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Structural Appraisal Report

Relating to

Proposed Barn Conversion

at

Parkmill,
Llangarron,
Herefordshire,
HR9 6NH

For

Mr. and Mrs. Feirn,
Parkmill,
Llangarron,
Herefordshire,
HR9 6NH

Davidson John Ltd.
Ref.No. 900/37/01/TJ

Structural Appraisal of
Outbuildings at Parkmill, Llangarron, Ross-on-Wye, Herefordshire, HR9 6NH

Preamble

In accordance with the instructions of Mr. and Mrs. Feirn, we have carried out an inspection on two agricultural buildings at Parkmill, Llangarron, Herefordshire, HR9 6NH, in connection with an application to the Local Authority for consent to convert the buildings for residential use.

Our brief is to provide an independent appraisal as to the structural feasibility of converting the existing buildings to achieve the specific accommodation shown in the proposed scheme prepared by Messrs HDP Architecture, and make recommendations relating to any structural remedial work required as part of the proposed works.

Our appraisal took the form of internal and external visual inspections carried out on 7th August 2018, together with a study of the Architect's drawings showing the basic proposals. At this stage trial pits have not been excavated to explore the foundations to the building, but our study of the local geological map would suggest that the underlying ground conditions should be the Brownstones Formation (Sandstone) overlying the St. Maughans formation (Mudstone). The Garron brook runs at the foot of the slope to the West of the site, approximately 200m away, and it is anticipated that ground conditions will change to Alluvium nearer to the brook. Please refer to Fig. 1.

It should be noted that this report is intended solely for the use of the client to whom it is addressed, their agent acting with regard to the planning application, and the local authority district council. The report may not be used by any other third party or for any other purpose than that of the planning application, without the prior consent of the writer.

The Existing Buildings

The buildings with which we are concerned in this application are outbuildings located to the South East side of the main farmhouse as shown in the Site Plan appended to this report as Fig. 2.

Referring to the site plan, for the purposes of this report, we shall refer to the outbuildings as Barn 1 and Barn 2. The structure of the barns is as follows:-

Barn 1

The south end of Barn 1 is open from ground floor to roof level. The remainder of the barn has a low 1st floor (mezzanine) level. The barn is divided into a storage area and a workshop area.

The barn was originally of solid natural stone masonry (rubble fill) construction (Please refer to photos 1 and 2) with walls approximately 450mm in thickness. The historical alterations to the building have been formed in concrete blockwork. Blockwork has been used to infill the cartway type door opening on the east side of the building (photo 2 and 3) to form the internal gable currently separating the storage / workshop mezzanine levels (photo 3), to form the upper part of the west side wall of the building (photo 4), and to form the large opening on the south side of the building (photo 4). At high level on the east wall, the inner leaf of stone has been removed (photos 5 and 6), presumably for building use elsewhere. The cartway door on the west side has been infilled at mezzanine level using a lightweight timber frame with timber cladding (Photos 7 and 8). The gable end to the north of the building is the original stone masonry construction (Photo 1).

The original stone part of the East wall contains arrow slit windows, with a later window opening formed in the block infill on this side. There are two further windows located on the North gable to the workshop area.

The roof to Barn 1 is a shallow two pitch gable ended structure, covered with lightweight corrugated sheeting. The sheeting is supported on wider spaced timbers running across the pitched faces of roof, spanning between steel portal frames (photo 4).

The ground floor slab is formed in concrete and steps down to a lower level to achieve a low head-height ground floor room under the mezzanine level.

Barn 2

This barn is a single storey structure with a two pitched roof. The roof has a gable at the west end and to the east is connected to Barn 1.

On the north side the wall has been constructed as blockwork to the inner face with stone facing externally (Photo 9). The wall on this side steps back to form a porch area, with the oversailing roof pitch supported on timber post and beams (photo 10). The posts are in poor condition (Photos 11 and 12). The west and south walls are constructed of blockwork internally with render finishes externally (photos 13 and 14). The roof gable on the west side is a timber framed construction with timber cladding.

The roof has been constructed with timber rafters, propped onto the ceiling joists, which are themselves supported on intermediate timber beams spanning between the masonry walls (photo--). The roof is covered with slate.

The ground floor slab has been formed in concrete with various steps and level change, associated with the previous usage associated with keeping livestock. The slab appears to be in reasonable condition.

The proposed scheme

The scheme proposes to convert the two barns to residential use, forming 2no. two-bedroomed dwellings.

Barn 1 is to become a two storey dwelling and Barn 2 will become a single storey dwelling.

From a structural perspective, the key point to note is that the scheme does not involve significant alteration to the position of the main walls of the buildings, nor does the scheme involve the addition of any substantial loads to the buildings. Roof coverings may change but the roof shapes are to be maintained in the final scheme.

Discussion

Barn 1

Essentially this barn as a whole would be considered to be of relatively robust construction and would be considered to be in a serviceable condition. There is some minor cracking in areas around the arrow slit windows and clearly the upper level of the East wall has been weakened by the removal of the inner half of the stonework. However, the walls are fairly plumb and where the original stonework remains, it is in reasonable condition. There will be extensive areas where repointing will be required, and the upper portion of the East side wall will require repair / localized rebuilding where it has been previously stripped. Lintels over windows and cartway openings would require replacement, and suitable framing may be required to the large openings that are re-instated/maintained in the proposed scheme.

The roof structure to this barn, is not original and would be replaced as part of the works. It is likely that conventional pitched rafters would be used, spanning from wall plate to ridge with intermediate support provided by a timber purlin. It should be possible to incorporate feature trusses within the new roof arrangement.

The proposed finished floor level relative to the current ground levels is still to be established. The ground floor slab may be serviceable from a structural perspective providing that acceptable floor to ceiling levels can be achieved whilst incorporating a suitable damp proof membrane, insulation and finishes, as will be required to comply with current Building Regulations. We can confirm that the property does not fall within an area where Radon protection measures are required. However, if a new slab installation is required to achieve suitable head heights, this is likely to involve lowering the formation level within the curtilage of the building sufficiently to allow for the installation of the sub-base, a concrete slab, a DPM, insulation, screed and finishes. Care would need to be taken to ensure that any reduction in level, however temporary, does not undermine the existing foundations. With this in mind, establishing the depth of the original walls, and more recent blockwork walls is considered essential. It is considered possible therefore that some underpinning may be required.

Barn 2

This barn is of much more recent construction to Barn 1 and again would be considered to be of fairly robust construction. Again , apart from the roof structure, we are of the opinion that the structure on the whole is in a serviceable condition.

The roof structure to this barn is poorly designed and constructed, and in our view would be inadequate for purpose. This would be replaced to form the same profile using either a traditional timber cut roof construction or prefabricated trussed rafters.

The timber post and framing on the North side of the building has extensive woodworm damage and would require replacement with a similar post , brace and beam arrangement.

The proposed finished floor level is yet to be defined, and again, the ground floor slab may be serviceable from a structural perspective. However, the comments made relating to the Barn 1 ground floor slab would similarly apply here.

Recommendations

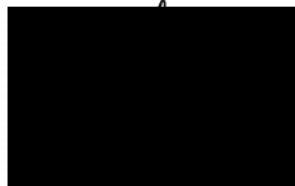
It is assumed that the structural works indicated within the scheme would be designed by a Chartered Engineer as part of a Building Regulations submission following the planning process. Whilst this should not be considered to be an exhaustive list of the structural works, we consider that the following recommendations should be considered to be essential to the structural scheme:

1. Prior to any general reduction in levels adjacent to or inside the building, excavate trial pits around the perimeter walls to define the depth and profile of existing walls/ foundations relative to the proposed ground floor slab. The trial pits should also note the founding soil type and strength.
2. If the foundations are not sufficiently deep to allow the installation of a new slab and sub-base, then underpinning should be considered as part of the scheme. Underpinning would be carried out using mass concrete trench fill foundations cast in an agreed Hit and miss sequence.

3. If the foundations are found to be shallower than 600mm below the proposed ground level generally, then the building may require underpinning to mitigate the future effects of soil frost action.
4. Make good any cracks in the main external walls. Repairs would be specified for each crack individually and these are likely to comprise either, simple re-pointing, the installation of resin bonded helibars or localized re-building , as deemed necessary.
5. Rake out and re-point the masonry to all elevations using a suitable lime / sand mortar mix.
6. Where there are existing timber inserts within external walls, the depth and condition of the timber is to be established and if possible should be removed in a sequential manner with associated making good of the stonework. If this is not possible or it is considered that this will further damage the wall, then resin treatment of the timber should be considered to harden any softened timber.
7. The roof structure to both barns will require replacement.
8. The First floor finished level in Barn 1 is not yet established. The timber first floor structure is likely to require strengthening or replacement.
9. The timber posts forming the porch area on the North side of Barn 2 are to be replaced. The new framing would be timber posts supported on staddle stones with arched braces to a new timber beam over.
10. Lateral and vertical restraint straps are to be installed as necessary around the perimeter of the barns where possible to tie the roof to the walls and vice versa.
11. Rainwater pipes serving the barns should not discharge adjacent to the existing buildings. Soakaways should be formed at a suitable distance from the main structures in accordance with the requirements of Building Control.

Conclusions

In our opinion, taking into account the recommendations above, the main fabric of the barn is sufficiently robust that the proposed conversion to residential use can be achieved without the need for wholesale demolition of the main walls. This building in our view is suitable for the conversion intended.



Signed:

Tim John

Davidson John Ltd

Report Date: 20th August, 2018

APPENDIX 1
Figs. & photographs

Geology of Britain viewer

Try the Beta version of our 3D Geology of Britain viewer

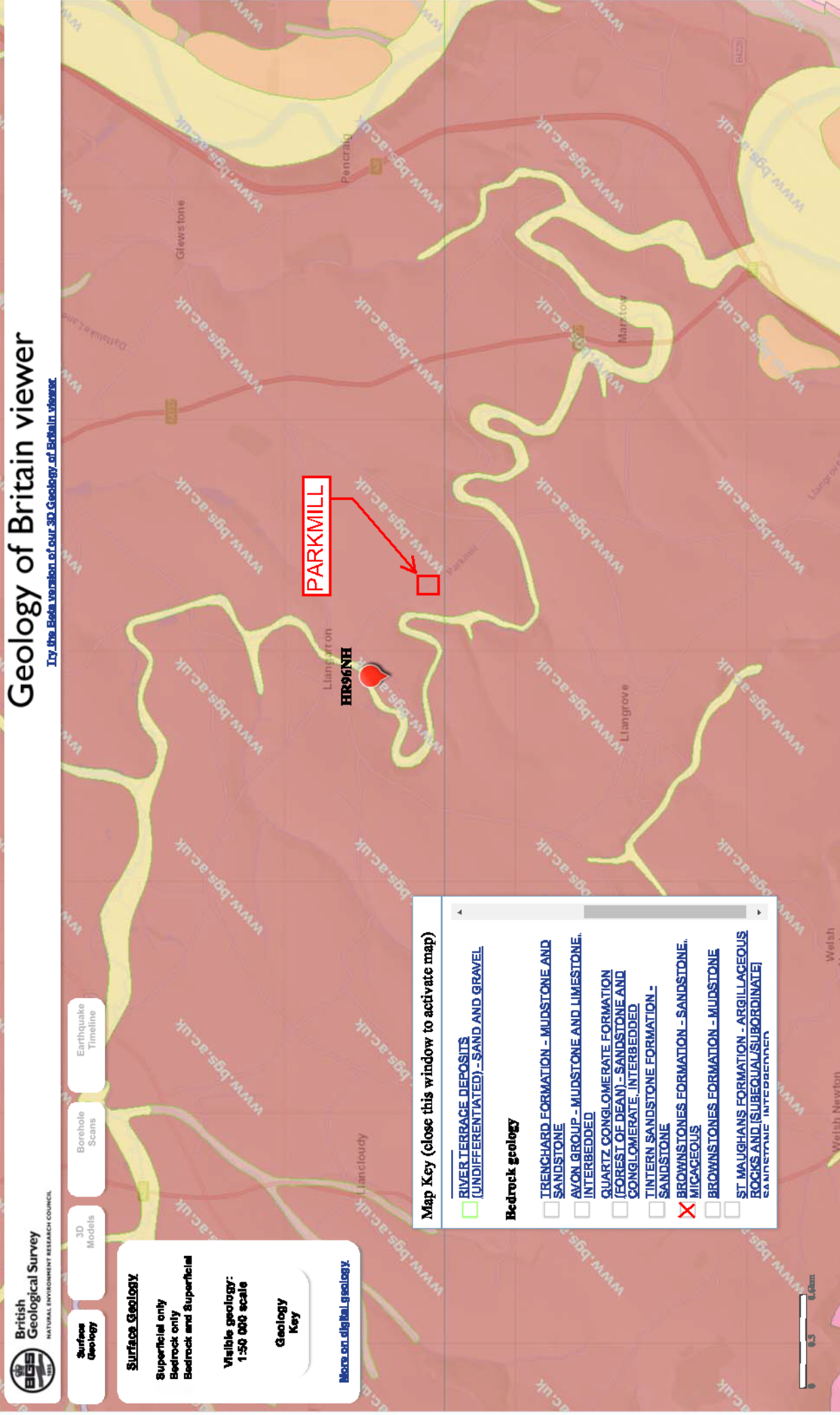
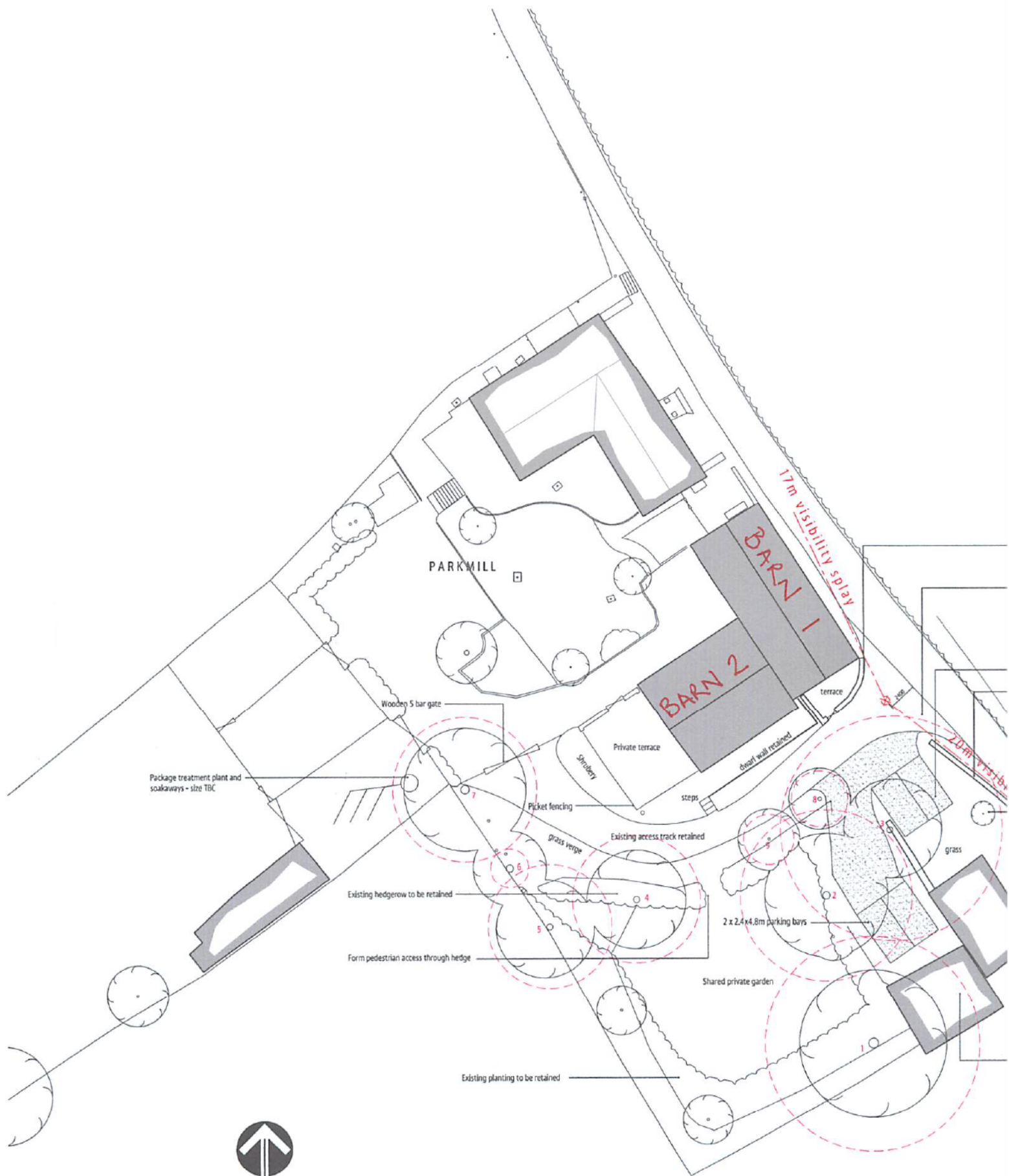


Fig.1- Site Geology



SITE PLAN 1:200
site area ~ 1490sqm / 0.14Ha

Fig. 2 -
SITE PLAN



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo15



Photo 16