics, wear and colour													
Age				18-25 years? (possible young adult)													
Sex				Unknown													
Stature				-													
Non-Metric Traits				-													
Pathology				-													
Dental Health				0 tooth positions; 27 teeth present, all loose Calculus													
	Right Dentition								Left Dentition								
Present	P(L)	P(L)	P(L)	P(L)	P(L)	P(L)	-	P(L,B)	P(L,B)	-	P(L)	P(L)	P(L)	P(L)	P(L)	-	
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	F l	-	-	-	
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear	2	2	3	2	2	2	-	-	-	-	2	2	2	3	2	-	
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	

Present	P(L)	P(L)	P(L)	P(L)	P(L)	P(L)	-	-	P(L)	P(L)	P(L)	P(L)	P(L)	P(L)	P(L)	P(L)
Calculus	-	-	S b	-	F L	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	-	-	3	3	2	2	2	3	2	1

Skeleton Number	**010B**
Preservation	Very poor (Grade 5), extreme fragmentation
Completeness	<10% Teeth N.B. Teeth from more than one individual present, recorded as Skeleton 010A and 010B; given state of preservation it is not certain that the correct teeth have been recorded together, less certain that these teeth (010B) all belong to one skeleton
Age	9-17 years? (possible older juvenile or adolescent?)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 9 teeth present, all loose, plus fragment of lower incisor

	Right Dentition								Left Dentition							
Present	P?	-	-	P	P	-	-	-	-	-	-	-	P	-	P?	P?
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	-	-	1	1	-	-	-	-	-	-	-	1	-	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	P?	-	-	-	P	-	-	-	-	P	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	-	1	-	-	-	-	1	-	-	-	-	-

Skeleton Number	**011**
Preservation	Poor (Grade 4), extreme fragmentation
Completeness	c. 10% Right femur (proximal end plus part proximal and mid shaft), left femur (part midshaft), fragments from lower limb possibly part of left tibia; part right calcaneus and talus
Age	18+ years (adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**012**
Preservation	Poor (Grade 4), severe fragmentation
Completeness	<10% Partial cranium (temporal bones)
Age	c. 1-2 years (younger juvenile)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 9 deciduous tooth crowns, 5 permanent tooth crowns (RI^1, LI^1, RM^1, 2 lower incisors), unidentified tooth crown fragments DEH: All four deciduous second molars have combination of pits and grooves around the cusps of the crowns, lower parts of crowns steppes outwards, cusp pattern normal; all deciduous canines present have broad groove on buccal side of crown; lower deciduous first molar has pits on buccal side RM_1 also has pits on the buccal side of the mesiobuccal cusp

	Right Dentition					Left Dentition				
Present	P(L)	-	P(L)	-	-	-	-	P(L)	P(L)	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	GP	-	G	-	-	-	-	G	-	GP
Caries	-	-	-	-	-	-	-	-	-	-
Wear	1	-	1	-	-	-	-	1	1	1
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	P(L)	-	-	-	-	-	-	P(L)	P(L)	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	GP	-	-	-	-	-	-	G	P	GP
Caries	-	-	-	-	-	-	-	-	-	-
Wear	1	-	-	-	-	-	-	1	1	1

Skeleton Number	**013**
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	<10% Partial cranium (temporal bones, vault fragments)
Age	c. 1½-3½ years (younger juvenile)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 4 deciduous teeth; 4 unerupted permanent teeth (RI^1, LI^1, RM^1, LM^1)

	Right Dentition					Left Dentition				
Present	P(L)	-	-	P(L)	-	P(L)	-	-	-	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-

Wear	1	-	-	1	-	1	-	-	-	1
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**014**
Preservation	Very poor (Grade 5), extreme fragmentation
Completeness	<10% Partial cranium (frontal, vault fragments)
Age	18-25 years? (possible young adult?)
Sex	Female??
Stature	-
Non-Metric Traits	Accessory supraorbital foramen (R)
Pathology	-
Dental Health	0 tooth positions; 5 identifiable tooth crowns, 1 partial molar crown, 2 partial premolar crowns, 8 enamel fragments Tooth roots and most dentine lost post-mortem, only enamel survives Calculus

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	P(L)	-	P(L)	P(L)	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	F m	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	2	-	3	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	P(L)	-	-	-	-	-	-	-	-	-	-	-	-	P(L)	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-

Skeleton Number	**015**
Preservation	Extremely poor (Grade 5+), severe fragmentation
Completeness	<10% Left femur midshaft & part distal shaft
Age	12+ years? (adult or adolescent)
Sex	Unknown
Stature	-
Non-Metric Traits	-

Pathology	-
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**016**
Preservation	Poor (Grade 4), severe fragmentation
Completeness	20-30% Partial cranium (parietals, occipital, temporal bones, left zygoma, sphenoid, maxilla, incus), mandible; atlas & axis; right scapula; left scapula; fragment from right lower arm(?); left & right os coxae (acetabulum fragments); right femur (proximal end & midshaft); left femur (proximal end); right and left tibiae (midshafts); fragments both tali
Age	25-45 years? (possible middle adult)
Sex	Indeterminate
Stature	-
Non-Metric Traits	Ossicle at lambda; ossicles in lambdoid (bilateral); parietal foramen (R); ossicle at asterion (L); extrasutural mastoid foramen (L); sutural mastoid foramen (R)
Pathology	Sinusitis (right maxillary sinus – strands of lamellar bone), possibly secondary to dental abscess? OA of facet for dens on atlas
Dental Health	29 tooth positions; 24 teeth present (1 of which loose) 6 teeth lost ante-mortem Possible periodontal disease (or continuous eruption) Mesial root of RM_1 fully exposed with resorption of most of the socket (socket for distal root still present) – possible periodontal disease? Perfectly circular aperture (2mm diameter) in floor of right maxillary sinus above the position of RM^1, margins very rounded and smooth, all surrounding bone smooth but a few strands of lamellar bone located c. 10mm to the posterior and medial of the hole. Possible abscess.

	Right Dentition								Left Dentition							
Present	AM	P	AM	AM	P	P	P	P	P	P	P	P	AM	-	-	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-	Fl	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	Md	-	-	-	-	-	-	-	-	-	-	-	-	-	Mm
Wear	-	5	-	-	5	4	4	4	4	4	4	5	-	-	-	3
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	AM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	AM
Calculus	-	Fl	-	Sd	Fl	-	-	-	-	-	-	-	-	-	Sl	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	5	6	5	4	4	4	4	4	4	4	4	5	5	3	-

Skeleton Number	**017**
Preservation	No bone survived

Skeleton Number	**018**
Preservation	No bone survived

Skeleton Number	**019**
Preservation	Poor (Grade 4), extreme fragmentation
Completeness	<10% Tooth crowns
Age	c. 4-6 years (younger juvenile)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 9 deciduous tooth crowns; 16 permanent tooth crowns; c. 15 enamel fragments Tooth roots and dentine lost post-mortem, only enamel survives

	Right Dentition					Left Dentition				
Present	P(L)	P(L)	P(L)	-	-	-	-	-	P(L)	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	1	2	1	-	-	-	-	-	2	1
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	P(L)	P(L)	-	-	-	-	-	-	P(L)	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	2	2	-	-	-	-	-	-	2	2

	Right Dentition								Left Dentition							
Present	-	-	-	P(U)	P(U)	P(U)	P(U)	P(U)	-	P(U)	P(U)	P(U)	-	P(U)	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	-	P(U)	-	P(U)	P(U)	P(U)	-	-	P(U)	P(U)	P(U)	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**020**
Preservation	No bone survived

Skeleton Number	**021**
Preservation	Extremely poor (Grade 5+), extreme fragmentation

Completeness	<10% Partial cranium (vault fragments)
Age	12+ years? (adult or adolescent?)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**022**
Preservation	Extremely poor (Grade 5+), extreme fragmentation
Completeness	<10% Partial cranium (frontal, temporal bones)
Age	18-25 years? (possible young adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 15 identifiable tooth crowns, 1 partial lower premolar crown, c. 20 small enamel fragments Tooth roots and dentine lost post-mortem, only enamel survives DEH Upper canines have pronounced bulge/ buttress on the buccal side of the crown (running vertically from CEJ towards tip of crown)

	Right Dentition								Left Dentition							
Present	-	P(L)	P(L)	P(L)	P(L)	P(L)	-	-	P(L)	-	P(L)	P(L)	P(L)	P(L)	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	L	L	-	-	-	-	-	-	-	-	-	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	3	2	2	2	-	-	3	-	2	2	2	3	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P(L)	P(L)	-	-	P(L)	-	-	-	-	-	-	-	-	P(L)	-	P(L)
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	-	-	2	-	-	-	-	-	-	-	-	4	-	2

Skeleton Number	**023**
Preservation	No bone survived (see context 077)

Skeleton Number	**024**
Preservation	No bone survived

Skeleton Number	**025**
Preservation	Very poor (Grade 5), extreme fragmentation

Completeness	<5% Tibia midshaft fragments (unsided)
Age	12+ years? (adult or adolescent?)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**026**
Preservation	Very poor (Grade 5), severe fragmentation
Completeness	30-40% Partial cranium (frontal, right parietal, occipital, temporal bones, right zygoma, left maxilla), mandible; atlas & axis, fragments of 1 cervical, 5 thoracic and 3 lumbar vertebrae; right arm (part humerus, radius and ulna); left arm (midshaft humerus); left os coxa (acetabulum + part ilium); right leg (part femur, patella, tibia); left leg (femur, tibia, fibula); left foot (calcaneus, talus, navicular)
Age	18-25 years? (possible young adult?)
Sex	Unknown
Stature	-
Non-Metric Traits	Ossicle at parietal notch (R) Acetabular crease (L)
Pathology	-
Dental Health	18 tooth positions; 19 teeth identifiable (5 of which loose); 2 teeth with crowns broken off post-mortem; 1 lower third molar partial crown present (uncertain side); 1 tooth lost PM Both lower central incisors possibly lost ante-mortem, or could be developmental absence

	Right Dentition								Left Dentition							
Present	P(L)	P(L)	P(L)	-	-	P(L)	-	-	P(L)	-	P	PM	P	P	P	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	5	-	-	2	-	-	3	-	2	-	3	4	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P?	P	P(B)	P	P	P	P	AM	AM	P	P	P	P	P(B)	P	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	-	3	2	2	2	-	-	2	2	2	3	-	2	-

Skeleton Number	**027**
Preservation	No bone survived

Skeleton Number	**028**
Preservation	No bone survived

Skeleton Number	**029**
Preservation	No bone survived

Skeleton Number	**030**
Preservation	Very poor (Grade 5), extreme fragmentation
Completeness	<10% Partial cranium (occipital?, right temporal), partial mandible
Age	25-35 years? (possible young middle adult)
Sex	Male??
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	4 tooth positions; 4 teeth (1 of which loose); 1 tooth root with crown broken off post-mortem

	Right Dentition								Left Dentition							
Present	P(L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P(B)	P	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	S b	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	4	5	-	5	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**031**
Preservation	No bone survived

Skeleton Number	**032**
Preservation	Extremely poor (Grade 5+), severe fragmentation
Completeness	10-20% Partial cranium (frontal, parietal bones, occipital, temporal bones, zygomatic bones, sphenoid, maxilla), mandible; 4 fragments from lower right(?) arm(?); right femur (part distal third shaft); left tibia (midshaft); fragment from feet (possible distal end of proximal first phalanx)
Age	25-45 years? (possible middle adult)
Sex	Male??
Stature	-
Non-Metric Traits	Parietal foramen (L)
Pathology	Maxillary sinusitis (bilateral) Cribra orbitalia (left orbit)
Dental Health	29 tooth positions; 13 teeth; 8 broken teeth (roots only); 5 lost PM

				Many teeth where roots in situ but crowns broken off post-mortem 3 teeth lost AM; 1 tooth with caries; calculus												
	Right Dentition								Left Dentition							
Present	-	AM	AM	P	P	P	P	P	P	P	P	P	P	AM	PM	PM
Calculus	-	-	-	-	-	F d	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	Sd	-	-	-	-	-	-	-	-	-
Wear	-	-	-	6	6	3	4	5	5	5	4	6	6	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	PM	P(B)	P(B)	P(B)	P	P	P(B)	-	-	PM	PM	P(B)	P(B)	P(B)	P(B)	P
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	5	4	-	-	-	-	-	-	-	-	-	3

Skeleton Number	**033**
Preservation	Poor (Grade 4), severe fragmentation
Completeness	<10% Femur midshaft, possibly right side
Age	6-16 years? (older juvenile or adolescent?)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**034**
Preservation	No bone survived

Skeleton Number	**035**
Preservation	No bone survived

Skeleton Number	**036**
Preservation	No bone survived

Skeleton Number	**037**
Preservation	No bone survived

Skeleton Number	**038**
Preservation	No bone survived

Skeleton Number	**039**
Preservation	No bone survived

Skeleton Number	**040**
Preservation	Grave not excavated?

Skeleton Number	**041**
Preservation	Grave not excavated?

Skeleton Number	**042**
Preservation	Grave not excavated?

Skeleton Number	**043a**
Preservation	Grave not excavated?

Skeleton Number	**043b**
Preservation	Grave not excavated?

Skeleton Number	**044**
Preservation	Grave not excavated?

Skeleton Number	**045**
Preservation	Grave not excavated?

Skeleton Number	**046**
Preservation	Very poor (Grade 5), severe fragmentation
Completeness	c. 10% Right(?) femur midshaft (ID as Bone E on context sheet); left femur mid to distal third shaft (ID as Bone B on context sheet); right tibia midshaft (ID as Bone D on context sheet); left(?) tibia midshaft (ID as Bone C on context sheet); N.B. Skeleton 046 comprises bones thought to be part of Skeleton 003 during excavation (marked as B, C, D & E on the context sheet for Skeleton 003)
Age	18+ years? (possible adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 7 teeth (all loose)

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	P	-	P	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	3	-	4	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	P?	P?	-	-	-	-	-	-	-	P	P	P	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Wear	-	3	4	-	-	-	-	-	-	-	3	4	4	-	-	-

KEY:
Present - Tooth presence; am - ante-mortem tooth loss; pm - post-mortem tooth loss; p - tooth present; p(l) – tooth present but socket absent; p (u) – tooth present but unerupted; e – erupting; s – sampled; - - jaw not present
Caries - Calculus; F - flecks of calculus; S - slight calculus; M - moderate calculus; H - heavy calculus; a - all surfaces; b - buccal surface; d - distal surface; m - mesial surface; l - lingual surface; o - occlusal surface
DEH - dental enamel *hypoplasia*; l - lines; g - grooves; p - pits
Caries - caries; s - small lesions; m - moderate lesions; l - large lesions
Wear - dental wear; numbers from 1-8 - slight to severe wear

Appendix 1: Osteological and Palaeopathological Catalogue – Disarticulated Bone

Full descriptions of pathological lesions can be found in the skeletal recording forms.

Context Number	**026**
Preservation	Poor (Grade 4), extreme fragmentation
Completeness	<10% Partial cranium (temporal bones), partial mandible
Age	25/30+ years (adult)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

Context Number	**077 (fill above grave for Skeleton 023)**
Preservation	Extremely poor (Grade 5+), extreme fragmentation
Completeness	<10% c. 25 fragments of long bone, most likely femur
Age	12+ years? (adult or adolescent?)
Sex	Unknown
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions; 0 teeth

KEY:
Present - Tooth presence; am - ante-mortem tooth loss; pm - post-mortem tooth loss; p - tooth present; p(l) – tooth present but socket absent; p (u) – tooth present but unerupted; e – erupting; s – sampled; - - jaw not present
Caries - Calculus; F - flecks of calculus; S - slight calculus; M - moderate calculus; H - heavy calculus; a - all surfaces; b - buccal surface; d - distal surface; m - mesial surface; l - lingual surface; o - occlusal surface
DEH - dental enamel *hypoplasia*; l - lines; g - grooves; p - pits
Caries - caries; s - small lesions; m - moderate lesions; l - large lesions
Wear - dental wear; numbers from 1-8 - slight to severe wear

APPENDIX 4

Ceramic Assemblage
Paul Courtney

DGTU Dyfed Gravel Tempered Unglazed
Unglazed cooking pots/jars with rounded quartz sand and moderate to abundant, flat water-eroded fine-grained rock (?siltstone) inclusions up to 5mm. This general type of pottery is found widely across Dyfed and was probably produced at several centres. Kiln waste has been published from Newcastle Emlyn (Early and Morgan 2004). Probably ?late 12th-15th century (O'Mahoney 1985 and 1995, 9-11; Papazian and Campbell 1992, 56).

North Devon Gravel Tempered
Coarsewares in red to grey gravel-tempered fabrics with green to brown glazes. The fabric is tempered with coarse gravel (angular quartz with some biotite) produced in Barnstaple and Bideford in North Devon. Two vessels in this fabric were found in Dissolution deposits at Cleeve Abbey (Allan 1999, 21). However, the main period of export around the Severn estuary seems to have been from the late 16th century to 18th centuries. However, some vessels may have been exported to Wales as late as the 19th century (Good and Russet 1987; Allan 1984, 129-32; Grant 2005).

SSOM South Somerset
Two joining sherds from the rim of an internally glazed jar (orange-red fabric) with evidence of copper added to the green, lead-based glaze which overlies a white. The fabric is a red earthen ware. Probably 17th century from Donyatt or another source in Southern Somerset (Coleman-Smith and Pearson 1988).

References
Allan, J. P. 1984, *Medieval and Post-Medieval finds from Exeter, 1971-1980*. Exeter Archaeological Report 3, Exeter.
Coleman-Smith, R. And Pearson, T., 1988, *Excavations in the Donyatt Potteries.* Chichester.
Good, G. L. and Russett, V. E. J, 1987, 'Common types of earthenware found in the Bristol area' *Bristol and Avon Archaeology* 6, 35-43.
Grant, A. 2005, *North Devon Pottery*. Bideford.

Cleaning Tr 1A

Fabric	Shs	Wt g	Comments
NDGT	4	172	bowl, int glazed. Sherds join.

Post-Med

Tr 1A From above natural

Fabric	Shs	Wt g	Comments
DGTU	10	25	cp, 1 vessel, oxidised, sooted

Med

005 Tr 1B

Fabric	Shs	Wt g	Comments
SSOM	2	62	Jar rim, sherds join, int glazed on white slip. Copper in glaze. ?Donyatt

Post-Med c.1600-1700

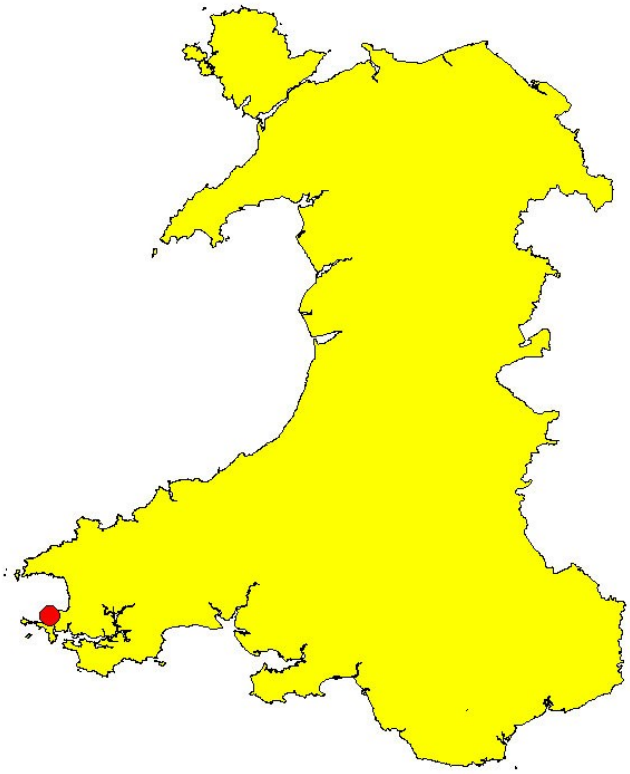


Figure 2: Location of St Bride's Haven

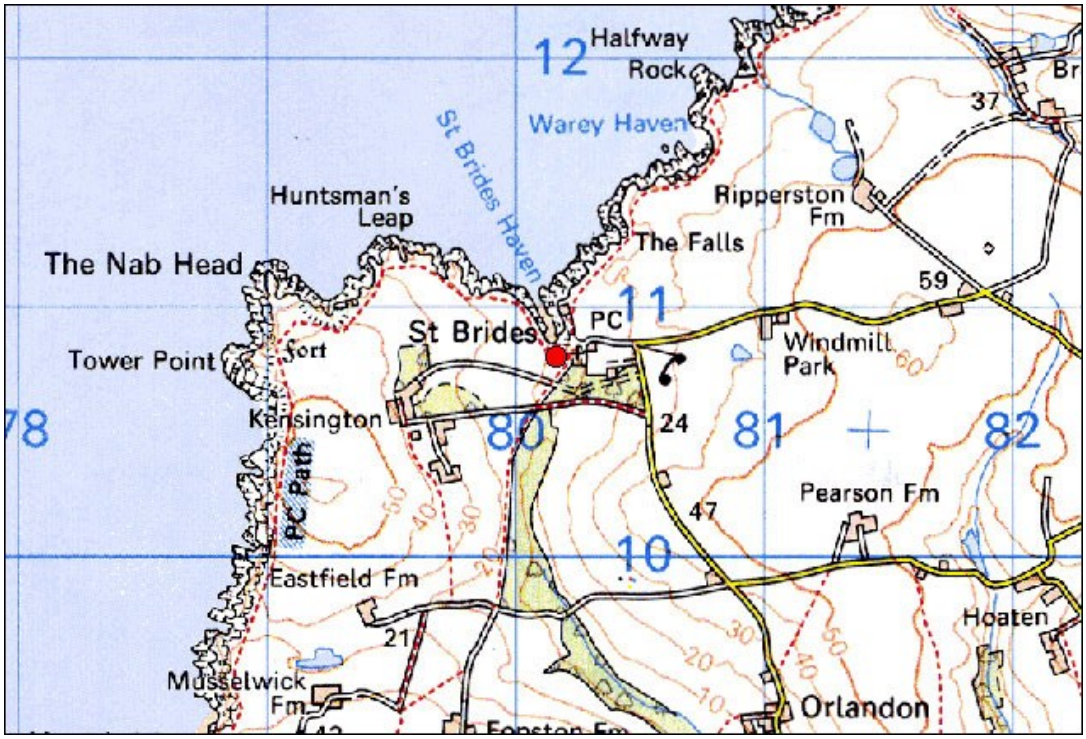


Figure 3: Site location map

Reproduced from the 1997 Ordnance Survey 1:50,000 scale Landranger Map with the permission of The Controller of Her Majesty's Stationery Office, © Crown Copyright Dyfed Archaeological Trust, The Shire Hall, Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AF. Licence No AL51842A.

Plate 1: Aerial photograph of St Brides (AP87.150.33). The arrow points to a curved cropmark feature.

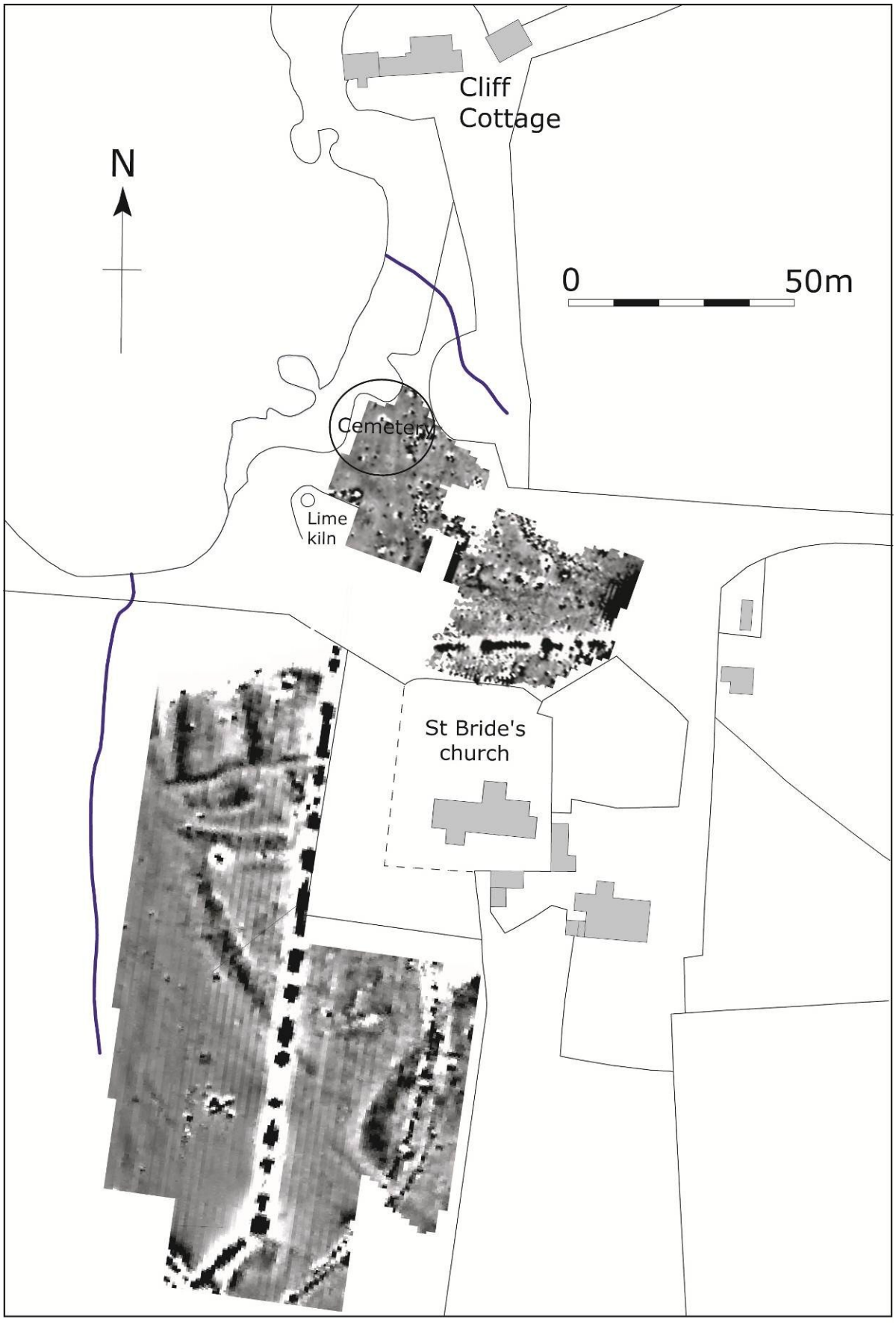


Figure 4: Plan showing geophysical survey plot in relation to other sites at St Bride's Haven

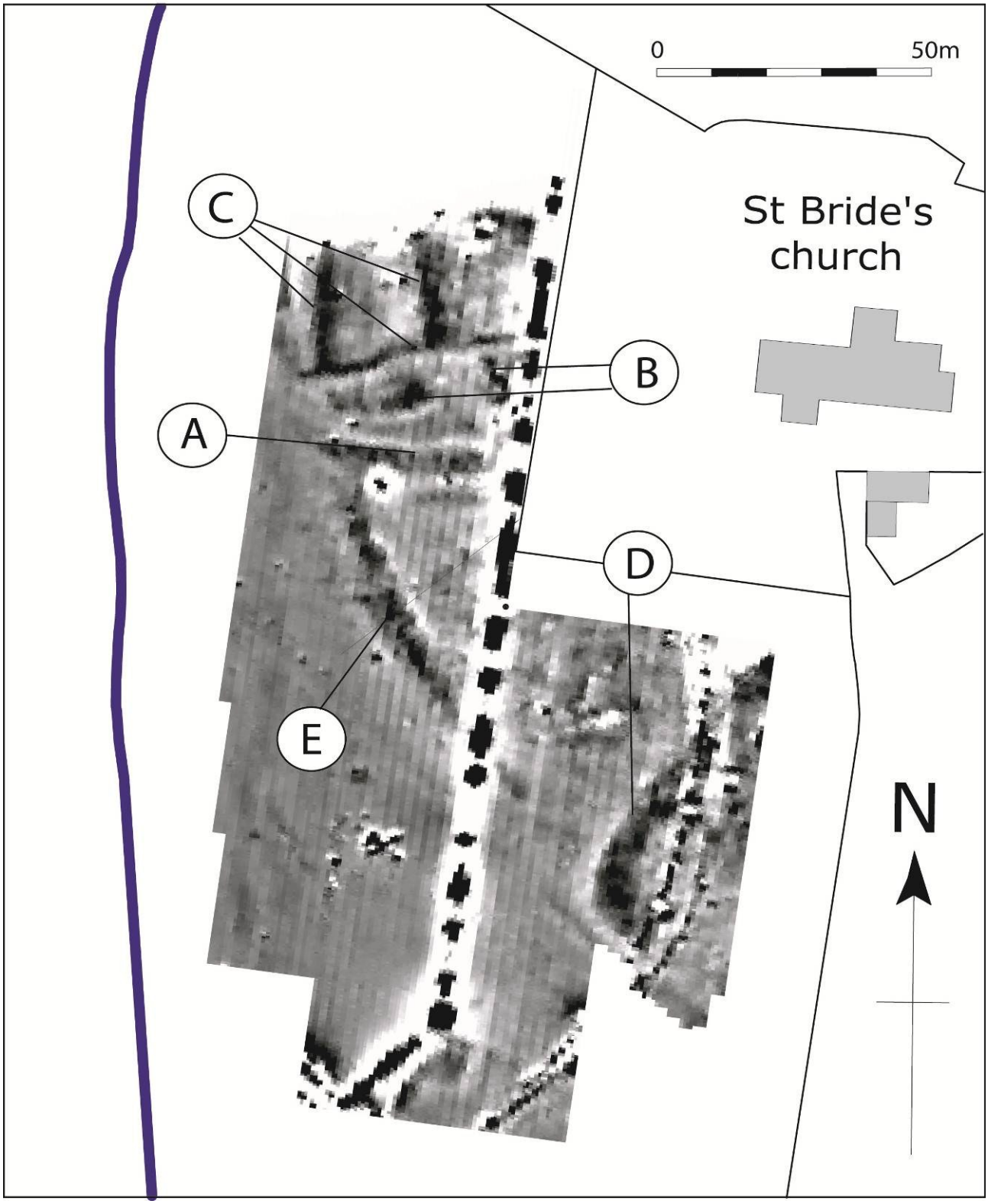


Figure 5: Plan showing geophysical survey plot in relation to other sites at St Bride's Haven

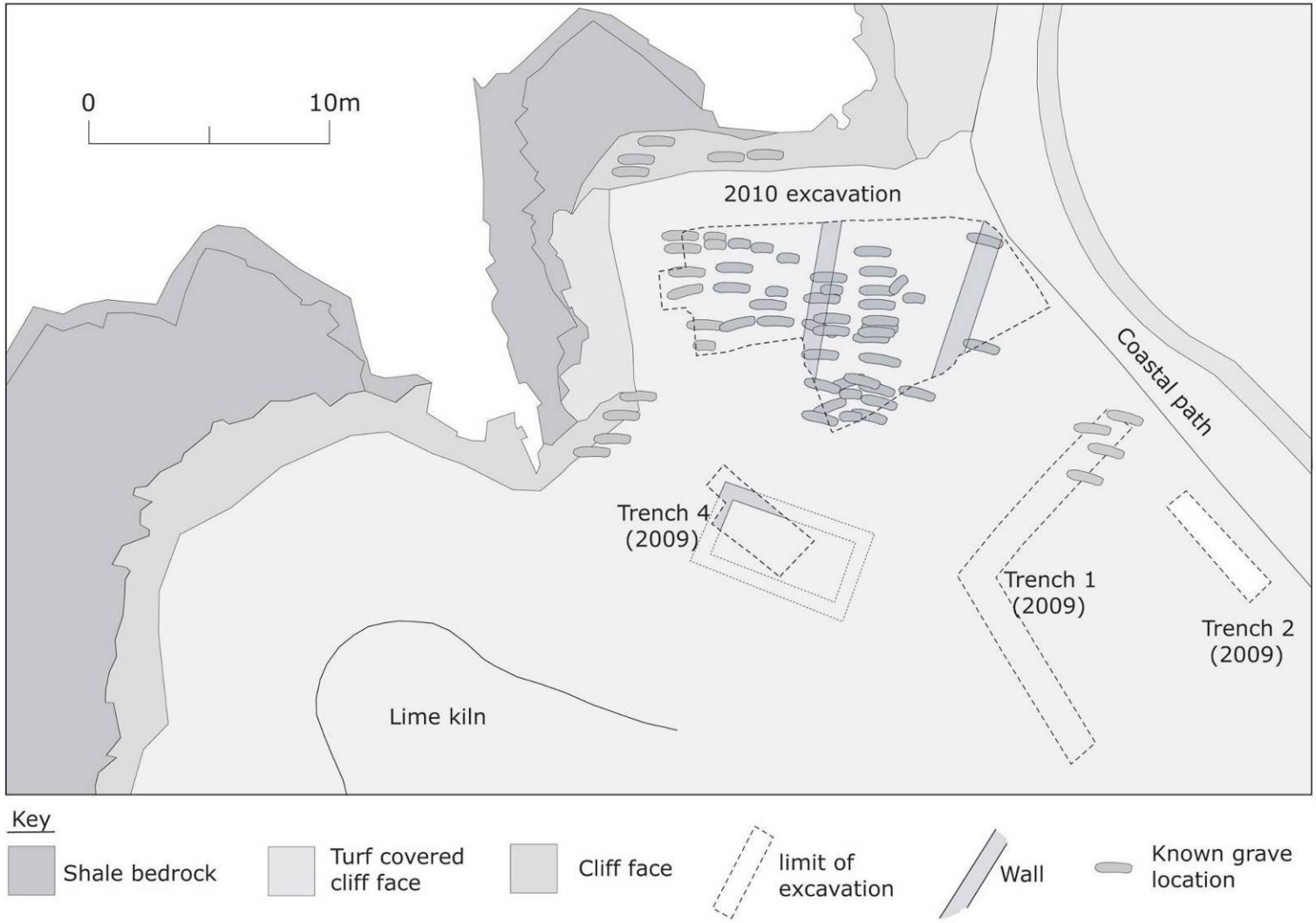


Figure 6: Plan showing 2009 and 2011 excavation areas and location of main features

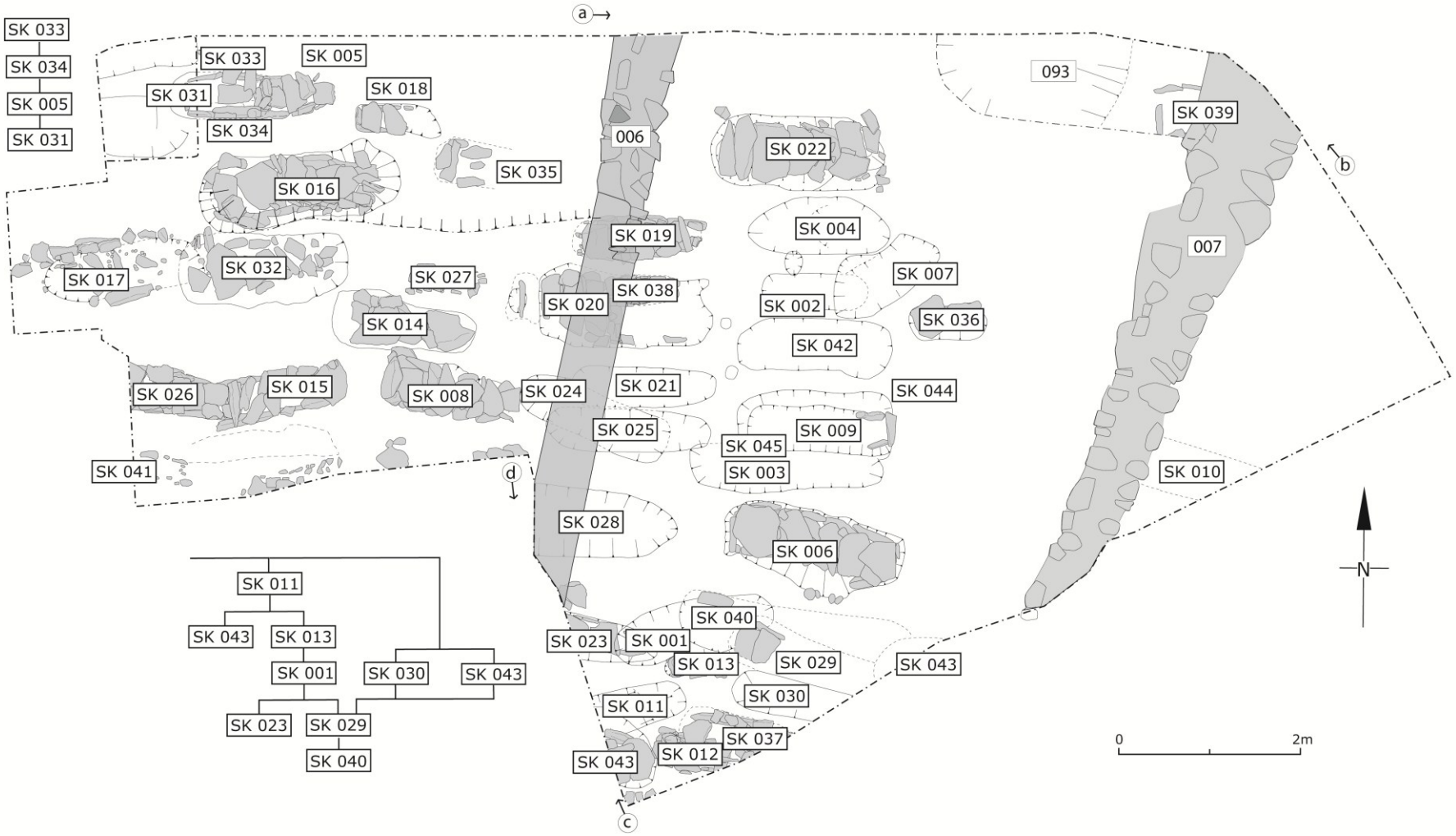


Figure 7: Plan of 2011 excavation area showing locations of burials and other features. Preliminary matrices for stratified burials and section locations (a, b, c and d) are included

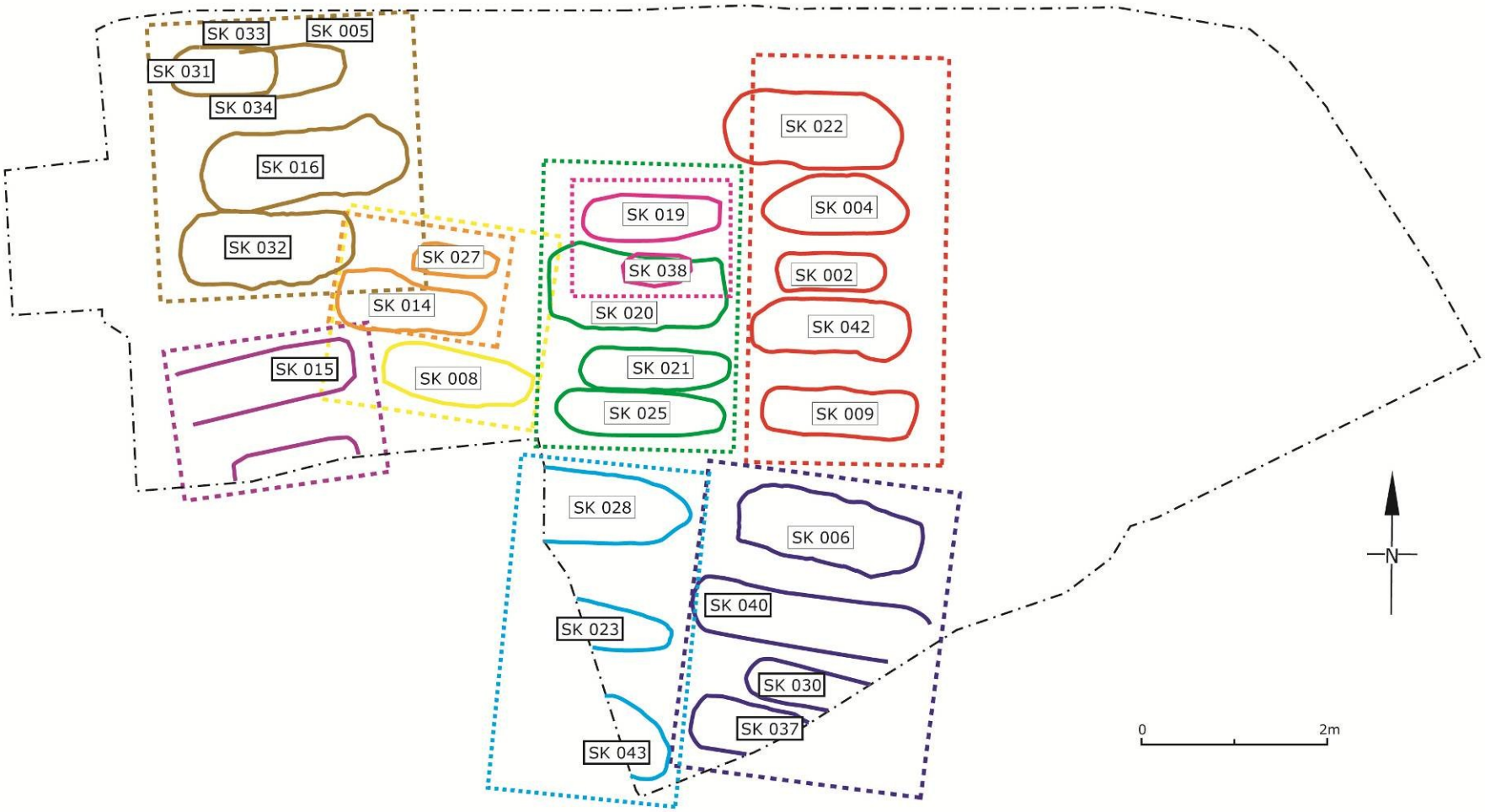


Figure 8: Suggested grave groupings

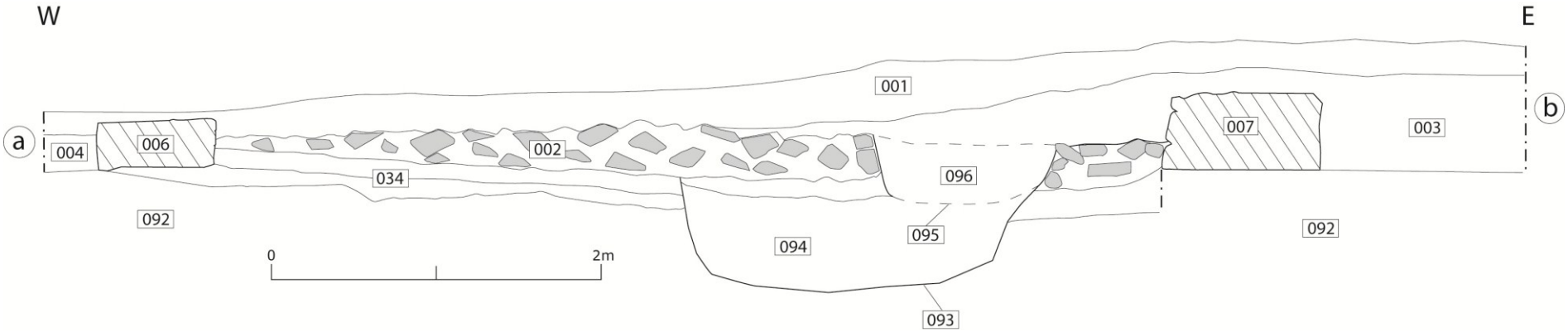


Figure 9: East-west trench profile (part of north edge of trench) see Figure xx for profile location (a and b)

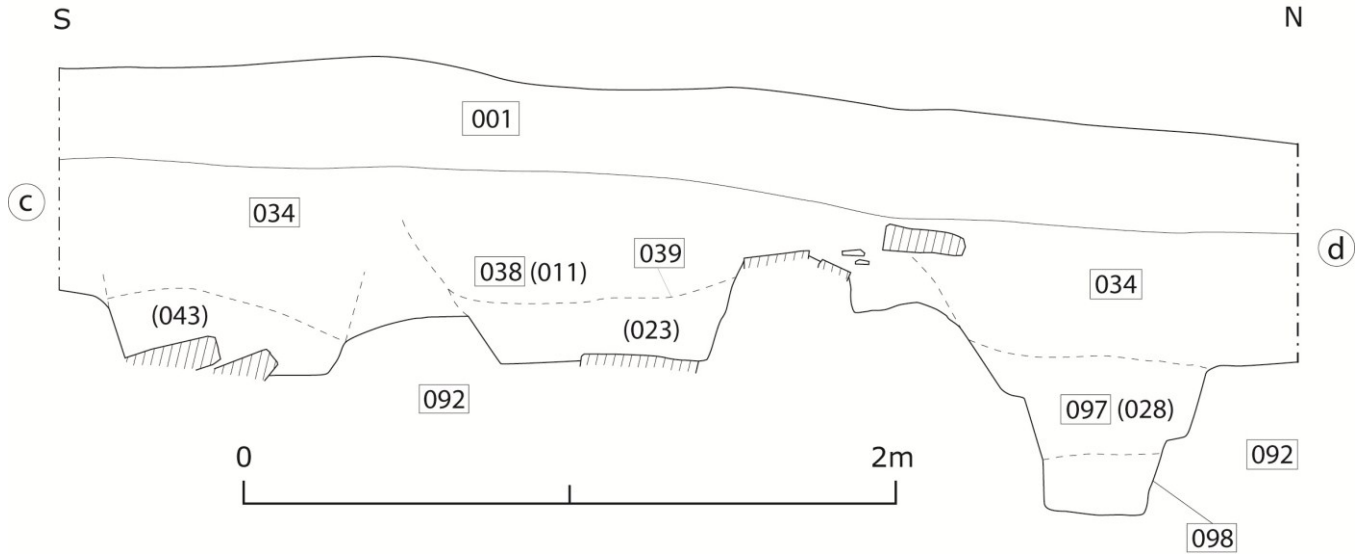


Figure 10: North-south trench profile (See Figure xx for profile location c and d)

Photo 55: View of St Bride's church looking east. The geophysical survey was undertaken on the far side of the stream dissecting the field

Photo 56: General view of St Brides Haven looking east

Photo 57: St Bride's churchyard, with the earthwork bank marking the earlier churchyard boundary

Photo 58: The north wall of Cliff Cottage, showing the blocked arched doorway and small window which may support the idea that the building was formerly a 'fishermen's chapel'.

Photo 59: Representative photo of cliff face showing slates of a possible structure below the scale

Photo 60: Trench 4. Interior of building

Photo 61: Trench 4 after excavation of parts of ditch 017

Photo 62: Trench 1b after removal of rubble, showing crushed ridge tiles on top of slates 003

Photo 63: Trench 1a. Stone bank 004

Photo 64: Trench 1a showing face of bank 004 and burnt fill 022 of pit 018

Photo 65: Wall 007 looking south.

Photo 66: Wall 006 looking west.

Photo 67: General view of eastern part of the cemetery, looking north.

Photo 68: General view of western part of the cemetery, looking north

Photo 69: General view of eastern part of the cemetery, looking north

Photo 70: General view of eastern part of the cemetery, looking east

Photo 71: General view of eastern part of the cemetery, looking west

Photo 72: General view of the cemetery, looking southwest

Photo 73: Iron knife from burial 28

Photo 74: Lead bead from Burial 26

THE PEMBROKESHIRE CEMETERIES PROJECT
EXCAVATIONS AT ST BRIDES HAVEN 2009 – 2011
FINAL REPORT

RHIF YR ADRODDIAD / REPORT NUMBER

June 2013
Mehefin 2013

Paratowyd yr adroddiad hwn gan / This report has been prepared by:

Duncan Schlee

Swydd / Position: Project Manager

Llofnod / Signature  Dyddiad / Date 27/06/2013

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
This report has been checked and approved by:

James Meek

ar ran Archaeolegol Dyfed Cyf.
on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: Head of Field Services

Llofnod / Signature ..... Dyddiad / Date 27/06/2013

Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadausydd gennych ar gynnwys neu strwythur yr adroddiad hwn

As part of our desire to provide a quality service we would welcome any comments you may have on the content or presentation of this report

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