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Forest of Bowland AONB

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DOWNHAM CONCESSIONARY BRIDLEWAY

**Tree report to identify tree related issues in relation to new construction,
and proposed method statement for construction work**

Aims and objectives

This report can be used initially as part of the viability study for the project, and as a tool to aid in design, planning and construction.

Route description

The route follows Downham Road on its north side, mainly through pasture fields and includes short section through woodland and on pavement. When exiting Chatburn walkers will use the bridge to cross the A59 then enter the bridleway and walk through 1 field to Greendale. From here they will use a pavement to reach a short section of field and small area of woodland, pass through 2 more fields, then cross Rimington Road and back into a short section of field avoiding a yard, to exit near Downham village.

There are 20 individual trees and one small woodland with 9 significant trees that have been identified that could be affected by the proposed bridleway route. These are trees that are located very close to the route. The woodland on the south side of Downham Road is unlikely to be affected by the bridleway.

Maps

All the trees are owned by the Downham Estate and are surveyed on an annual basis because they are close to a public highway. The maps used are adapted from the annual tree survey, and the number system has been retained to aid cross referencing. Not all trees are numbered in direct sequence.

Map 1: Trees on Downham Road, from Chatburn to Greendale



Map 2: Trees on Downham Road, from Greendale to Rimington Road junction



Map 3: Trees on Downham Road, Rimington Road junction and Downham Estate yard

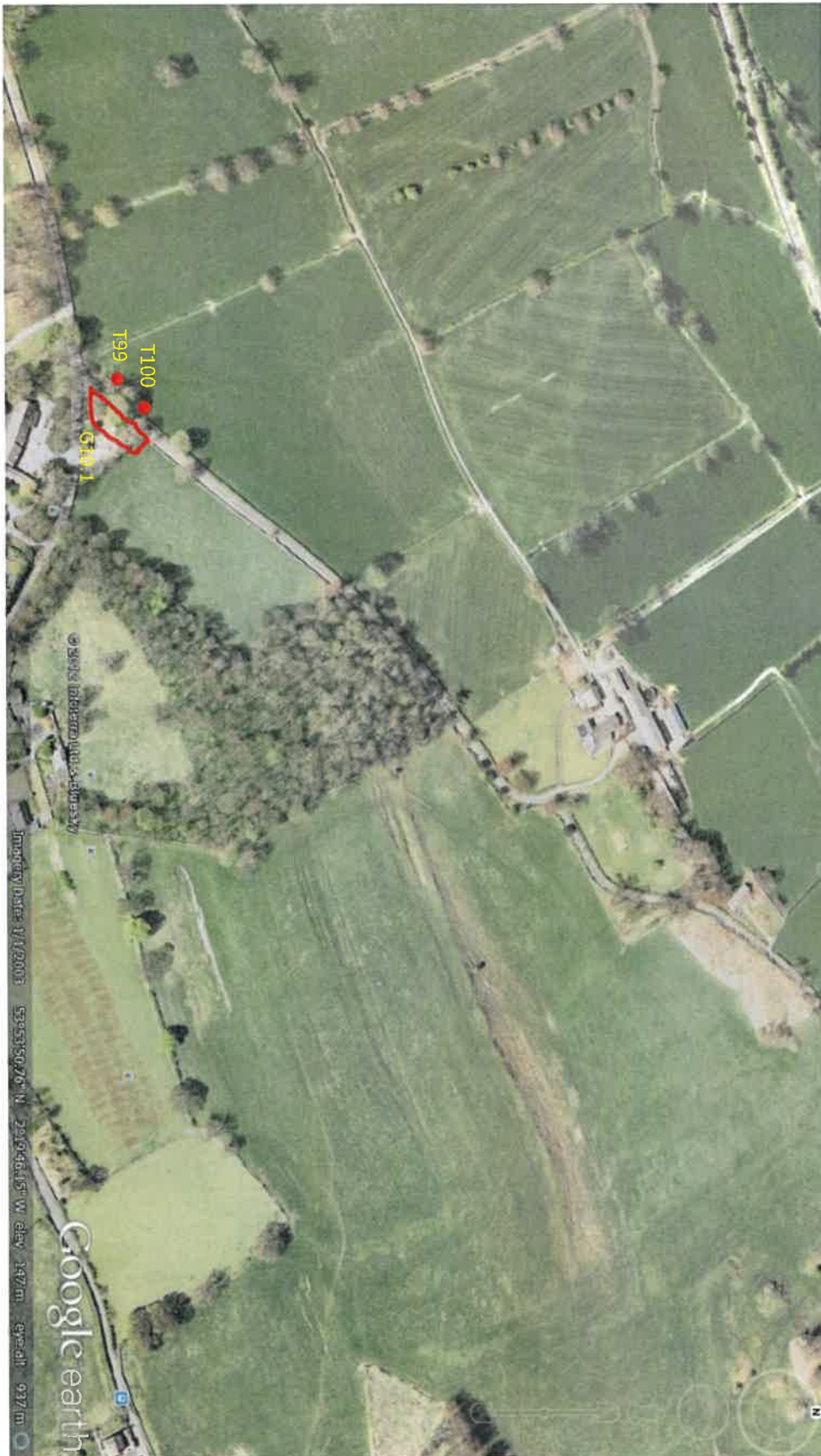


Table showing results from the 2018 Downham Estate tree survey

No	Species	Height m	Age class	Category BS5837	Comments
T44	Sycamore	25	Mature	A	Pruned over road 2014.
T45	Ash	18	Mature	A	
T46	Ash	20	Mature	C	Weighted over field.
T47	Lime	26	Over mature	C	Deadwood present in canopy that will fall into field. Low risk.
T50	Sycamore	24	Mature	C	Several dead branches to removed from above road.
T51	Elm	15	Young	B	
G2.4	12x Sycamore 1x Ash 1x Pine	- - -	Semi mature Mature Mature	B B B	1 sycamore has small basal cavity. Low risk. Saplings felled and mature trees pruned.
T52	Oak	16	Mature	B	
T53	Oak	18	Mature	B	Old <i>ganaderma</i> bracket at base. Consider felling.
T54	Oak	12	Mature	B	
T55	Oak	16	Mature	B	Deadwood over field
T56	Oak	16	Mature	B	
T99	Oak	20	Mature	B	
T100	Oak	18	Mature	C	
T101	Sycamore	20	Mature	B	
G10.1	2x Oak 1x Sycamore	- 20	Mature Mature	B B	Sever ivy to permit thorough tree inspection

The trees are generally good quality mature oak, ash and sycamore. They have received pruning in the last 5 years to maintain roadside safety. Most will required deadwood removal and some might require crown-lifting to allow the bridleway to access the desired route.

Root Protection Areas

As described in BS 5837:2005 a RPA is the minimum area around the base of the tree that contains enough rooting volume to ensure that a tree can survive and grow. If this area is compromised during construction work the trees anchored to the ground and health of the tree can be affected.

The RPA is a key tool in protecting trees when developing or building on a site as it sets out the minimum area within which existing soil conditions must remain undisturbed.

The radius (m) of the RPA for a single stemmed tree is calculated as follows:

- Stem diameter (m) measurement at 1.5m height (breast height) x 12
- Stem circumference (m) at 1.5m x 4 (similar result, varies slightly due to the difference when multiplying by π or 3, easier to check onsite)

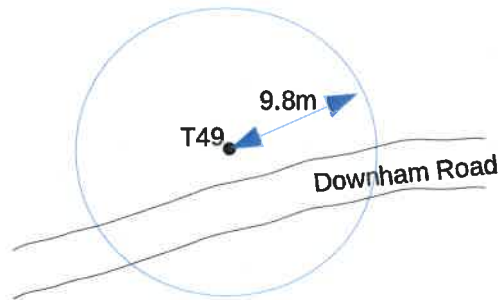
The radius (m) of the RPA for a multi-stemmed tree is calculated as follows:

- Diameter (m) measured at ground level x 10

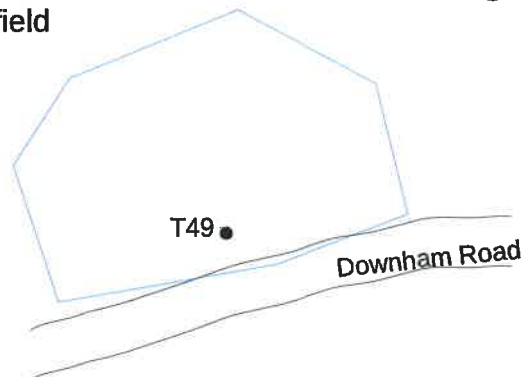
The idea behind imposing a root protection area is to reduce the 2 main causes of tree disturbance during construction; soil compaction and root damage.

In reality the actual Root Protection Area for most of the trees are unlikely to be a concentric circle from the stem, but a polygon with a bias to rooting in the field, as there is little for the tree to gain by growing an extended root system under a tarmac road.

Example of a conventional RPA: Roots unlikely to extend under road



Example of a polygon shaped RPA: must have the same volume of soil protected as above, biased to rooting in field



As the bridleway will undoubtedly infringe on the Root Protection Areas of each of these trees the concept of protection zones will need to be explored. The tree protection zone can be divided into 3 different zones: the prohibited zone (within 1 metre of the stem), the precautionary zone which extends to 4x the tree circumference, and the permitted zone which is outside the other two.

Number	Species	Stem circumference	Root Protection Radius m (4 x circumference) m
T44	Sycamore	3.48	13.92
T45	Ash	2.7	10.8
	Hawthorn	Field tree, close to route, consider removing	
T46	Ash	2.45	9.8
T47	Lime	2.94	11.76
T49	Sycamore	0.23	0.92
T50	Elm	1.3	5.2
T51	Sycamore	2.18	8.72
G2.4	8 sycamore	Average 1.60	Average 6.4m per tree
	1 pine	1.58	6.32
T52	Oak	2.11	8.44
T53	Oak	2.49	9.96
T54	Oak	2.37	9.48
T55	Oak	2.81	11.24
T56	Oak	3.79	15.16
T99	Oak	2.9	11.6
T100	Oak	2.85	11.4
G10.1	Sycamore	2.8	11.2
	Ash	1.47	5.88
	Elder/Ivy	Blocking proposed route, remove	
	Sycamore	1.61	6.44
	Sycamore	1.9	7.6

Method Statement

Pre construction

Prior to any bridleway construction, hedge planting and fencing it is advisable to complete any major tree work required. This could involve felling poorer quality trees and pruning remaining trees to permit site access. Fencing off the root protection areas is not viable in the situation as the bridleway is planned to run through these areas, so engineering solution is required.

Construction methods

In areas of the site that do not have a root protection area conventional bridleway construction has been proposed. This is likely to include excavating the bridleway route to a suitable depth (300mm), backfilling with local quarry stone, compaction and top dressing.

In areas of the site where the route is proposed to infringe a root protection area excavation must be avoided. To simplify this concept for construction workers on site, many of the root protection areas are similar in size to the drip line of the canopies. By using a 'no dig' construction method explained below, root severance, soil compaction, along with disturbed drainage and changes in soil levels cannot effect the trees. Since designating a RPA prevents excavation for the sub base, the bridleway will need to be constructed on the existing ground surface. Interlocking plastic grids should be laid on top of the existing ground and held in place using pins, these then need to be filled with Type 1 sub base. The path then needs finishing with a base course and porous wearing course, and the edges landscaped. The three dimensional cellular confinement system distributes the vertical load on the sub soil and protects tree roots, by spreading any loading over a wide area. Only surface vegetation needs be removed, or sprayed beforehand. The finished surface allows trafficking by light vehicles.

CellWeb and Terram Geocell are the 2 most common brands available. Sadly these are both plastic products, so there environmental credentials have to be considered against retaining the mature trees. Long-term durability could also be an issue when compared to conventional construction.

Method of work

The method of work must be designed to minimise soil compaction. Storage yards for machinery and materials must be located to minimise driving over the tree roots excessively. Movements of machinery should be planned so that they are driving on a surfaced path or road wherever possible, so there load is spread evenly.

Tree aftercare

The trees are surveyed on an annual basis. Careful inspection to monitor the health of each tree after construction is needed, and remedial action taken if required (felling or pruning). Tree will probably

recover from root damage, however the damaged roots may put on additional growth, which could potentially crack the new surfaces in a short time period.

Recommendations

I recommend that T46 (poor quality Ash) is felled prior to construction, which will allow the route to be kept close to the wall. The lower section of bridleway from Chatburn to Greendale could then be constructed using conventional methods, with only 3 trees on the route requiring Geocells to be used over their RPA's.

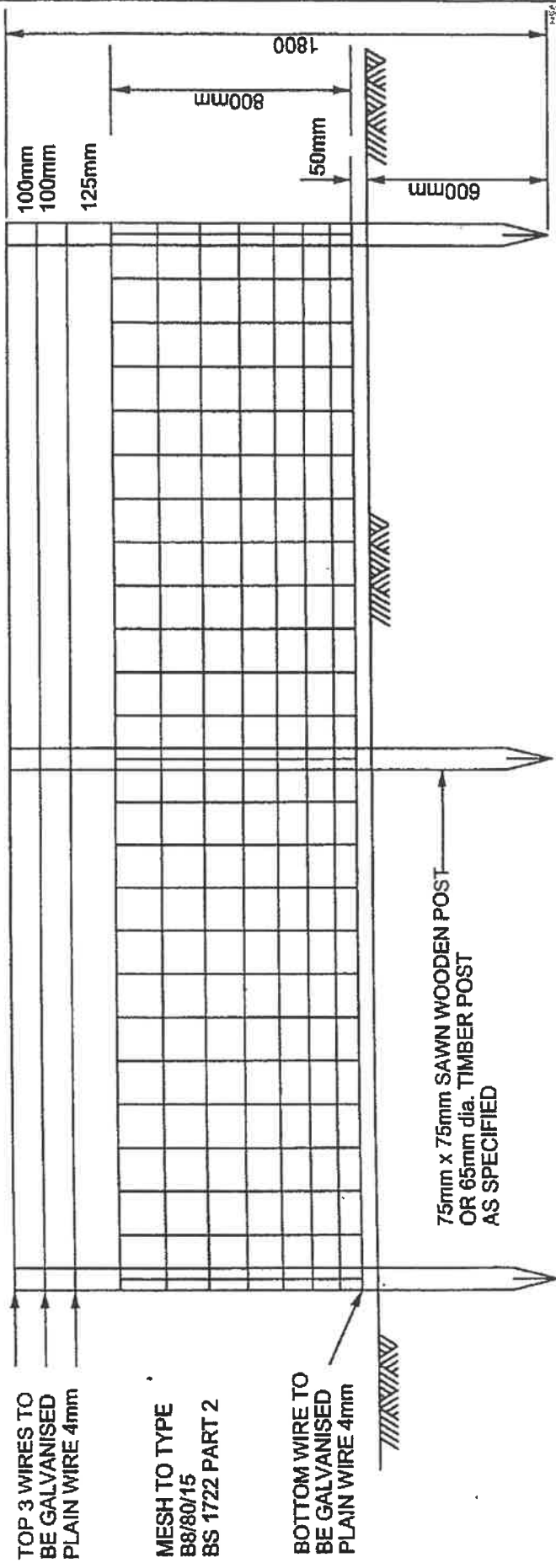
The upper parts of the bridleway are likely to require a full 'no dig' approach, as the trees are closely spaced and their RPA's are likely to overlap in places.

With these recommendations I feel it would be viable for the scheme to go ahead in the interest of the public's safety, diverting pedestrians away from the main road.

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Email: rmdtreecare@hotmail.co.uk
www.rmdtreecare.co.uk



FENCE TO COMPLY WITH BS1722 PART2



NOTES

1. Straining posts and struts as detailed in BS1722 Part 2.
2. 50mm gap required between mesh/bottom wire and ground.







TECHNICAL DATASHEET

TECHCELL 75 CELLULAR CONFINEMENT SYSTEM



PRODUCT DESCRIPTION

Techcell confinement system utilizes a three dimensional honeycomb structure to provide stabilisation across a wide variety of applications like erosion control, soil stabilisation, load support earth retention and tree root protection.

Techcell is manufactured with ultrasonically-welded virgin High-Density Polyethylene (HDPE) with Ecoloy® Formula that are expanded on-site and filled with sand, soil, rock or concrete, etc.



APPLICATION



TREE ROOT PROTECTION



RETAINING WALL



SLOPE PROTECTION



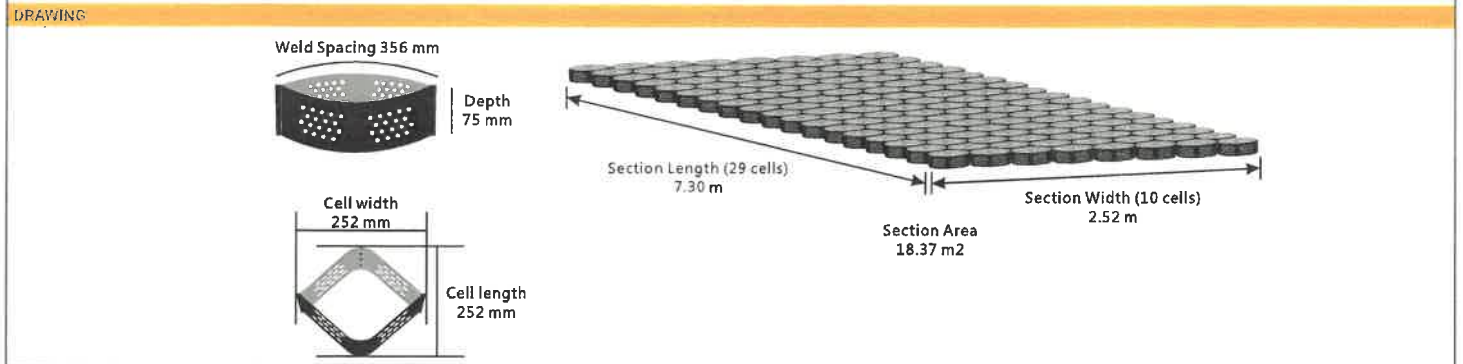
LOAD SUPPORT



CHANNEL PROTECTION

PROPERTY	TEST METHOD	VALUE
CELL		
CELL DEPTH	-	75mm (+/- 0.5 mm)
WELD SPACING	-	356mm (+/-1.0 mm)
COLOUR	-	black
MATERIAL		
MATERIAL	-	VIRGIN HDPE BASIC (ECOLOY® FORMULA)
DENSITY	ASTM D1505	0.945-0.960 g/cm³
THICKNESS	ASTM D5199	1.50 mm (-5% +10%)
CARBON BLACK	ASTM D1603	≥1.5%
SEAM PEEL STRENGTH	USACE GL-86-19	≥1200N
TENSILE STRENGTH AT BREAK	ASTM D638	≥32000 kN/m² (TD) / ≥30000 kN/m² (MD)
TENSILE STRENGTH AT YIELD (kN)	EN ISO10319	≥2.55
TENSILE STRENGTH AT YIELD (kN/M)	EN ISO10319	≥12.80
EXTENSION (%) AT MAX LOAD (YIELD)	EN ISO10319	≥9.5
ELONGATION AT BREAK	ASTM D6693	≥900% (TD) / ≥480% (MD)
OXIDATIVE INDUCTION TIME	ASTM D 3895	≥150 min
DURABILITY	RESISTANCE TO WEATHERING EN12224, RESISTANCE TO OXIDATION EN ISO 13438 (25 YEARS), TO BE COVERED WITHIN 1 MONTH AFTER INSTALLATION. PREDICTED TO BE DURABLE FOR A MINIMUM OF 25 YEARS IN NATURAL SOILS WITH 4<PH<9 AND SOIL TEMPERATURE <25°C	

DIMENSION		
EXPANDED CELL SIZE	-	252 mm x 252 mm
SECTION SIZE	-	2.52 m x 7.30 m
SECTION AREA	-	18.37 m²



REGISTERED OFFICE ADDRESS

Units 2 & 5 Tetbury Close
Martland Industrial Park
Wigan
Greater Manchester
WNS 0LA

1. TCS Geotechnics Ltd reserves the right to alter product specifications without prior notice.
2. It is the responsibility of all users to satisfy themselves that the above data is current.
3. The above figures are average values obtained from testing to current EN ISO standards
4. TCS Ltd cannot accept responsibility for the performance of these products as the conditions of use are beyond our control.
5. Installation details are available on request.



**Specification for an Archaeological Watching Brief at
Field east of the Junction of Green Lane and Chatburn Road, Downham
(SD 78294443)**

Prepared on behalf of Pendle Hill Landscape Partnership. Contact: Ms S Dorman, Room 5c LCC Offices, Pimlico Road, Clitheroe, Lancashire BB7 2BW

1. Introduction

.1 An application for planning permission (3/2019/0754) has been submitted by the Pendle Hill Landscape Partnership to Ribble Valley Borough Council for the creation of an off-road multi-use link between the villages of Chatburn and Downham. This link would be of bridleway standard and accommodate walkers, cyclists, horse riders and those with mobility issues including chair users.

1.2 The route of the link runs in the field along the north side of Chatburn Road east from the bridge over the Clitheroe bypass (SD 77484429), past Greendale View where it will divert onto a short section of existing roadside footpath, then back into the field edge to the junction with Green Lane. It will then run a short way up the field on the northwest side of Green Lane before crossing the lane and the field to the east of the Green Lane – Chatburn Road junction, before exiting onto Chatburn Road just west of Downham Hall (SD 78294440). The path has been designed to avoid the known archaeology by the use of a minimum dig construction, but will cross the raised *agger* (construction mound) of the Ribchester to Ilkley Roman road (Margary 72a, below) in this last field. As a consequence works in this field will need to be accompanied by a formal archaeological watching brief.

2. Background.

2.1 An archaeological walk-over survey of the route of the link was undertaken in March 2019 by Northern Archaeological Associates and a report produced (*Chatburn to Downham Proposed Bridleway*, NAA Project No. 1488). This identified and described a number of heritage assets along the route, assessed the impact of the proposed link upon them and suggested potential mitigation for that impact. The executive summary of that report states:

In total, nine features were identified during the walkover survey (Sites 1 – 9), and all of the HER assets (Sites 2, 3, 7, 8 and 9) except for a Roman coin hoard (Site 2) were visible on the ground. There are no designated heritage assets lying within the proposed route, therefore no nationally significant assets will be directly affected by the proposals. ... The proposed route crosses the line of the Roman road

and it was recommended that preservation in situ was the preferred option. This may take the form of a detour or shortening of the route or an engineering solution if a detour is not viable ...

2.2 Following discussions with Peter Iles of Lancashire Archaeological Advisory Service (LAAS, at that time advisors to Ribble Valley Borough Council), the design of the link was amended to avoid all but the shallowest excavations into the ground where archaeological remains were identified. Some filling of land over some of the remains (small quarry pits and a hollow, initially suggested as medieval archery butts but more probably an earlier line of the Chatburn road) is required, but should not result in significant disturbance of buried remains. As a result of this re-design LAAS agreed that the only mitigation still required was on the section of the link as it crossed the well-defined *agger* of the Roman road. This mitigation would comprise an archaeological watching brief during turf and topsoil stripping and the agreement, once that stripping had been undertaken, of the final siting of the posts to support an agricultural gate also required here.

2.3 The route of the Roman road at this point is defined by a slightly raised ridge crossing the field, having crossed Chatburn Road from Downham Park to the west, proceeding slightly north of east across the field and into a wooded area north of Downham Hall. The wider route of the road is described in Margary 1957, "*Roman Roads in Britain*" (Vol.2 pp.104-6) and Graystone 1996, "*Walking Roman Roads in the Fylde and the Ribble Valley*" (pp.80-82) and whilst a section has not been cut in the immediate area, the authorities agree that the ridge described above represents the *agger* of the Roman road. No roadside ditches were visible during the site inspections, but it should be assumed that they exist flanking the road; it is also possible that parallel ditches could flank either side of the road some metres further out and defining a 'road zone' – such have been found on some, but not all, Roman roads in Lancashire which have been investigated archaeologically.

2.4 The general aim of the watching brief is to monitor the ground works required for the link construction, and to record any traces archaeological remains that are found and thus mitigate its impact on those remains. The work should be carried out in accordance with best practice guidelines, including the appropriate Standards and Guidance of the Chartered Institute for Archaeologists (CIfA) including the "*Standard and guidance for an archaeological watching brief*" (2014) and in line with the requirements of the National Planning Policy Framework (MoHCLG, 2018). The objectives are:

Archaeological Watching Brief: to maintain an archaeological presence in order to identify, investigate and record any archaeological remains that may be encountered.

Agricultural crossing: to agree the most appropriate location for the posts supporting the gate to the required agricultural crossing to minimise the archaeological impact as far as are practicable.

Report: the works shall result in a final report to be submitted within eight weeks of completion of the fieldwork (subject to any specialist reports outstanding), unless an alternative deadline is agreed with the client at the outset of the project.

Archive: a site archive shall be produced to the appropriate professional guidelines. The information will be finally disseminated through the deposition of the archive with Lancashire Museum Service (if finds are retained) or the Lancashire Archives (if no finds are retained). As well as a client copy, a digital copy of the report shall be submitted to the Lancashire Historic Environment Record.

3. General Considerations

3.1 Prior to the commencement of *any work*, the archaeological contractor should confirm in writing adherence to this specification, or state (with reasons) any proposals to vary the specification. Should the contractor wish to vary the specification, then written confirmation of the agreement of LCAT to any variations is required prior to work commencing. The archaeologist carrying out the watching brief should be appropriately qualified and experienced. Any technical queries arising from the specification detailed below should be addressed to LCAT *without delay*.

4. Fieldwork Methodology

4.1 An archaeologist should be present on site during the turf stripping and excavation works required for the link within the field east of the Junction of Green Lane and Chatburn Road, Downham (SD 78294443). The archaeologist should view the area as it is being dug and any trench sections after excavation has been completed. Where archaeology is judged to be present, the excavated area should be rapidly cleaned and the need for further work assessed. Where appropriate, any cut features and finds should then be quickly hand excavated, sampled and recorded, within the confines of the works required for the link. Note that it is intended that the Roman road should be preserved in situ as far as possible and the excavation of a full section is not expected to be required.

4.2 Excavated soil should be searched as practicable for finds. The presence and nature of 19th and 20th century material should be noted (quantified and summarily described) but finds of this date need not be retained for processing. Finds judged to be 18th-century in date or earlier should be retained.

4.3 The actual areas of ground disturbance, and any features of possible archaeological concern noted within these areas, should be accurately located on a site plan and recorded by photographs, scale drawings (including height above O.D.) and written description sufficient to permit the preparation of a report on the site.

4.4 The intention of the archaeological watching brief is not to unduly delay the work of other contractors on site. This work should not, therefore prejudice the progress of the main or subsidiary contractor's work, except by prior agreement and on-site co-operation.

4.5 The archaeologist on site will operate with due regard for Health and Safety regulations. In this case, where archaeological work is carried out at the same time as the work of other contractors, regard should also be taken of any reasonable additional constraints that these contractors may impose. This work may require the preparation of a Risk Assessment of the site, in accordance with the Health and Safety at Work Regulations. **LCAT and its officers cannot be held responsible for any accidents that may occur to outside contractors engaged to undertake this survey while attempting to conform to this specification.**

5. Unexpectedly Significant or Complex Discoveries

5.1 Should there be, in the professional judgement of the archaeologist on site, unexpectedly significant or complex discoveries made that warrant more detailed recording than possible within the terms of this specification, then the archaeological contractor is to urgently contact LCAT with the relevant information to enable the matter to be resolved with the developer.

5.2 Any human remains that are discovered must initially be left in-situ, covered and protected. If removal is necessary, this must comply with the relevant legislation, any Home Office and local environmental health regulations and English Heritage's and The Church of England's *Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England* (2005) where relevant.

5.3 The terms of the Treasure Act, 1996 must be followed with regard to any finds, which might fall within its purview. Any such finds must be removed to a safe place and reported to the local coroner as required by the procedures laid down in the "Code of Practice". Where removal cannot be effected on the same working day as the discovery, suitable security measures must be taken to protect the finds from theft.

6. Monitoring

6.1 The recording exercise will be monitored as necessary and practicable by LCAT in its role as 'curator' of the county's archaeology. LCAT should receive at least one week's notice of the intention to start the watching brief.

7. Post-Excavation/Post-Recording Work and Report Preparation

7.1 On completion of the fieldwork, any samples shall be processed and all finds shall be cleaned, identified, assessed, dated (if possible), marked (if

appropriate) and properly packed and stored in accordance with the requirements of the receiving museum or archive and national guidelines. A fully indexed field archive shall be compiled consisting of all primary written documents, plans, sections, and fully labelled photographs. Labelling should be in indelible ink on the *back* of any photographic print and should include film and frame number; date recorded and photographer's name; name and address of site; national grid reference. Photographic prints should be mounted in appropriate archivally-stable sleeves. **A quantified index to the field archive should form an appendix to the report.** The original archive is to accompany the deposition of any finds, providing the landowner agrees to the deposition of finds in a publicly accessible archive (see Section 8.1 below).

7.2 A report should be produced to provide background information, a summary of the works carried out, a description and separate interpretation of any features and finds identified. Details of the report's style and format are to be determined by the archaeological contractor, but it should include a non-technical summary, a description of the works undertaken and the results obtained, a full bibliography, a quantified index to the site archive and (as an appendix) a copy of this specification. The report illustrations should include, as a minimum, location maps showing the location of the site within Lancashire and within the locality with sufficient detail to allow their easy identification, a plan of the field showing the area of the watching brief, and all drawings and photographs required to illustrate the findings.

7.3 If nothing of archaeological interest is identified during the course of the watching brief, then a summary report will be adequate, as long as sufficient details are supplied for Historic Environment Record (HER) purposes. Drawings beyond the location plans noted above would not be required, although sufficient supporting information (e.g. photographs) demonstrating the absence of remains should be included. A summary record should include: (1) details of the commissioning body; (2) the nature of the development and resultant ground disturbance; (3) the approximate position of any ground disturbance viewed with relation to adjacent existing fixed points; (4) the date(s) of fieldwork; (5) name(s) of fieldworker(s); (6) brief written observations on the nature and depth of deposits observed (this may include annotated sketch sections); (7) the conditions under which they were observed (for example, details of weather conditions, ease of access and views, attitude of other organisations *etc.*); (8) a quantified index to the field archive; (9) details of the archives present location and intended deposition and (10) a copy of this specification.

7.4 The report should be produced within eight weeks of completion of the fieldwork, unless otherwise agreed with LCAT. Copies of the report should be supplied to the client and the Lancashire HER. The report will become publicly accessible once deposited with the Lancashire HER. The report for the HER should be supplied in digital format, preferably as a single PDF file, but with any accompanying gazetteers, images, plans, etc. in their original formats, to allow it to be easily incorporated into the digital HER.

7.5 Archaeological contractors must complete the online OASIS form at <http://ads.ahds.ac.uk/project/oasis/>. Contractors are advised to contact Lancashire HER prior to completing the form. Once a report has become a public document by submission to or incorporation into the HER, Lancashire HER may place the information on a web-site. Please ensure that you and your client agree to this procedure in writing as part of the process of submitting the report to the case officer at Lancashire HER.

8. Deposition of Archive

8.1 It is the responsibility of the archaeological contractor to endeavour to obtain consent of the landowner, in writing, to the deposition of finds with the Lancashire Museum Service or an alternative MGC registered museum.

8.2 If no finds or made or retained, it would be appropriate for the archive to be deposited within the Lancashire Archives, Bow Lane, Preston.

8.3 It is the responsibility of the archaeological contractor to meet the Museum or Archive's requirements with regard to the preparation of fieldwork archives for deposition.

9. Further Details

9.1 Any queries about this brief which cannot be answered by the client should be addressed to:

Lancashire County Archaeology Team,
Lancashire County Council Planning and Environment Service,
PO Box 100,
County Hall,
Preston
PR1 0LD

Tel. 01772 531258

Email archaeology@lancashire.gov.uk

10. Valid period of specification

10.1 This specification will remain valid for up to one year from the date of issue. After that time it may need to be revised to take into account new discoveries, changes in policy or the introduction of new working practices or techniques.