From: [redacted] [redacted]
Sent: 07 February 2019 14:20
To: Planning & Regulatory Services <[redacted]@scotborders.gov.uk>
Cc: [redacted] <[redacted]>
Subject: LDP Representation - ANON-7TG7-FAFM-3

Good afternoon

I wish to amend a representation that was made in the recent Main Issues Report consultation, as well as include additional supporting information. The representation relates to the residential site at Harmony Hall Gardens, Melrose (site reference: AMELR013). The initial response was sent on Thursday the 31st of January before the close of the consultation, but was not accompanied by the relevant supporting documentation.

Please find attached a geo-environmental report that is referenced in the MIR questionnaire response with the reference number ANON-7TG7-FAFM-3.

In addition, attached is a Word document with the questionnaire response we wish to supersede the previously submitted comments. There is only one response enclosed, an answer to question 7.

I trust that this is acceptable. Please let me know if you require any further information or have any questions about the enclosed.

Kind regards,
Murray

[redacted]
[redacted]
t: [redacted] | **f:** [redacted] | **m:**

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233 St Vincent Street | Glasgow | G2 5QY | [redacted] | www.g-s.co.uk

Residential | Commercial | Specialist | Construction

7) Do you agree with the preferred options for additional housing sites? Do you agree with the alternative options? Do you have other alternative options?

[redacted] acknowledges Scottish Borders Council's position that the Local Development Plan 2 (LDP2) is unlikely to require a significant number of new housing allocations. The Main Issues Report (MIR) has identified [redacted]' land at Harmony Hall Gardens (Site Reference: AMELR013) as an alternative option for housing development. The recognition of this site as a suitable location for a small scale housing development is fully supported by [redacted]. This is an effective site that can be delivered during the plan period and it is requested that this site is specifically allocated for housing in the LDP2.

The adopted Scottish Borders Local Development Plan (May 2016) allocates two housing sites in Melrose (Site Reference: EM32B for 230 units and Site Reference; EM4B for 25 units). Both of these sites have progressed to planning application stage and have been, or are in the process of being, developed. It is noted that the MIR does not identify any other residential sites in Melrose as preferred or alternative sites. The progression and development of the sites allocated in the adopted plan demonstrates that there is market demand for dwellings in Melrose. The allocation of Harmony Hall Gardens would provide an opportunity for a small scale residential development within Melrose to meet market demand. The allocation of this site would provide flexibility and choice to the Melrose housing market.

The SESPlan Housing Background Paper from October 2016 is referenced in Paragraph 5.2 of the MIR, stating that there is a requirement of 3,841 housing units in the Scottish Borders between 2021/22 to 2030/31. The Council's Finalised Housing Land Audit dated April 2018 details that the Council currently has an effective supply of 3,469 units. Melrose is located within the Central Housing Market Area. Table 6 of the Housing Land Audit details that the Central Housing Market Area has an 11 year effective housing land supply. Table 8 identifies that the Central Housing Market Area has a higher rate of completion in comparison to other Housing Market Areas in the Scottish Borders. The Housing Land Audit specifically recognises the role small sites play in terms of housing land supply and completions. The allocation of the land at Harmony Hall Gardens would demonstrate the Council's commitment to the delivery of small scale housing sites and would contribute to the effective housing land supply in the Central Housing Market Area.

Paragraph 5.8 of the MIR identifies that the Scottish Borders is an attractive area to live and work. Melrose was recently named "The Best Place to Live in Scotland" by the Sunday Times. The allocation of Harmony Halls Gardens would contribute towards the housing supply in this highly desirable area. The proposed allocation of Harmony Hall Gardens represents a modest small-scale expansion of the town and an opportunity to provide low density, sensitively designed units as an alternative housing offer.

Paragraph 5.11 of the MIR states that there is a requirement to ensure that sites are deliverable within the plan period. To this end, various existing housing allocations totalling 95 units are proposed to be removed from the plan as they are no longer considered to be effective. Paragraph 5.1 of the MIR details that a site is only considered to be effective where is can be demonstrated that within 5 years it will be free of constraints and can be developed for housing.

Planning Advice Note (PAN) 2/2010: Affordable Housing and Housing Land Supply outlines the criteria for assessing the effectiveness of a site. Paragraph 55 of this PAN sets out the criteria as follows:

"Ownership: the site is in the ownership or control of a party which can be expected to develop it or to release it for development. Where a site is in the ownership of a local authority or other public body, it should be included only where it is part of a programme of land disposal;

Physical: the site, or relevant part of it, is free from constraints related to slope, aspect, flood risk, ground stability or vehicular access which would preclude its development. Where there is a solid commitment to removing the constraints in time to allow development in the period under consideration, or the market is strong enough to fund the remedial work required, the site should be included in the effective land supply;

Contamination: previous use has not resulted in contamination of the site or, if it has, commitments have been made which would allow it to be developed to provide marketable housing;

Deficit Funding: any public funding required to make residential development economically viable is committed by the public bodies concerned;

Marketability: the site, or a relevant part of it, can be developed in the period under consideration;

Infrastructure: the site is either free of infrastructure constraints, or any required infrastructure can be provided realistically by the developer or another party to allow development; and

Land use: housing is the sole preferred use of the land in planning terms, or if housing is one of a range of possible uses other factors such as ownership and marketability point to housing being a realistic option."

Assessing each of the above criteria in turn, it is considered that the land at Harmony Hall Gardens, Melrose is an effective housing site that can be delivered during the plan period.

Ownership – The site is in the ownership of National Trust for Scotland and can be released for development.

Physical – There are no known physical constraints that would prevent development at this location. Ground stability is not considered to be an issue due to low and very-low risk of historical mineral and coal extraction respectively. Flood risk is identified as a low-to-medium concern and a Flood Risk Assessment has been recommended to accompany any planning application. There is an existing site access from St Mary's Road.

Contamination – The site is currently greenfield land. The Phase 1 geo-environmental desktop study prepared by Stuart Burke Associates concludes that the likelihood of contamination is low.

Deficit Funding – It is not considered that public funding would be required to make this site economically viable.

Marketability – The site is capable of being delivered during the plan period. The residential sites allocated in the adopted Local Development Plan have been brought forward for development. Melrose is a highly desirable location and it is anticipated that there will be demand for a low density residential development at this location.

Infrastructure – The required infrastructure to service this site can be provided to allow the site to be developed. Access to the site can be created from St Mary's Road via the existing site access.

Land Use – the site is located in a residential area and located within close proximity to local services and amenities such as St Mary's School, the bowling club and Harmony House. Residential is considered to be the most appropriate land use for this site.

As demonstrated above, this is an effective small scale housing site that can be delivered in the plan period and contribute towards the housing land supply for the Housing Market Area.

The alternative option allocation in the MIR identifies an indicative capacity of 5 units. This scale of development is supported by [redacted]. An Indicative Layout Plan has been submitted in support of this representation. This demonstrates that the site is capable of being delivered for a low density development of 5 units. This scale of development would allow the mature trees on site to be retained, where possible. As shown on the Indicative Plan, access could be provided from the existing access point in the western section of the traditional wall facing onto St Mary's Road, causing minimal disruption to the wall itself.

The MIR identifies number of site specific requirements and [redacted] is generally supportive of the requirements. [redacted] is supportive of the retention and protection of the existing boundary features and trees, where possible (bullet point 2 in the Site Requirements). [redacted] is also fully supportive of ensuring that the design and layout of the site should take account of the Conservation Area, setting of Scheduled Monuments and trees on/adjacent to the site (bullet point 7). [redacted] agrees with the site requirement which states that access to the site should result in the least disruption to the existing stone wall (bullet point 8).

[redacted] fully recognises that the development must respect the setting of Melrose Abbey Scheduled Monument. Bullet point 6 of the Site Requirements details that no development within the Melrose Abbey Scheduled Monument would be permitted. The Scheduled Monument boundary extends to the eastern part of this site. [redacted] agrees with the restriction that no residential units should be built within this part of the site. However it is requested that the wording of this requirement is changed to specifically restrict the development of housing in this part of the site. It is assumed that this part of the site could be utilised for the provision of open space/amenity ground, landscaping and infrastructure.

Bullet point 9 states that *'existing trees/hedging within and on the boundaries of the site must be retained and protected'*. It is requested that this requirement is slightly amended to state that existing trees and hedging must be retained, *where possible*.

Bullet point 10 stated that *'in order to safeguard the character of the Conservation Area and adjacent listed buildings, dwellinghouses should be restricted to single storey'*. The site is situated opposite Harmony Hall House, which is 3 storeys in height. The adjacent St Mary's School also has high pitched roofs and is two storey in parts. It is considered that the design and height of the proposed residential units can be controlled through the planning application process and it is requested that this site requirement is removed.

Stuart Burke Associates have prepared a preliminary geo-technical appraisal to identify potential environmental constraints on the site. This was a non-intrusive desktop report that also assessed the potential for contamination, flooding, and ecological impact. A copy of this report has been uploaded with the consultation response.

The preliminary geo-technical appraisal identified that the site is within an area of low-risk of flooding from the River Tweed. A portion of the northern part of the site is situated within a medium-risk area. Therefore, [redacted] agrees with the inclusion of the site requirement for a Flood Risk Assessment

The appraisal has also indicated that development of the site is at low risk of having an environmental impact on nearby ecological receptors and designations, including the River Tweed Special Area of Conservation, due to the low permeability of soils and distance from the site. However, it is acknowledged that the site exists within environmental designations and that consultation with relevant authorities (Scottish Borders Council, SEPA, and SNH) will be required at application stage. It is requested that bullet point 4 ("Mitigation required to ensure no significant adverse effects upon integrity of River Tweed Special Area of Conservation") as this will be addressed in bullet point 3 requiring the assessment of ecological impacts and provision of mitigation.

[redacted] fully supports the identification of the land at Harmony Hall Gardens as an alternative residential site. It has been demonstrated above and in the enclosed documentation that this is an effective site that can be delivered during the plan period. It is therefore requested that this site is allocated for residential development in the LDP2.

National Trust for Scotland

Phase I Geo-Environmental Desktop Study for Harmony Hall Gardens, Melrose.

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Client:	Document Reference:		Project Number:
National Trust for Scotland	SBE5013_Phase I Geo-Environmental Report		SBE5013
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AT	PDP	AWB	01

Contents

Appendices

Appendix A: Site Location Plans

Appendix B: Selected Historical Ordnance Survey (OS) Maps

Appendix C: Selected Historical BGS Borehole Records

Appendix D: Supportive Environmental Classification Data sheets

Appendix E: Zetica Ltd., UXO Risk Map

Revision Changes

Rev.	Revision Notes	Date	Prepared	Checked	Approved
01	Minor text changes	04/02/2019	AT	PDP	AWB

Executive Summary

On behalf of [redacted], and to the instruction of Graham + Sibbald, Stuart Burke Associates Ltd., has prepared a Phase I geo- environmental desktop report to identify any environmental constraints to the site, with regards to the proposed residential development of Harmony Hall Gardens, Melrose.

In support of the site being included on the Scottish Border's Local Development Plan, Phase I reporting, and subsequent compilation of a Phase I Conceptual Site Model (CSM) and associated Phase I environmental risk assessment was completed.

Review of the published data determined the site is located within a Greenfield site, consisting of the undeveloped garden grounds of Harmony Hall House.

The historical development of the wider area largely comprises the development of several towns and villages, including Melrose, surrounded by undeveloped agricultural land and sparse residential, commercial and industrial developments, since the earliest available OS, circa 1859. Continued urban development is noted throughout the historical timeline, coinciding with the decommissioning and remediation of nearby industrial and quarrying works.

The site is located within a Drinking Water Protection Zone, with the underlying bedrock being identified as a *Low Productive Aquifer.* The Drinking Water resources are identified as the Pebbles, Galashiels and Hawick aquifer and the Upper Tweeddale Sand and Gravel aquifer, both of which have an overall classification of *Good*.

The published geology indicates natural superficial strata comprises a sequence of Alluvium (clay, silt, sand and gravel), Glaciofluvial (gravel and sand, locally with lenses of silt, clay or organic material), and Glacial Till (boulder clay). A substantial depth of made ground deposits is not considered likely to be present across the site. Localised and shallow occurrences of made ground may be present, however.

The underlying solid geology is recorded to be the Hawick Group, which consists of greywacke and interbedded silty mudstones. Several intrusive igneous events have also occurred nearby, with the closest being the Chiefswood Vent approximately 450m to the south west of the site.

The site is located within several environmental designations, with a number of listed buildings, Canmore Sites, Historic Environment Records, licensed sites and registered woodlands located within the general area. These designations will require consultation with local authorities (Scottish Borders Council, SEPA and SNH).

At this time, the likelihood of contamination is considered unlikely but remains uncertain. This is mainly due to lack of site specific ground investigations and the uncertainty associated with the composition and character of foundation soils present in situ.

As a result, and conservatively adopting qualitative risk assessment, a *Low* (Phase I) risk of contamination source and associate pollutant linkage to Human Health and the Water Environment was identified. On this basis, the site would not be considered a Part IIa site within the assessment framework of the Contaminated Land Act 1990.

1. Introduction

On behalf of [redacted], and to the instruction of Graham + Sibbald, Stuart Burke Associates Ltd., has prepared a Phase I geo- environmental desktop report to identify any environmental constraints to the site, with regards to the proposed residential development of Harmony Hall Gardens, Melrose.

The site is located in Melrose, and at approximate national grid reference (NGR) E: 354682, N: 634335. All measurement provided within this report will be taken from this location, unless otherwise stated. A site location plan is presented in ***Appendix A***.

This non- intrusive Phase I geo- environmental desktop report initiates a review of the condition of the land for development in relation to Part IIA of the Contaminated Land Act (1990), and assesses the potential for contamination and an associated pollutant linkage being present from either on site or off site sources.

A Conceptual Site Model (CSM) is assembled using data recovered from various published sources with geotechnical and environmental focus, and used to inform a Phase I Environmental Risk Assessment for the proposed development.

The Conceptual Site Model (CSM), Phase I Environmental Risk Assessment and Phase I Desktop report were informed from the following:

1. Review of the available Ordnance Survey (OS) mapping record for the site and wider area;
2. Review of the published geology and hydrogeology for the site and wider area; and
3. Review of published online records provided by The Coal Authority, SEPA, Past-Map, Zetica Ltd., MAGIC, Scotland's Environment, Scottish Natural Heritage (SNH), Historic Scotland, UkRadon and Topographical Map.

A general Phase I reporting structure is adopted here, with background information about the site provided in Section 2, and including a site description, review of the historical development of the site and surrounding area, description of the published geology from mapping and nearby site investigation data, and interrogation of other pertinent engineering and environmental records. The Conceptual Site Model (CSM) is developed in Section 3, together with the Phase I environmental risk assessment. General environmental constraints are considered in Section 4, with conclusions and recommendations to emerge from the Phase I study presented in Section 5.

2. Background and Site Characteristics

2.1 Introduction

Within this section background details of the site and general surrounding area are considered. These background details were collated from the sources listed in Section 1, above.

2.1.1 Site Description

The site comprises the undeveloped garden grounds of Harmony Hall House, and is located to the north of St. Mary's Road and to the west of Annay Road. The topography of the site is generally flat, with a slight rise towards the south of the site.

The site largely comprises grass and a number of well-established trees, with a traditional style building owned by [redacted] located at the eastern extents of the site. The site is enclosed by a stone wall to the south, east and west of the site, and a wooden post and wire fence to the north of the site.

The wider area surrounding the site is heavily developed and trafficked, with several towns, urban settlements and major transport links present.

Boundaries to the site include:

1. North: Largely undeveloped agricultural land, with a few residential and commercial properties located to the immediate north east of the site. A buried drain is likely to run along the northern boundary of the site;
2. East: Annay Road, which leads onto the ruined remains of Melrose Abbey;
3. South: St. Mary's Road, which leads onto Harmony Hall and associated grounds, and St. Mary's School and associated grounds; and
4. West: A number of residential properties and Melrose Bowling Club.

2.1.2 Historical Development

A collection of historical Ordnance Survey (OS) maps for the site, and wider surrounding area, recovered from old-maps.co.uk, are presented in ***Appendix B***, whilst a summary of the historical development of the site and surrounding area is presented in ***Table 2.1***, below. ***Appendix B*** contains a collection of available historical OS maps, however; due to significant scaling differences, and difficulty in accurately interpreting data, some of these maps were omitted from the historical development summary.

Table 2.1: Historical development summary

Map Year	Site Conditions	Surrounding Area Conditions
1859 - 1861 (*)	- The site largely comprises wooded land. The following is also noted: • Located to the approximate centre of the site is a fenced off area, with no trees shown to be present; • 2No. non- descript (likely residential) buildings are located to the south east corner of the site.	- A number of neighbouring towns and villages have already been established, including Melrose where the site is located. - Melrose generally comprises residential and commercial properties, with several developments associated with the local Abbey. - Surrounding transport links are already established, with most main roads already situated in their present-day locations. - North British Railway, located approximately 450m to the south of the site is also already established. - Out with the established towns and villages, the surrounding area generally comprises undeveloped agricultural land with sparse residential developments throughout. - Nearby surface water courses include: • The River Tweed approximately 270m to the north of the site, flowing from west to east; and • Mill Lade approximately bounding the site to the north, flowing from west to east. • Malthouse Burn, flowing from south west to north east, joining Mill Lade approximately 650m to the east of the site. - Notable developments across the surrounding area include: • Corn Mill, bounding the site to the north east. • Saw Pit, approximately 250m to the south east of the site. • Smithy, approximately 260m to the south of the site. • Gas works, approximately 340m to the south west of the site. • Melrose Station, approximately 440m to the south of the site, with the aforementioned railway line running in a general west to east direction. • 'Town's Reservoir' (Melrose's Water Supply), approximately 650m to the south of the site. • Several working and old quarries located across 'Quarry Hill', approximately 800m to 1.2km to the south west of the site.
1898 (*)	- The site is no longer shown to be forested. No further changes noted to the site.	- Some urban development of the neighbouring villages and towns has taken place across the surrounding area. - The old quarries located across 'Quarry Hill' are no longer labelled. 2No. working quarries remain in this location, however. - A gravel pit has opened up approximately 370m to the north of the site. - The aforementioned saw pit is no longer shown on the mapping.

Map Year	Site Conditions	Surrounding Area Conditions
1921 (*)	- The site is shown to be forested again. No further changes noted to the site.	- Further urban development to the neighbouring villages and towns has taken place across the surrounding area. - The aforementioned Corn Mill is now noted as disused. - The aforementioned gravel pit is no longer shown on the mapping. - The aforementioned smithy is no longer labelled on the mapping.
1951 (*)	- No significant changes recorded.	- General urban development to the neighbouring villages and towns has taken place across the surrounding area.
1964 (*)	- The fenced off area to the approximate centre of the site is no longer shown on the mapping. - The north west corner of the site has been fenced off, with no trees shown to be present.	- Further urban development to the neighbouring villages and towns has taken place across the surrounding area. - The disused Corn Mill is now being used as a TA Centre. - Mill Lade has partially been re- developed into a drain, with only approximately half being present at ground surface to the north of the site. - All quarries located across 'Quarry Hill' are no longer shown to be working, with Earthworks being identified instead.
1979 (*)	- The fenced off area to the north west is no longer shown to be present. - The majority of the site is no longer forested, with the exception of approximately 1/3 of the site to the west.	- Further urban development of the neighbouring villages and towns has taken place across the surrounding area. - The aforementioned Melrose Station and North British Railway line are shown to be dismantled/ disused. - Only 1No. disused quarry is identified at 'Quarry Hill'. - Further alterations to Mill Lade are noted, with more of the water course being buried beneath ground level. - The aforementioned gas works is no longer identified on the mapping. - The aforementioned TA centre is now identified as the Abbey Mill.
1983 (*)	- No significant changes recorded.	- General urban development to the neighbouring villages and towns has taken place across the surrounding area.
1992 (*)	- The aforementioned forested area to the west of the site remains fenced off from the remainder of the site but no trees are shown to be present.	- General urban development to the neighbouring villages and towns has taken place across the surrounding area. - The aforementioned disused railway line has been re- developed into the present day A6091, approximately 450m to the south of the site. - A sewage works has been developed approximately 450m to the north east of the site. Possible these works were present as early as circa 1979 OS map, however, available mapping is incomplete.
2018 (^)	- No significant changes recorded.	- Further urban development to the neighbouring villages and towns has taken place across the surrounding area.

Notes:

(*) OS Map(s) sourced from Old-Maps.co.uk;

(^) OS Map(s) sourced from Google Maps, circa January 2019.

In summary, the site has comprised the garden grounds of Harmony Hall House since the earliest available OS mapping, circa 1859, through to the present day. Throughout this time, some minor alterations are noted to the land uses at the site, and comprise different sections being fenced off and occasional felling of trees.

Since the earliest available OS mapping, circa 1859, the wider area comprises a number of towns and villages, including Melrose, surrounded by undeveloped agricultural land and sparse residential developments. At this time, several industrial works are located across the general area including: a corn mill, which bounds the site to the north; and a number of quarries located between 800m to 1.2km to the south west of the site on 'Quarry Hill'.

Continued urban development of the general area is seen throughout the historical timeline, together with major upgrades to the transport links. Indeed, the North British Railway line is located approximately 450m to the south of the site since circa 1859, through to circa 1979, when the railway line is noted as 'disused'. Sometime between circa 1983 and 1992, this disused railway line was re- developed into the present day road system, including the A6091 approximately 450m to the south of the site.

Coinciding with this continued urban development, the limited industrial and quarrying works located across the surrounding area were decommissioned and, in some cases, remediated. Indeed, the quarries located at 'Quarry Hill' gradually become labelled as 'disused', with all quarries being decommissioned by circa 1964.

2.1.3 Published Geology and Hydrogeology

Online records provided by The British Geological Survey (BGS) indicates the superficial deposits at the site to comprise a sequence of Alluvium deposits (clay, silt, sand and gravel), Glaciofluvial deposits (gravel and sand, locally with lenses of silt, clay or organic material), and Glacial Till deposits (boulder clay).

No made ground deposits are reported for the site and, given the limited historical development of the site, a substantial depth of made ground deposits is not considered likely to be present. Localised and shallow occurrences of made ground may be present, however.

Superficial deposits overlie solid bedrock strata of the Hawick Group, which consists of greywacke and interbedded silty mudstones. In addition, the general area to the south of the site has been subjected to several events of intrusive igneous activity, including:

- Chiefswood Vent (an agglomerate (consolidated volcanic ash, commonly with large blocks) filled volcanic neck) intruded approximately 450m to 3km to the south west of the site (Lower Carboniferous);
- Eildon Hills Laccolith (trachytic rocks) intruded approximately 1.4km to 2.9km to the south east of the site (Lower Carboniferous); and
- Various occasions of felsite, porphyrites, quartz- hornblende and undifferentiated acid rocks intruding as sills or dykes in various places across the surrounding area, with the closest being approximately 1.15km to the south of the site (Lower Devonian and Lower Carboniferous).

Local to the site, the solid geology is anticipated to dip by approximately 45 degrees (°) to the north, north west. Dip degree and direction is noted to vary across the wider surrounding area, however.

A reverse or thrust fault is inferred to sub- crop approximately 950m to the south east of the site, which trends in a general south west to north east direction and downthrows to the south east. The amount of displacement along this fault, however, remains unknown at the time of writing.

Hydrogeological records indicate the solid geology, underlying the site and general surrounding area, to be a *Low Productive Aquifer* that comprises highly indurated greywackes with limited groundwater in near surface weathered zones and secondary fractures.

2.1.4 Ground Investigation Works

Historical site investigation data was recovered from the BGS online borehole viewer, with four (4No.) boreholes located between 320m and 350m to the south west of the site, and four (4No.) located approximately 450m to the south of the site. Additional historical boreholes are located within the general surrounding area, however, these are either not considered pertinent or are currently unavailable for review.

Records of these eight (8No.) boreholes are reproduced within ***Appendix C.***

In summary, the historical boreholes located between 320m and 350m to the south west of the site encountered a variable mix and depth of made ground deposits over natural superficial deposits, comprising a sequence of cohesive dominate soils above granular dominate soils, to a maximum recorded depth of 9.90m bgl. No solid geology was encountered within these historical boreholes.

Here, made ground deposits typically comprised a variable mix of ash, clay, sand and/ or gravel fill material, and were encountered to depths ranging between 0.70m (NT53SW28) and 3m (NT53SW1431/3) bgl. Borehole NT53SW1431/2, however, recorded made ground to comprise a 1m deep 'pit' founded on a 0.15m thick concrete base. Locally, asphalt was encountered at the ground surface and continued to 0.15m bgl (NT53SW28).

Directly underlying the made ground deposits, natural superficial deposits typically comprise a sequence of firm, locally very stiff, sandy, silty clay to a depth of approximately 3 to 3.50m bgl; soft to very soft silty clay to a depth of approximately 4 to 5m bgl; and medium dense to dense sand and gravel with some cobbles to a maximum recorded depth of 8m bgl. Indeed, all these boreholes terminated within the superficial deposits.

A distinct odour of gas is noted for the made ground deposits in borehole NT53SW1431/3, while lenses or pockets of oily sand with a strong oil and sulphur smell was noted for the natural superficial deposits in borehole NT53SW28.

Historical boreholes located approximately 450m to the south of the site, however, typically encountered thinner deposits of made ground and natural superficial deposits, with rockhead being encountered at depths varying between 5m and 7m bgl.

Indeed, made ground deposits comprised hardcore and ash fill to a maximum depth of 0.50m bgl, with the exception of borehole NT53SW1901/22, which encountered 1.60m of firm clay and ash fill. Natural superficial deposits typically comprised firm to stiff boulder clay, locally with traces of sand, or gravel and cobbles, to depths between 5m and 7m bgl. The underlying solid geology comprised strata of siltstone and sandstone, that is noted to be slightly to heavily fractured and weathered, to a maximum recorded depth of 13.40m bgl.

Groundwater was typically encountered between 3.50m and 3.80m bgl in the historical boreholes to the south west of the site, with the exception of one (1No.) borehole (NT53SW1431/3), which recorded a groundwater strike of 1.30m bgl. No commentary on groundwater is provided in the four (4No.) historical boreholes located approximately 450m to the south of the site.

It should be noted, however, that these historical boreholes are located at some distance from the site and within areas of differing historical development. Indeed, those located approximately 350m to the south west of the site are located near a historical gas works, while those approximately 450m to the south of the site are situated around the historical North British Railway line and present-day A6091 road. As a result, ground conditions encountered at these locations may vary to those situated beneath the site, and in particular the depth and types of made ground deposits encountered.

2.1.5 Mining

Online records provided by The Coal Authority (CA) indicates the site and immediate surrounding area is not located within a Coal Mining Reporting Area. Indeed, BGS published geology, as detailed in Section 2.1.3, identifies the underlying solid geology to not be coal bearing.

The BGS Non- Coal Mining Plans interactive mapping indicates the site is not located within any known non- coal mining plans.

Finally, no evidence of historical shallow or surface mineral extraction, coal or otherwise, is shown on the available historical OS mapping to have taken place at the site or immediately surrounding area. Indeed, the closest known historical mineral extraction is known as 'Quarry Hill', and is located between approximately 800m to 1.2km to the south west of the site and within the Chiefswood Vent strata, consisting of agglomerate (consolidated volcanic ash, commonly with large blocks).

It is noted, however, that available historical OS mapping only date back as far as circa 1860, and subsequently mine workings predating this may have occurred at the site or surrounding area.

Based on the above, the risk associated with historical or present-day coal mining is considered *very low*, and the risk associated with historical or present-day mining of minerals other than coal is considered *low*, and as a result, no further action is warranted here.

2.1.6 Water Environment

Surface Water Courses

The closest SEPA monitored water courses to the site comprises the River Tweed (ID: 5202), which is located approximately 270m to the north and flows in a general west to east direction.

The River Tweed is classified by SEPA as having overall *Good* conditions, as well as being classified as a Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). Further details of the protection classifications are provided below in Section 2.1.7.

Other small water courses are located across the general surrounding area, however, these are not classified or monitored by SEPA. These minor water courses include the possible buried drain located along the northern boundary to the site.

Groundwater

The groundwater body local to the site, and including the River Tweed, is catalogued within the SEPA interactive mapping as Peebles, Galashiels and Hawick aquifer, while the larger surrounding area is catalogued as the Upper Tweeddale Sand and Gravel aquifer.

The associated aquifers of both of these groundwater bodies are identified by SEPA as having an overall classification of *Good*, as well as being a Drinking Water Protection Zone (Drinking Water Directive).

Flooding

Based on the SEPA online flooding mapping, the majority of the site is situated within an area of low risk of flooding from the River Tweed, located approximately 270m to the north of the site, however the northern extent of the site is situated within a medium risk of river flooding.

The velocity of the potential river flooding at the site is classified by SEPA as typically being less than 1m/s, with localised areas reaching 1m/s to 2m/s, while the potential depth is classified as being up to 1m.

Given the proximity and limited information regarding the presence and development of the historical lade, that bounds the site to the north, a flooding risk associated with this potential water course is highlighted. Assessments of the potential of flooding from this source should be included within any future flood risk assessments for the site.

Small, and localised, areas of surface water flooding are identified across the wider surrounding area, however.

No risk associated with groundwater is identified by SEPA for the site or wider surrounding area.

2.1.7 Ecology/ Environmental - General

Online records provided by Scotland's Environment, Past-Map, Scottish National Heritage (SNH), SEPA, and MAGIC interactive mapping identified the following environmental constraints at, or within proximity to, the site.

- The site is located within Natural Heritage future Zone No. 16;
- The site is located within Zone of Natural heritage Sensitivity ID. 2337, and Gridcode: 5
- The site is located within an Environmentally Sensitive Areas, which covers a total area of 35360.9 Ha and is known as Central Borders;
- The site is located within a Conservation Area, which encompasses the whole of Melrose.

  Features of the classification include: the types of building materials used within the area, which include sandstone, whinstone, harl, slate and on a few occasions red clay tiles; the architectural details, which include sash and case windows, fanlights, transom lights, a range of dormers, occasional continuous sills on upper floors, skews, margins and rybats; and boundary walls, some with iron.

  A map detailing the full extent of the Melrose Conservation Area is presented in ***Appendix D.***

- The site is located within a National Scenic Areas, which encompasses an area of 3600-3880 Ha and is known as Eildon and Leaderfoot.

  The SNH Site Code for this designation is 9142, while the EU Site Code is 18989. There are no features or agreements associated with this classification. Special qualities of this National Scenic Area, however, include: great landscapes diversity within a compact area; the distinctive triad of the Eildon Hills; spectacular views from the hill summits; a strongly united landscape pattern of lively rhythm and colour; a richly wooded scene of great variety; the River Tweed, an iconic river of international renown; a rich array of historical buildings, structures and estates; the hub of border settlement; a harmonious and varied prospect from unequalled viewports; inspiration for the arts, literature and painting, border country ballads and battles, the historic crossings of Leaderfoot; Scott's view; and the Wallace Statue.

  Further details on these designations are provided in ***Appendix D.***

- The River Tweed (ID: 5202), located approximately 270m to the north of the site, is identified as a Biological Special Area of Conservation (Scotland) and a Site of Special Scientific Interest.

  The Special Area Conservation (SAC) and Site of Special Scientific Interest (SSSI) designations are both associated with [redacted]. The SAC is also classified for being a river with floating vegetation often dominated by water-crowfoot. The SSSI, however, is also classified for beetle, fly and vascular plant assemblage, as well as being a tropic range river/ stream. There are no agreements identified by SNH for either of these designations.

  Further details on these designations are provided in ***Appendix D.***

- The eastern extent of the site, together with the land bounding the site to the north, is included within the Scheduled Monument designation boundary for the nearby Melrose Abbey (ID:SM90124). Indeed, the Scheduled Monument includes the lade that brought water to the abbey, and historically ran along the northern boundary to the site.

- Multiple listed buildings (mostly Grade B and C, with few Grade A), Canmore Sites and/ or Historic Environment Records are located across the general area of Melrose and the wider area. None are located within the site boundaries, however, the closest is noted to be Harmony Hall Stables just south of St. Mary's Road.

- Several areas of woodland located across the surrounding area are included on the National Forest Inventory. None are located at the site, however, with the closest being a broadleaved woodland approximately 270m to the south east of the site.

- Several Licensed Sites are located across the area surrounding the site, and include:

  - 3No. located between 220m and 350m to the north of the site: ID: 88184, CAR/S/1140743, Granted 22/10/2015; ID: 84182, CAR/S/1019344, Granted 17/08/2007; ID: 4275, CAR/L/1026280, Granted 31/07/2011;

  - 1No. located approximately 450m to the north east of the site: ID: 3625, CAR/L/1010346, Granted 08/03/2007, known as the sewage works; and

  - 1No. located approximately 300m to the south east of the site: ID: 76926, CAR/R/1149173, Granted 26/07/2016.

In addition, SEPA online landfill mapping identifies three (3No.) landfill sites to be located within a 16km radius, and a further one (1No.) landfill site, as well as a transfer station, within a 19.3km radius. The closest landfill site is located approximately 10.7km to the north east of the site.

SEPA online Landfill Sites and Capacity Map identifies a Non- Hazardous landfill approximately 3.5km to the north west of the site, which is the Easter Langlee Landfill Site, Galashiels, which is operated by Scottish Borders Council under Permit Number: PPC/A/1000112 between 2017and 2020. Further landfills are identified at greater distance to the site, however, these are no longer operational.

Finally, online interactive mapping, by UK radon.org, indicates the site is located within the lowest band of radon potential, whereby less than 1% of homes within a 1km grid square are above the Action Level.

2.1.8 Unexploded Ordnance (UXO)

Regional unexploded bomb risk information was obtained from Zetica Ltd in the form of an indicative unexploded bomb (UXOs) risk map, which is presented in ***Appendix E***.

The site is located within a low unexploded bomb risk area, which is classified as having fifteen (15No.) bombs per 1000 acres or less. Furthermore, no World War II targets are located at, or within proximity, to the site.

The overall risk of UXOs affecting the pending develop of the site is therefore considered to be 'low', and unlikely to affect the proposed construction works.

2.2 Summary

In summary, background review of the site has determined:

- The site is Greenfield, consisting of the undeveloped garden grounds of Harmony Hall House.
- The historical development of the wider area largely comprises the development of several towns and villages, including Melrose, surrounded by undeveloped agricultural land and sparse residential, commercial and industrial developments, since the earliest available OS, circa 1859. Continued urban development is noted throughout the historical timeline, coinciding with the decommissioning and remediation of nearby industrial and quarrying works.
- As part of the wider historical development of Melrose, a lade flowed west to east, along the northern boundary of the site. Local to the site, however, this open water course was partially buried circa 1964, and totally buried circa 1979.
- An extensive transport network has been present since the earliest available OS, circa 1859, and consists of road and rail.
- The published geology indicates natural superficial deposits to comprise a sequence of Alluvium deposits (clay, silt, sand and gravel), Glaciofluvial deposits (gravel and sand, locally with lenses of silt, clay or organic material), and Glacial Till deposits (boulder clay).
- A substantial depth of made ground deposits is not considered likely to be present across the site. Localised and shallow occurrences of made ground may be present, however.
- The underlying solid geology is recorded to be the Hawick Group, which consists of greywacke and interbedded silty mudstones. Several intrusive igneous events have also occurred nearby, with the closest being the Chiefswood Vent approximately 450m to the south west of the site.
- No known faults are located within the site boundaries, with the closest major fault located approximately 950m to the south east of the site (Middleton Hall Fault).
- Nearby historical boreholes (up to 350m to the south west) record a variable mix and depth (up to 3m) of made ground deposits over a sequence of cohesive and/ or granular natural superficial deposits to a maximum recorded depth of 8m bgl. Indeed, all boreholes at this location terminated within the superficial deposits.
- Further south (approximately 450m), rockhead was encountered between approximately 5m and 7m bgl, with the underlying solid geology comprising strata of siltstone and sandstone, that is noted to be slightly to heavily fractured/ weathered. Bedrock was proven to a maximum depth of 13.40m bgl.
- Groundwater was encountered between 3.50m and 3.80m bgl in the historical boreholes to the south west of the site.

- The solid geology is classified as being a *Low Productive Aquifer* that comprises highly indurated greywackes with limited groundwater in near surface weathered zones and secondary fractures.
- The risk associated with historical or present-day coal mining is considered *Very Low*, and as a result, no further action is warranted here.
- The risk associated with historical or present-day mining of materials other than coal is considered *Low*, and as a result, no further action is warranted here.
- The site is located within a Drinking Water Protection Zone. The Drinking water resources are identified as the Peebles, Galashiels and Hawick aquifer and the Upper Tweeddale Sand and Gravel aquifer, both of which have an overall classification of *Good*.
- The River Tweed, approximately 270m to the north of the site, is classified as having overall *Good* conditions, an Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI).
- Associated with the River Tweed, the site has a low to medium risk of flooding. Small and localised areas of surface water flooding are identified across the wider surrounding area. No risk associated with groundwater flooding is identified for the site or surrounding area.
- Given the proximity and limited information regarding the presence and development of the historical lade, that bounds the site to the north, a flooding risk associated with this potential water course is highlighted. Assessments of the potential of flooding from this source should be included within any future flood risk assessments for the site.
- The site is located within a Conservation Area (Melrose), a Natural Heritage Zone (No.16), a Zone of Natural Heritage Sensitivity (ID. 2337), an Environmentally Sensitive Area (Central Borders), and a National Scenic Area (Eildon and Leaderfoot). In addition, the eastern extent of the site and the land bounding the site to the north are included within the Scheduled Monument designation boundary for the nearby Melrose Abbey.
- A number of listed buildings, Canmore Sites, Historic Environment Records, licensed sites and registered woodlands are located across the general area of Melrose and the wider area. None are located within the site boundaries, however.
- The closest SEPA recorded landfill is a Non- Hazardous landfill approximately 3.5km to the north west of the site.
- The overall risk of UXOs affecting the proposed redevelopment of the site is considered to be *Low*.
- The risk associated with Radon Potential is considered *Low.*

3. Phase I Conceptual Site Model and Phase I Environmental Risk Assessment

3.1 Introduction

A Phase I conceptual site model (CSM) is developed from the background information collated and discussed within Section 2. The framework used to compile the CSM and subsequent Phase I environmental risk assessment follows the (UK) best practice guidance of BS10175: *Investigation of Potentially Contaminated Sites (2007)* and CIRIA C552, *Contaminated Land Risk Assessment a Guide to Good Practice (2001)*.

In addition, and adopting the source- pathway- receptor terminology of BS10175, the Phase I environmental risk assessment is developed from considering the potential for plausible pollutant linkage being present in situ and the potential for harm, in particular, to Human Health and the Water Environment.

Here, risk estimates are qualitative and applied following professional judgement based on best practice guidance including CIRIA 552 (2001) and The Scottish Government Statutory Guidance on Contaminated Land (2006).

The qualitative definitions of environmental risk used here include:

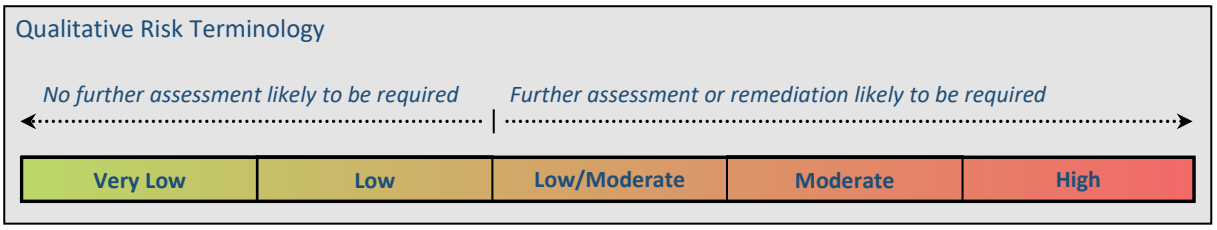


Figure 3.1. Qualitative Risk Definitions

3.2 Pollutant Linkage

3.2.1 Potential Contaminant Sources

From Phase I review and assessment of the site and wider surrounding area the following potential pollutant sources are identified.

- General historical and current use of the site as a kept garden.
- General past use of the wider area, which includes the corn mill and the mill/ abbey lade, located to the immediate north of the site. Both of these developments were constructed prior to the earliest available OS map, circa 1859.
- General past use of the wider area, which includes the opencast quarries located from 450m to the south west of the site, known as 'Quarry Hill', and other, smaller, quarries and gravel pits across the wider surrounding area. All of these historical surface mineral workings were decommissioned and generally remediated and infilled by circa 1964. Infill materials are likely to comprise ash and sand infill, with varying degrees of clay, brick fragments, gravel and slag material.

The potential sources of contamination listed above are considered in turn in the following sub-sections.

Made Ground Materials (All Sources: Site & off site)

A substantial depth of made ground/ fill deposits is not considered likely to be present across the site. Localised and shallow areas of made ground/ fill deposits may be present, however.

Should any imported made ground/ fill deposits be present on site, the possibility remains for them to contain waste material, particularly where industry generating these waste products were present nearby, including the quarries, mills, smithies and gas works historically located across the surrounding area.

The potential for contaminative made ground deposits being present at nearby off site locations is considered low to moderate due to the general development of the surrounding area, when waste generating industries are located nearby.

Indeed, imported material may have been used during the construction of the mill and lade, which bound the site to the north, allowing for the possibility of contamination sources to be brought adjacent to the site. It is considered, however, that the majority of developments across the area of Melrose are residential and non- commercial, with many gardens and green space throughout.

Current and Historical Operation (Site)

Small and localized fuel spills may have occurred at some time in the past through general maintenance activities on the garden grounds. Fertilizer, pesticides and herbicides may also have been used at some point, also through general maintenance activities on the garden grounds.

3.2.2 Pathways

The key pathways and receptors considered for the remainder of this section have been identified on the basis of current site use and that no remedial measures are to be undertaken (in order to determine the likely risks without remediation).

The future end use is to be residential. The principal exposure pathways pertinent to the site are considered to be:

- Exposure of site users to near-surface contamination, such as made ground, through ingestion, inhalation and dermal routes;
- Migration of contaminants into the Water Environment (incl. groundwater and surface waters);
- Uptake of contamination by plant roots; and
- Build- up of ground gases and vapours in buildings and structures.

3.2.3 Key Receptors

'Receptors' are defined in BS10175 as "*persons, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by the contaminant(s)*". Potential receptors at the site are given below.

Humans

Although considered unlikely, the occurrence of contamination within the underlying soils from past and/ or recent site use (such as from small fuel spills and the use of pesticides etc, for example), or within made ground deposits (if present) from past or recent material importation, has potential to cause harm to human health.

Based on the published geology, the migration of contamination, including ground gas, from off- site sources is considered to be unlikely due to the presence of low permeable soils beneath the site and immediately surrounding area, comprising Alluvium (cohesive dominant deposits) and Glacial Till deposits (boulder clay). Should more granular dominant deposits be present, however, a pathway for the migration of contamination, including ground gas, would be present.

The site is located within the lowest band of radon potential, whereby less than 1% of homes within the 1km grid square are above the Action Level. The risk associated with the build-up of radon gases is therefore considered low.

Surface Water

The closest SEPA monitored water courses to the site include the River Tweed (ID: 5202), which is located approximately 270m to the north and flows in a general west to east direction.

The River Tweed is classified by SEPA as having overall *Good* conditions, as well as being classified as a Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). Further details of the protection classifications is provided above in Section 2.1.7.

Other small water courses are located across the general surrounding area, however, these are not classified or monitored by SEPA. These minor water courses include the possible buried drain located along the northern boundary to the site.

The potential for contaminant migration (if present) from the site to the buried historical lade, is considered unknown due to the limited knowledge of its presence and development, and its proximity to the site.

Alternatively, the River Tweed is located at such distance (approximately 270m to the north) that the potential for contaminant migration (if present) from the site is considered unlikely.

In addition, and as noted above, the presence of a pathway for the migration of contaminants (if present) will depend on the soils beneath the site and immediately surrounding site. Based on the published geology, the likelihood of a pathway is considered unlikely due to the presence of low permeable soils beneath the site and immediately surrounding area. Should more granular dominant deposits be present, however, a pathway would be present.

Groundwater

The site is located within a Drinking Water Protection Zone. The Drinking water resources are identified as the Pebbles, Galashiels and Hawick aquifer and the Upper Tweeddale Sand and Gravel aquifer, both of which have an overall classification of *Good*.

The published geology indicates the prevailing ground conditions within the wider area to likely comprise Alluvium (cohesive dominant deposits) and Glacial Till (boulder clay), which are of low permeability and are unlikely to provide reasonable groundwater resource potential. These cohesive dominant soils also provide a low permeable cap over the underlying bedrock aquifer, therefore, reducing the potential for mobile pollutants (if present) to impact on deeper groundwater regimes. Should more granular dominant deposits be present, however, a pathway would be present.

Fauna and Vegetation (Ecology)

The River Tweed, approximately 270m to the north of the site, is classified as having overall *Good* conditions, and is located in an Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). This designated habitat is considered to be located at such a distance that the likelihood of a pathway being present is considered unlikely.

The closest SEPA recorded landfill is a Non- Hazardous landfill approximately 3.5km to the north west of the site, and is unlikely to have any impact on the present land quality, or any future development of the site.

The site is well kept with grass, trees, bushes and a private garden established in situ.

Buildings and Services

The site is being put forward for the potential development for residential purposes.

The chemistry of made ground deposits (if present) or natural superficial deposits may have long term implications for concrete foundations and the material construction of any buried drinking water supply pipes, due to the levels of sulphates within the ground conditions being unknown at the time of reporting.

The potential for the build-up of ground gas is considered unlikely given the presence of low permeable soils beneath the site and immediately surrounding area, comprising Alluvium (cohesive dominant deposits) and Glacial Till deposits (boulder clay). Should more granular dominant deposits be present, however, a pathway for the migration of contamination, including ground gas, would be present.

3.3 Qualitative Phase I Environmental Risk Assessment

Table 3.2 and **Table 3.3** below summarise the likely significance of the potential contamination sources identified at the site in relation to their respective environmental receptors in its current condition and future potential residential development (without remedial measures or works being undertaken). The qualitative risk determinations have been made in accordance with UK best practice and UK Guidance on risk assessment.

On the basis of the conceptual site model, together with the (conceptual) Phase I risk assessment, an overall risk rating of ***Low*** has emerged in relation to the potential for a pollutant linkage and risk of harm to human health and the water environment for the current and future site use.

3.3.1 Environmental Comment

The overall environmental risk rating of ***Low*** has emerged for current and future site use from conservative review of the likely potential for contamination source and an associated pollutant linkage being present.

On this basis, the site would not be considered a *Part IIa site* within the assessment framework of the Contaminated Land Act 1990.

At this time, the likelihood for contamination is considered unlikely but remains uncertain, mainly due to lack of site-specific ground investigations and the uncertainty associated with the composition and character of foundation soils present in situ.

Table 3.2: Initial Phase I Conceptual Site Model (Current and Continued Site Use)

Source	Potential Pathways	Receptors (with respective pathways)	Potential severity of pollutant linkage [a]	Probability of pollutant linkage occurring [b]	Risk Classification [c]	Estimated Overall Risk [d]
Potentially contaminated soils Made ground present in situ and ex- situ (adjacent sites) and potentially contaminated from past activities, including, waste quarry material, localised leaks and spills of chemicals and hydrocarbons, and the use of pesticides, herbicides and fertilisers.	1. Dermal contact 2. Inhalation of dust/gases 3. Ingestion of contaminated soils 4. Ingestion of contaminated waters 5. Leaching/migration of contaminants to groundwater 6. Leaching/migration of contaminants to surface water 7. Surface water run-off 8. Surface contact to buildings/building services 9. Plant uptake 10. Migration of ground gases/vapours 11. Build- up of ground gas/vapour in structures	Current Site Users (1,2,3)	Mild	Low	Low	**Low**
		Adjacent land/adjacent land uses (2,3,6)	Mild	Unlikely	Very Low	
		Groundwater (5,7)	Medium	Unlikely	Low	
		Surface Water (6,7)	Medium	Unlikely	Low	
		Flora and Fauna (9)	Mild	Low	Low	
		Buildings and Structures (8)	Minor	Unlikely	Very Low	
Potentially contaminated waters Groundwater from neighbouring sites, past known and unrecorded industry, localised leaks and spills of hydrocarbons in situ, and the use of pesticides, herbicides and fertilisers.		Current Site Users (1,2, 4)	Mild	Low	Low	**Low**
		Groundwater (5,7)	Medium	Unlikely	Low	
		Surface Water (6,7)	Medium	Unlikely	Low	
Ground Gas Unknown levels of methane, carbon dioxide, hydrocarbon and organic vapours, reduced levels of oxygen		Current Site Users (2)	Medium	Unlikely	Low	**Low**
		Adjacent land/adjacent land uses (2,10,11)	Medium	Unlikely	Low	
		Buildings and Structures (11)	Medium	Unlikely	Low	

(a) Classification of potential severity taken from Table 6.3 in CIRIA C552, Contaminated Land Risk Assessment, A guide to good practice (Severity:- Minor, Mild, Medium, Severe)

(b) Classification of probability taken from Table 6.4 in CIRIA C552, Contaminated Land Risk Assessment, A guide to good practice (Probability:- Unlikely, Low, Likely, High)

(c) Risk Classification is a comparison of the potential severity of the pollutant linkage and the probability of the linkage occurring, taken from Table 6.5 in CIRIA C552, Contaminated Land Risk Assessment - a guide to good practice

(d) The Estimated Overall Risk is the highest risk classification associated with a particular source.

Table 3.3: Initial Phase I Conceptual Site Model (Potential residential development - Future Reuse)

Source	Potential Pathways	Receptors (with respective pathways)	Potential severity of pollutant linkage [a]	Probability of pollutant linkage occurring [b]	Risk Classification [c]	Estimated Overall Risk [d]
Potentially contaminated soils Made ground present in situ and ex- situ (adjacent sites) and potentially contaminated from past activities, including, waste quarry material, localised leaks and spills of chemicals and hydrocarbons, and the use of pesticides, herbicides and fertilisers.	1. Dermal contact 2. Inhalation of dust/gases 3. Ingestion of contaminated soils 4. Ingestion of contaminated waters 5. Leaching/migration of contaminants to groundwater 6. Leaching/migration of contaminants to surface water 7. Surface water run-off 8. Surface contact to buildings/building services 9. Plant uptake 10. Migration of ground gases/vapours 11. Build- up of ground gas/vapour in structures	Future Site Users (1,2,3)	Mild	Low	Low	**Low**
		Adjacent land/adjacent land uses (2,3,6)	Mild	Unlikely	Very Low	
		Groundwater (5,7)	Medium	Unlikely	Low	
		Surface Water (6,7)	Medium	Unlikely	Low	
		Flora and Fauna (9)	Mild	Low	Low	
		Buildings and Structures (8)	Minor	Unlikely	Very Low	
Potentially contaminated waters Groundwater from neighbouring sites, past known and unrecorded industry, localised leaks and spills of hydrocarbons in situ, and the use of pesticides, herbicides and fertilisers.		Future Site Users (1,2, 4)	Mild	Low	Low	**Low**
		Groundwater (5,7)	Medium	Unlikely	Low	
		Surface Water (6,7)	Medium	Unlikely	Low	
Ground Gas Unknown levels of methane, carbon dioxide, hydrocarbon and organic vapours, reduced levels of oxygen		Future Site Users (2)	Medium	Unlikely	Low	**Low**
		Adjacent land/adjacent land uses (2,10,11)	Medium	Unlikely	Low	
		Buildings and Structures (11)	Medium	Unlikely	Low	

(a) Classification of potential severity taken from Table 6.3 in CIRIA C552, Contaminated Land Risk Assessment, A guide to good practice (Severity:- Minor, Mild, Medium, Severe)

(b) Classification of probability taken from Table 6.4 in CIRIA C552, Contaminated Land Risk Assessment, A guide to good practice (Probability:- Unlikely, Low, Likely, High)

(c) Risk Classification is a comparison of the potential severity of the pollutant linkage and the probability of the linkage occurring, taken from Table 6.5 in CIRIA C552, Contaminated Land Risk Assessment - a guide to good practice

(d) The Estimated Overall Risk is the highest risk classification associated with a particular source.

4. Environmental Considerations

Following the review of available online sources, several environmental constraints were identified for the site, and which will require consultation with local authorities (Scottish Borders Council, SEPA and SNH). During these consultations it is likely to become apparent that any future developments on site will need to comply with a number of environmentally sensitive criteria, such as the buildings materials used and the height of any future developments.

These environmental constraints include the designation of the site and wider area as being within a Conservation Area (Melrose), a Natural Heritage Zone (No.16), a Zone of Natural Heritage Sensitivity (ID. 2337), an Environmentally Sensitive Area (Central Borders), a National Scenic Area (Eildon and Leaderfoot).

In addition, the eastern extent of the site and the land bounding the site to the north are included within the Scheduled Monument designation boundary for the nearby Melrose Abbey.

A number of listed buildings, Canmore Sites, Historic Environment Records, licensed sites and registered woodlands are located across the general area of Melrose and the wider area. None are located within the site boundaries, however, and any future development works are unlikely to have a detrimental impact on these sites. Constraints to the future development of the site may be implemented, however, due to the close proximity of these listed buildings, such as the buildings materials used and the height of any future developments.

The River Tweed, approximately 270m to the north of the site, is classified as having overall *Good* conditions, and be located in an Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). Given the distance between the site and the river, it is considered unlikely that any future development works at the site would have a detrimental impact on this designated surface water course.

Finally, the closest SEPA recorded landfill is a Non- Hazardous landfill approximately 3.5km to the north west of the site. Given the distance to the site, however, this landfill is not likely to have an impact of the site or any future development works.

5. Conclusions and Recommendations

From Phase I background review of the site, together with preparation of the conceptual site model and environmental risk assessment the following main conclusions associated with the redevelopment of the site have emerged.

1. The risk associated with historical or present-day coal mining is considered *Very Low*, and as a result, no further action is warranted here.
2. The risk associated with historical or present-day mining of materials other than coal is considered *Low*, and as a result, no further action is warranted here.
3. The risk associated with Radon Potential is considered *Low*, and as a result, no further action is warranted here.
4. The overall risk of UXOs affecting the proposed development of the site is considered to be *Low*, and as a result, no further action is warranted here.
5. The site is located within a Drinking Water Protection Zone, however, a pathway to these deeper groundwater regimes is not considered to be present due to the likely presence of low permeable (cohesive) soils across the site. Should granular deposits be located at the site, however, a pathway will be present.
6. The River Tweed, approximately 270m to the north of the site, is classified as having overall *Good* conditions, an Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). Given the distance and the likely presence of low permeable soils across the site, no pathway between the site and the designated surface water course is considered to be present.
7. Associated with the River Tweed, the site has a low to medium risk of flooding. Small and localised areas of surface water flooding are identified across the wider surrounding area. No risk associated with groundwater flooding is identified for the site or surrounding area. Given the proximity and limited information regarding the presence and development of the historical lade, that bounds the site to the north, a flooding risk associated with this potential water course is highlighted. Future flood risk assessments for the site should include the potential of flooding from all neighbouring water courses, including the historical lade, and nearby surface- water flooding.
8. Following our review of available online sources, several environmental constraints were identified for the site, and which will require consultation with local authorities (Scottish Borders Council, SEPA and SNH).
9. Environmental Risk Assessment for the site determined a ***Low*** risk of contamination source and an associated pollutant linkage to Human Health and the Water Environment associated with the historical and current site use, and proposed future development.
10. The site would not be considered a *Part IIa Site* within the assessment framework of the Contaminated Land Act 1990.
11. The level of environmental risk rating to emerge was concluded from a review of published information for the site.
12. The site is Greenfield, consisting of the undeveloped garden grounds of Harmony Hall House.
13. The surrounding area has been subjected to localised historical mineral extraction (non- coal) and industrial works, and extensive urban development. An extensive transport network is also present across the surrounding area and consists of road and rail canal networks.
14. A substantial depth of made ground deposits is not considered likely to be present across the site. Localised and shallow occurrences of made ground may be present, however.

Appendix A

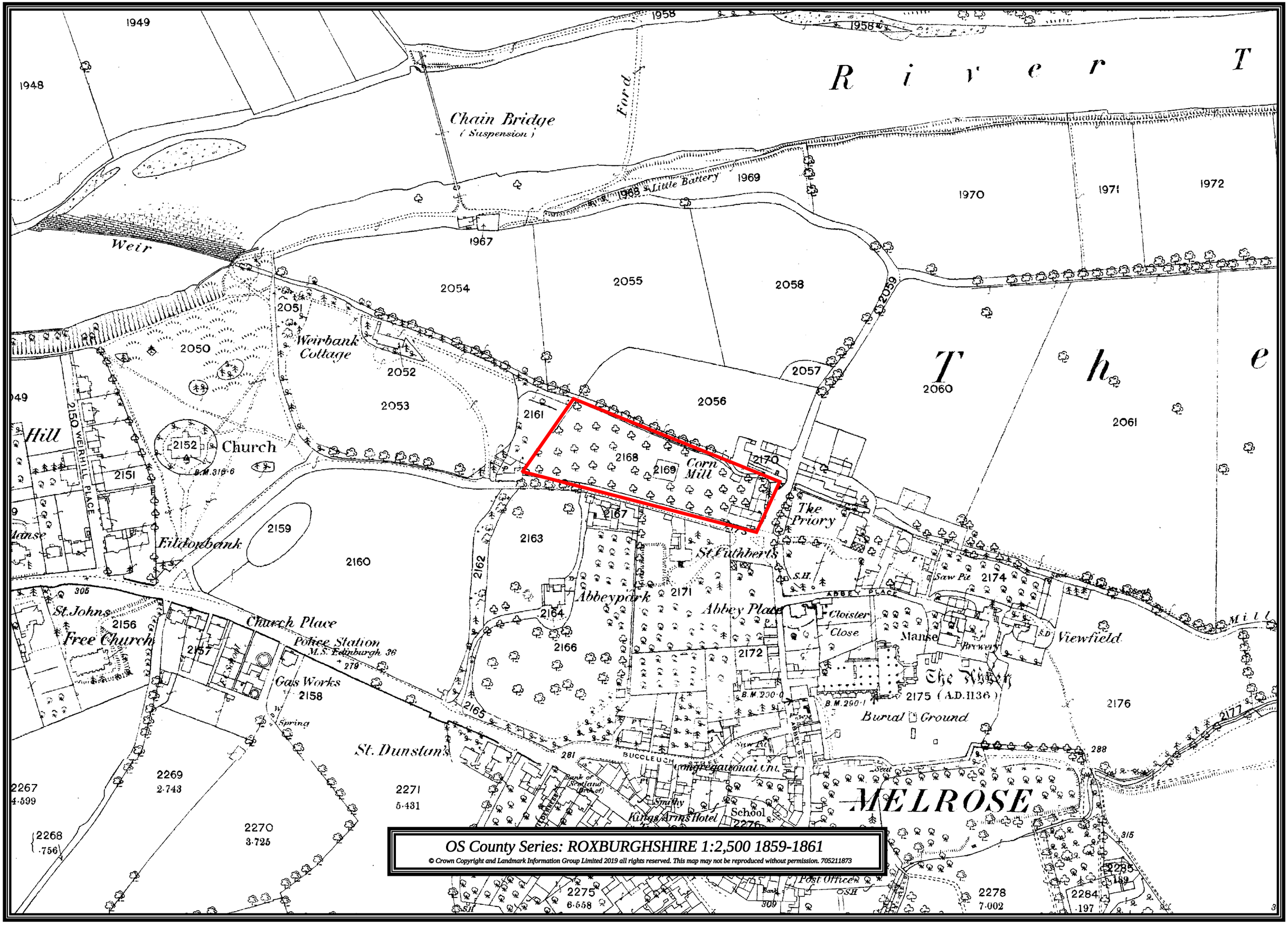
Appendix A: Site Location Plans

Figure A1. Site Location Plan. Site identified by red outline.

Figure A2. Wider Site Location Plan. Site identified by grey pin.

Appendix B

Appendix B: Selected Historical Ordnance Survey (OS) Maps



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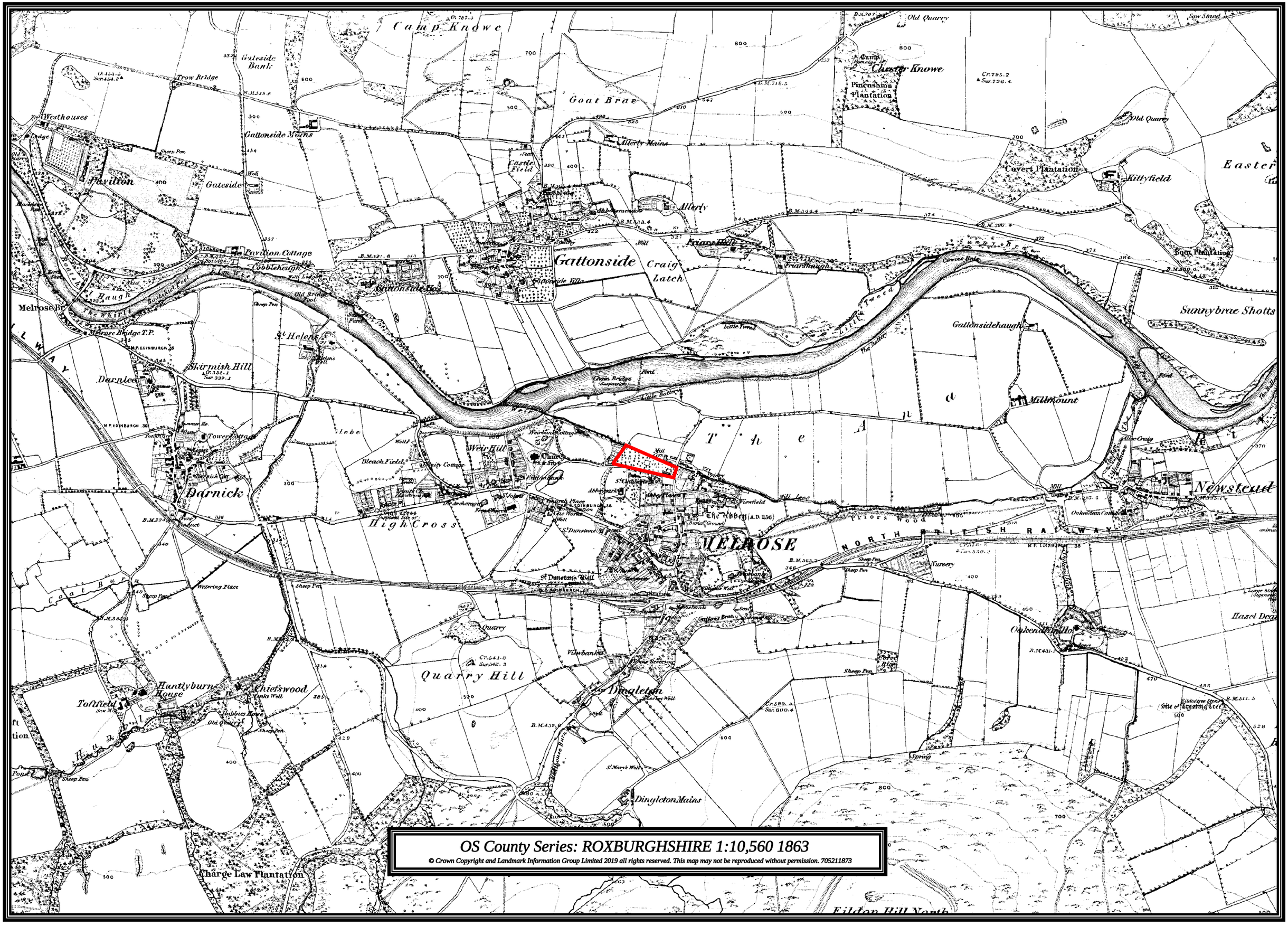
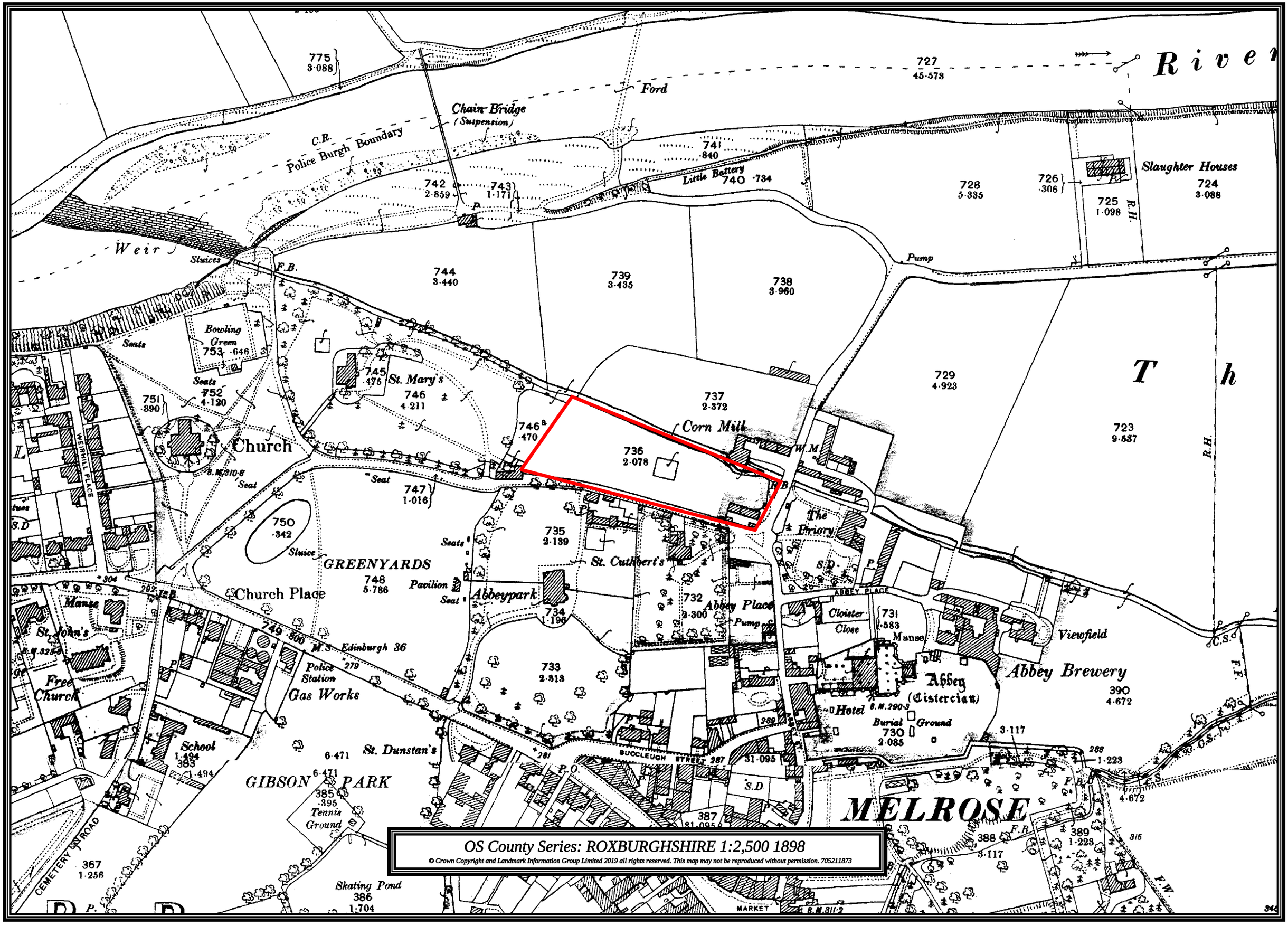
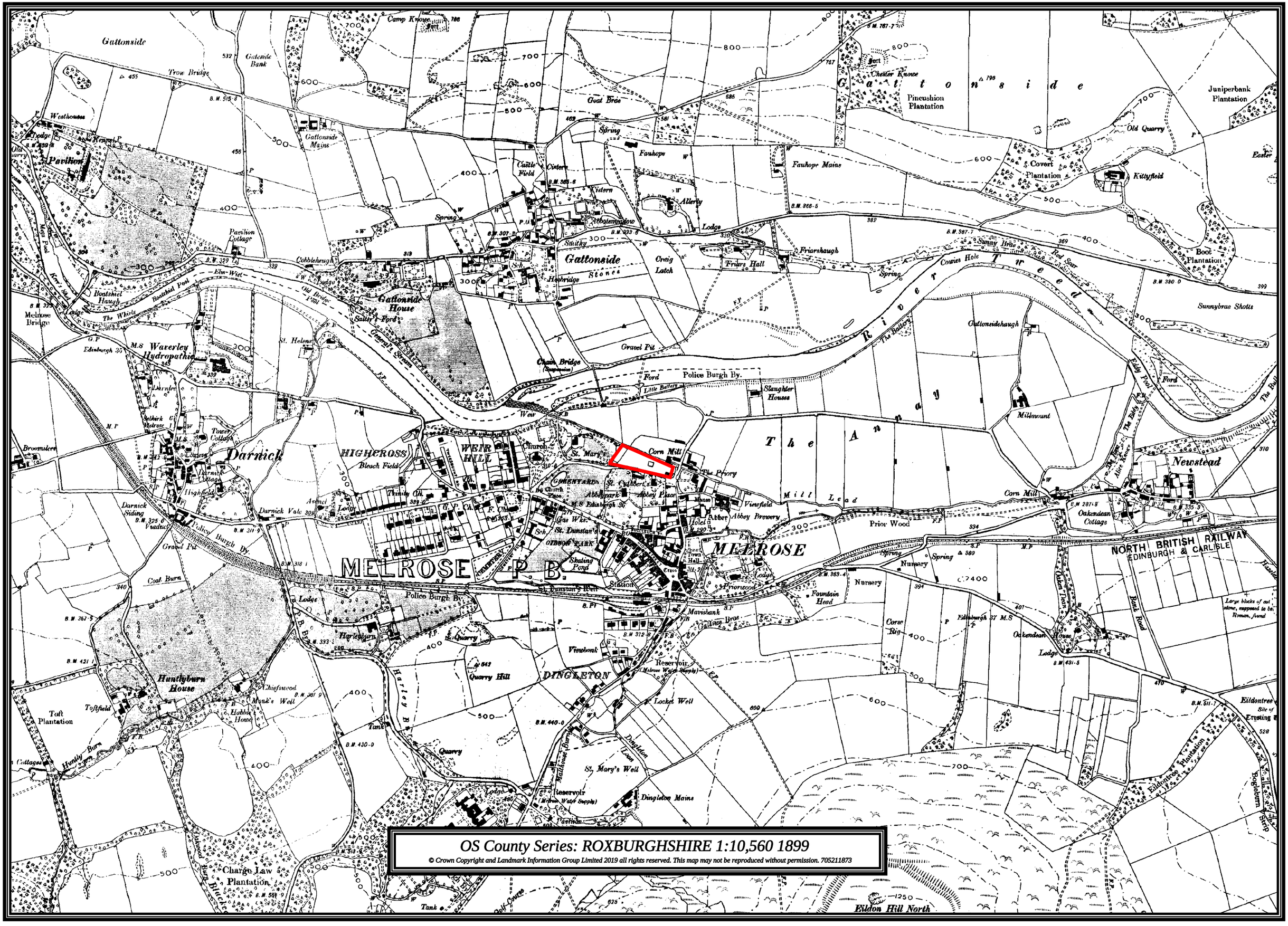
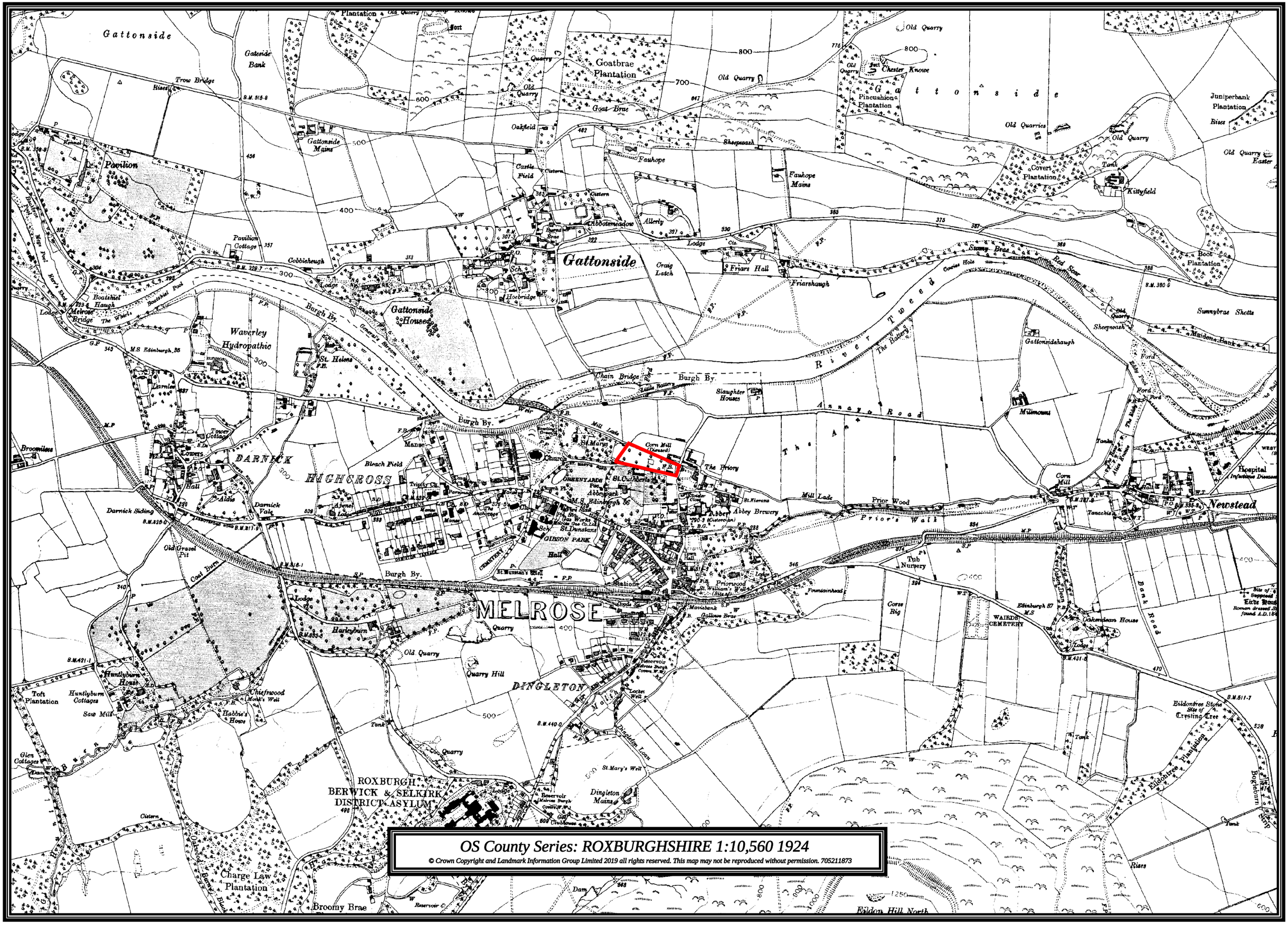




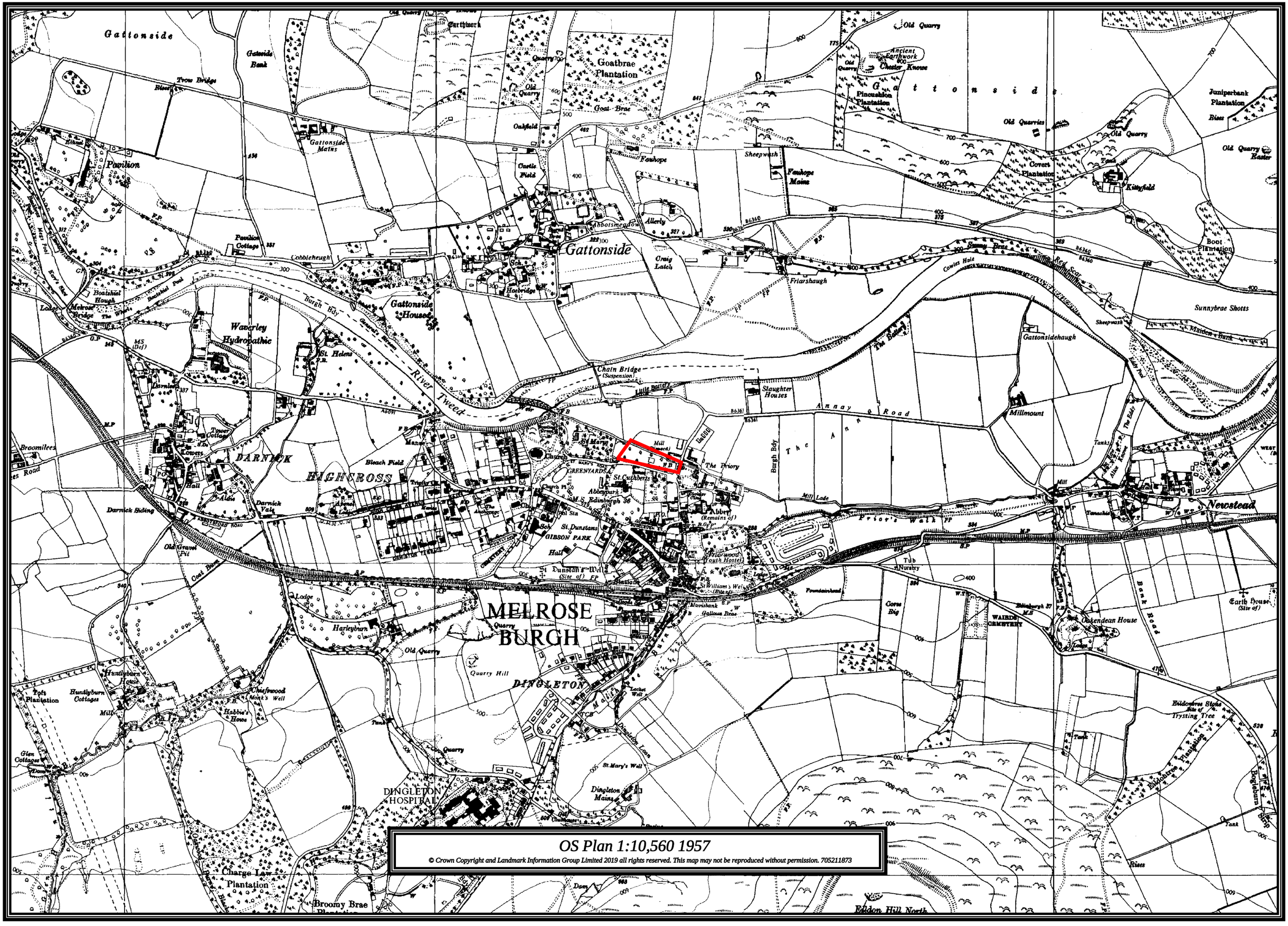
OS County Series: ROXBURGHSHIRE 1:2,500 1898



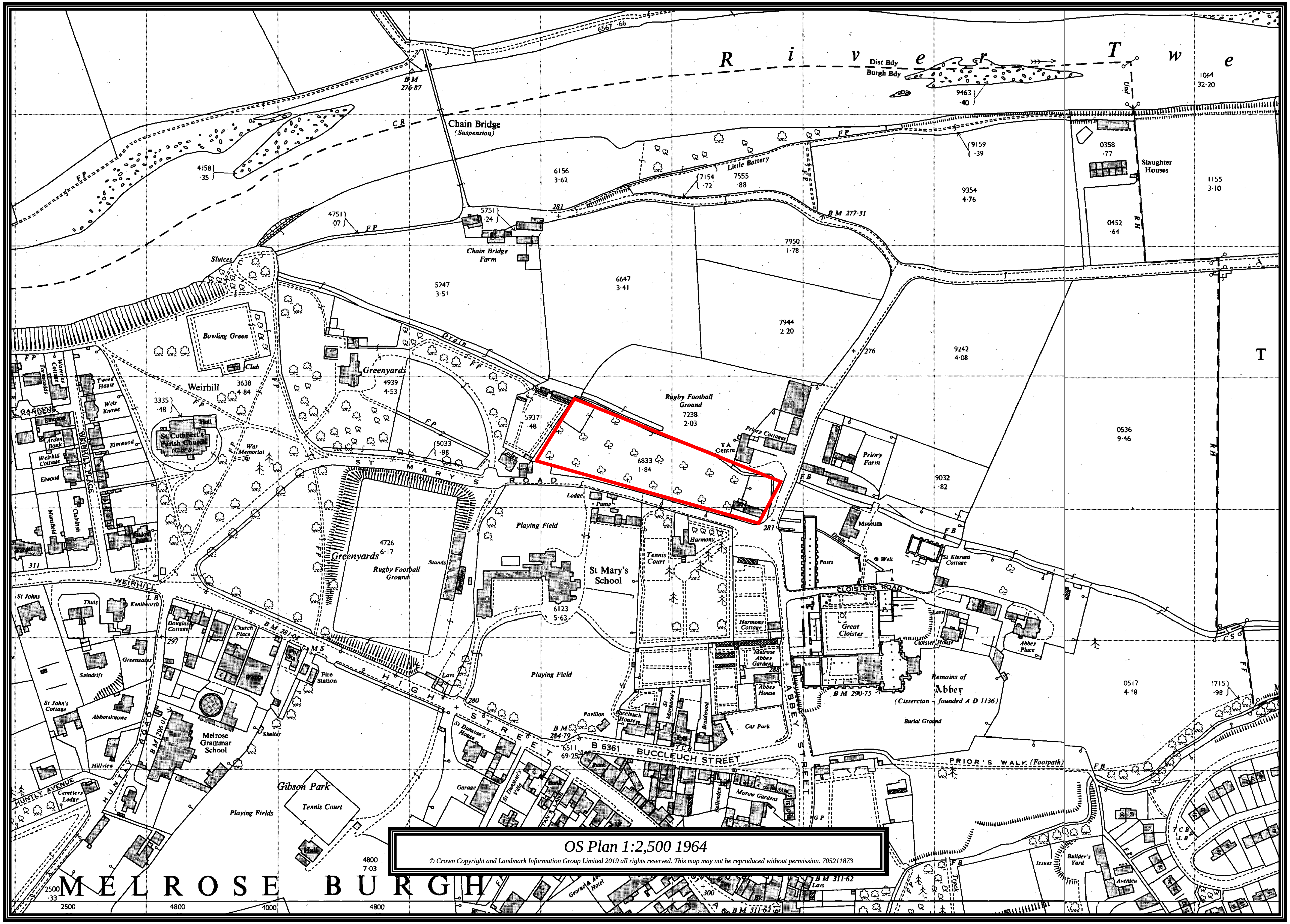
OS County Series: ROXBURGHSHIRE 1:2,500 1921



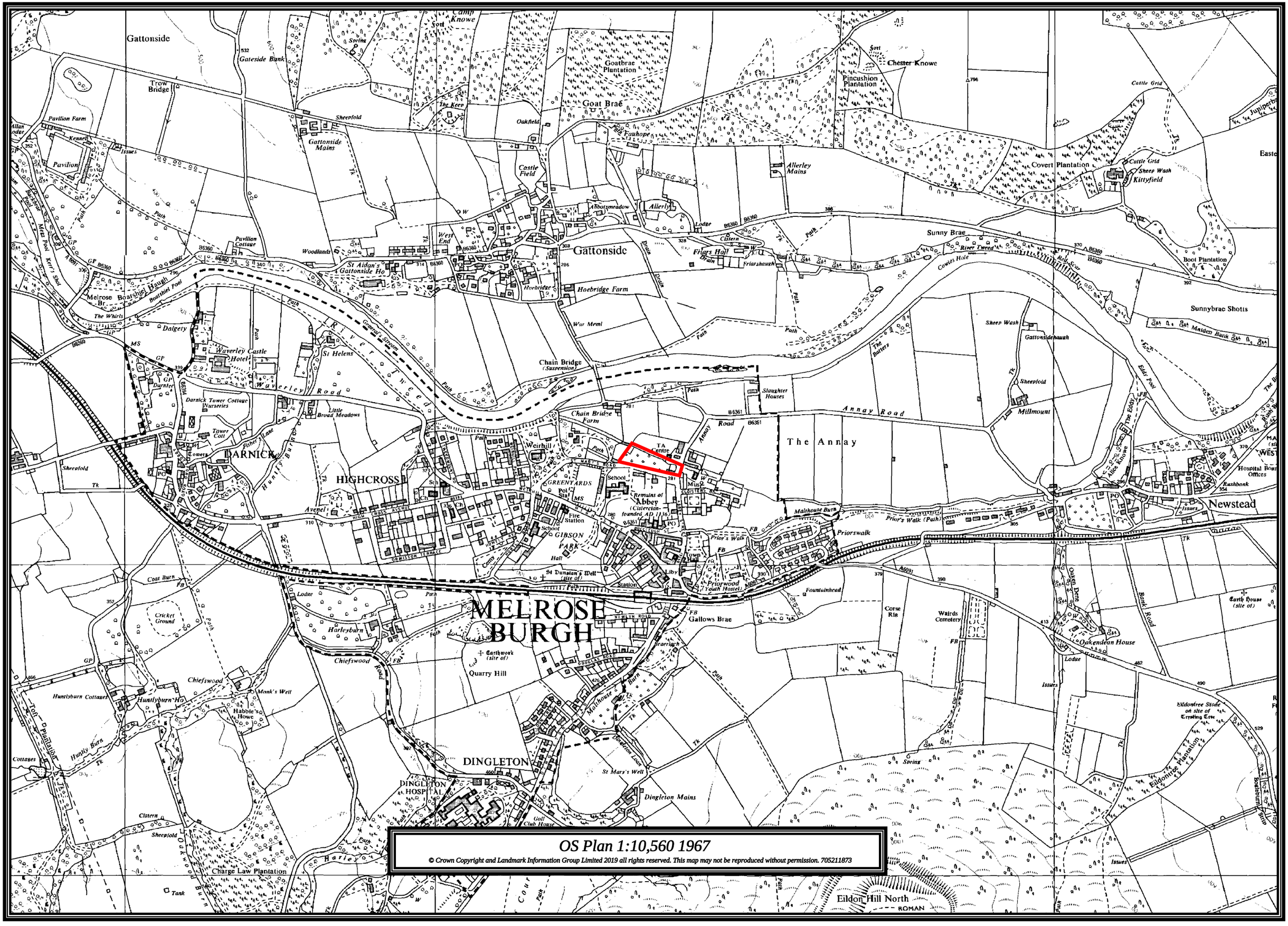
OS County Series: ROXBURGHSHIRE 1:10,560 1924



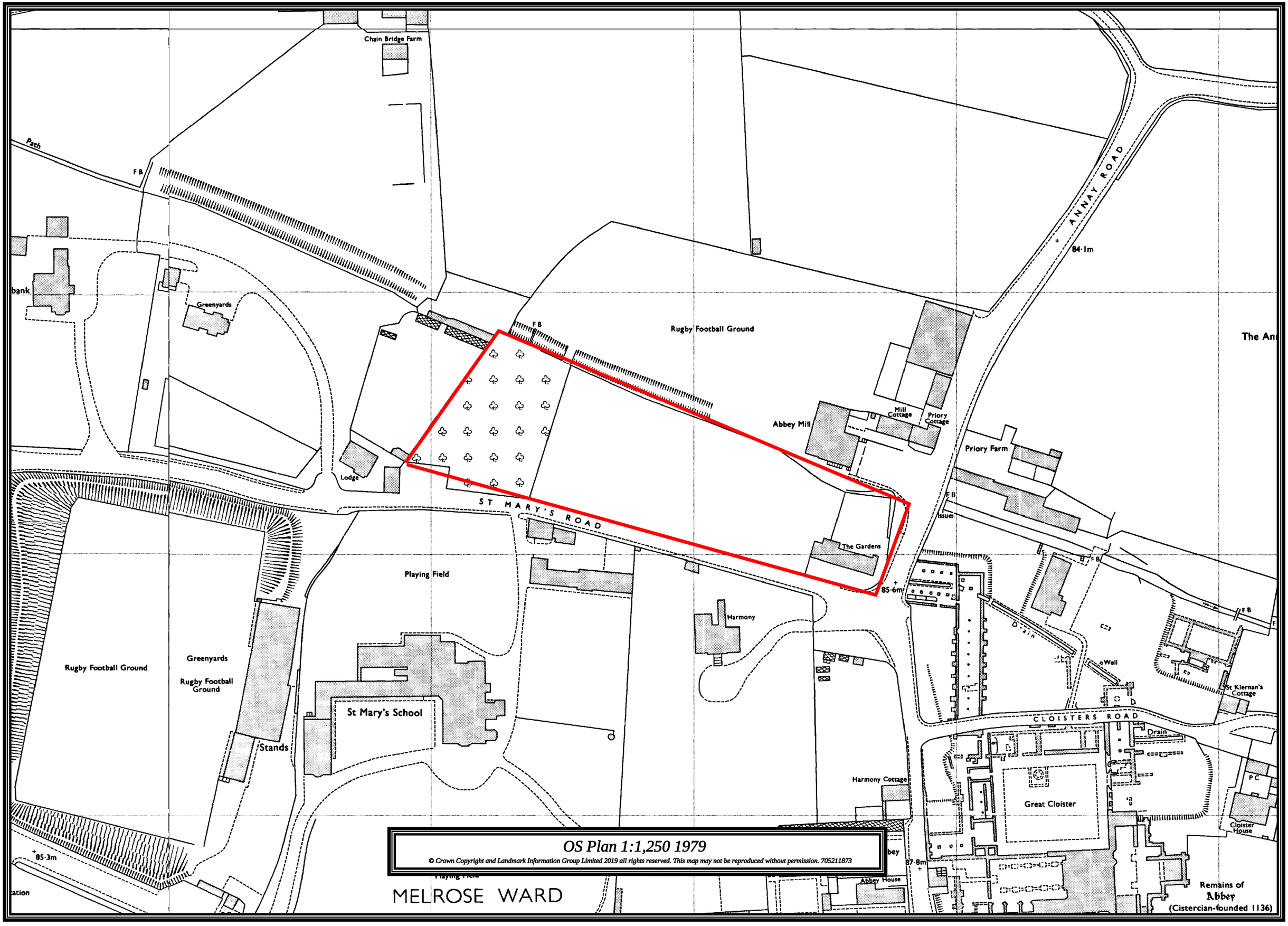
OS Plan 1:10,560 1957


River Tweed
Dist Bdy
Burgh Bdy
Chain Bridge
(Suspension)
Little Battery
Chain Bridge Farm
Sluices
Bowling Green
Club
Weirhill
Greenyards
Tweed House
Weir Knowe
St Cuthbert's Parish Church (C of S)
Hall
War Memorial
Elmwood
Elwood
St Mary's Road
Rugby Football Ground
Priory Cottages
TA Centre
Priory Farm
Museum
Playing Field
St Mary's School
Harmony
Tennis Court
Lodge
Pump
Stands
Pavilion
Cloisters Road
Great Cloister
St Kierans Cottage
Cloister House
Abbey Place
Remains of Abbey
(Cistercian - founded A D 1136)
Burial Ground
Harmony Cottage
Melrose Abbey Gardens
Abbey House
Car Park
Abbey Street
Buccleuch Street
B 6361
High Street
Prior's Walk (Footpath)
Slaughter Houses
Weirhill
St Johns
Thuis
Kenilworth
Douglas Cottage
Church Place
Works
Fire Station
Greengates
Spindrift
St John's Cottage
Abbotsknowe
Melrose Grammar School
Shelter
Hillview
Huntly Avenue
Cemetery Lodge
Gibson Park
Tennis Court
Playing Fields
Hall
St Dunstan's House
St Dunstan's Villa
Garage
Bank
Buccleuch House
Braidwood
Morow Gardens
Issues
Builder's Yard
Avenlea
MELROSE BURGH

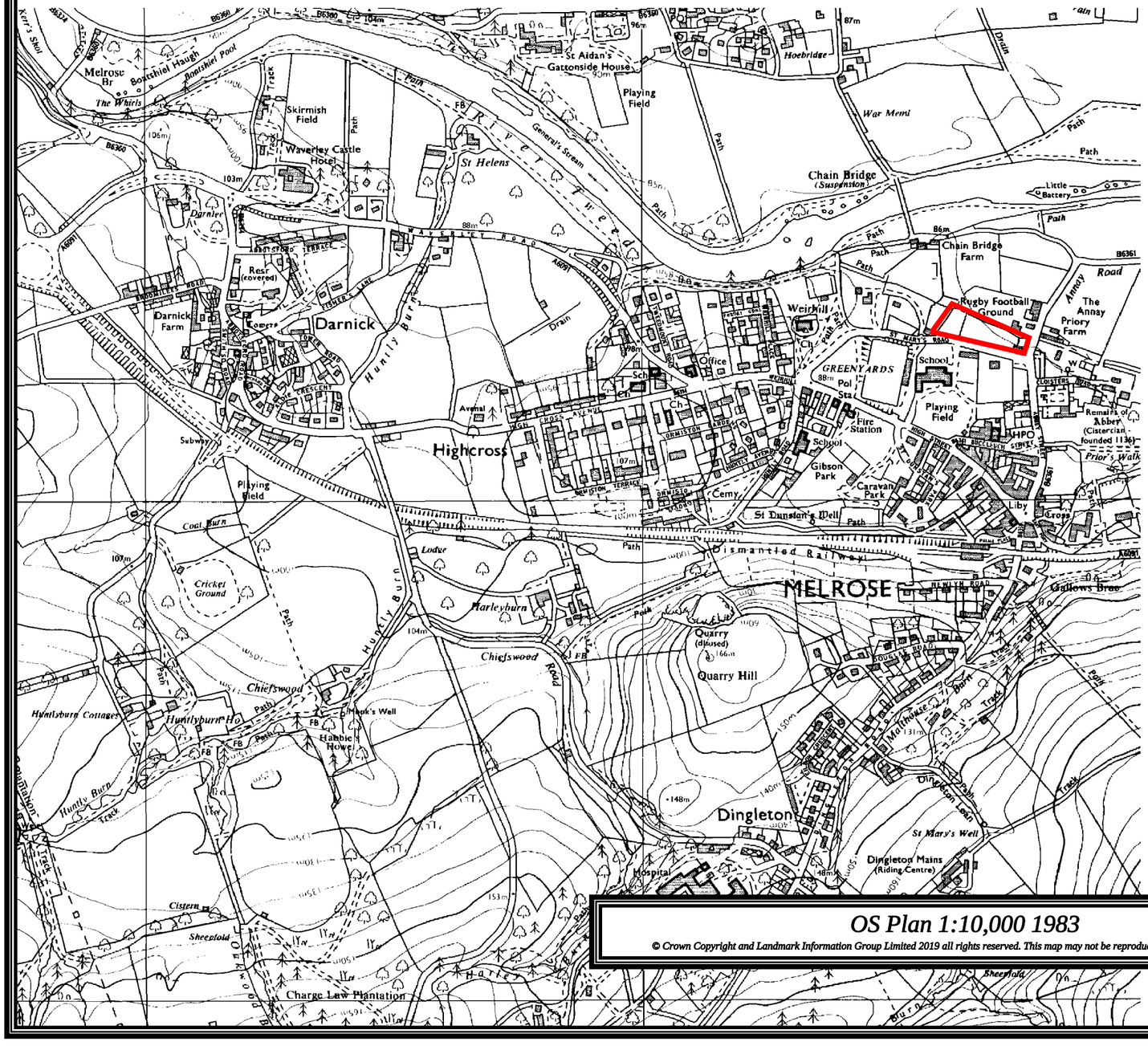
OS Plan 1:2,500 1964



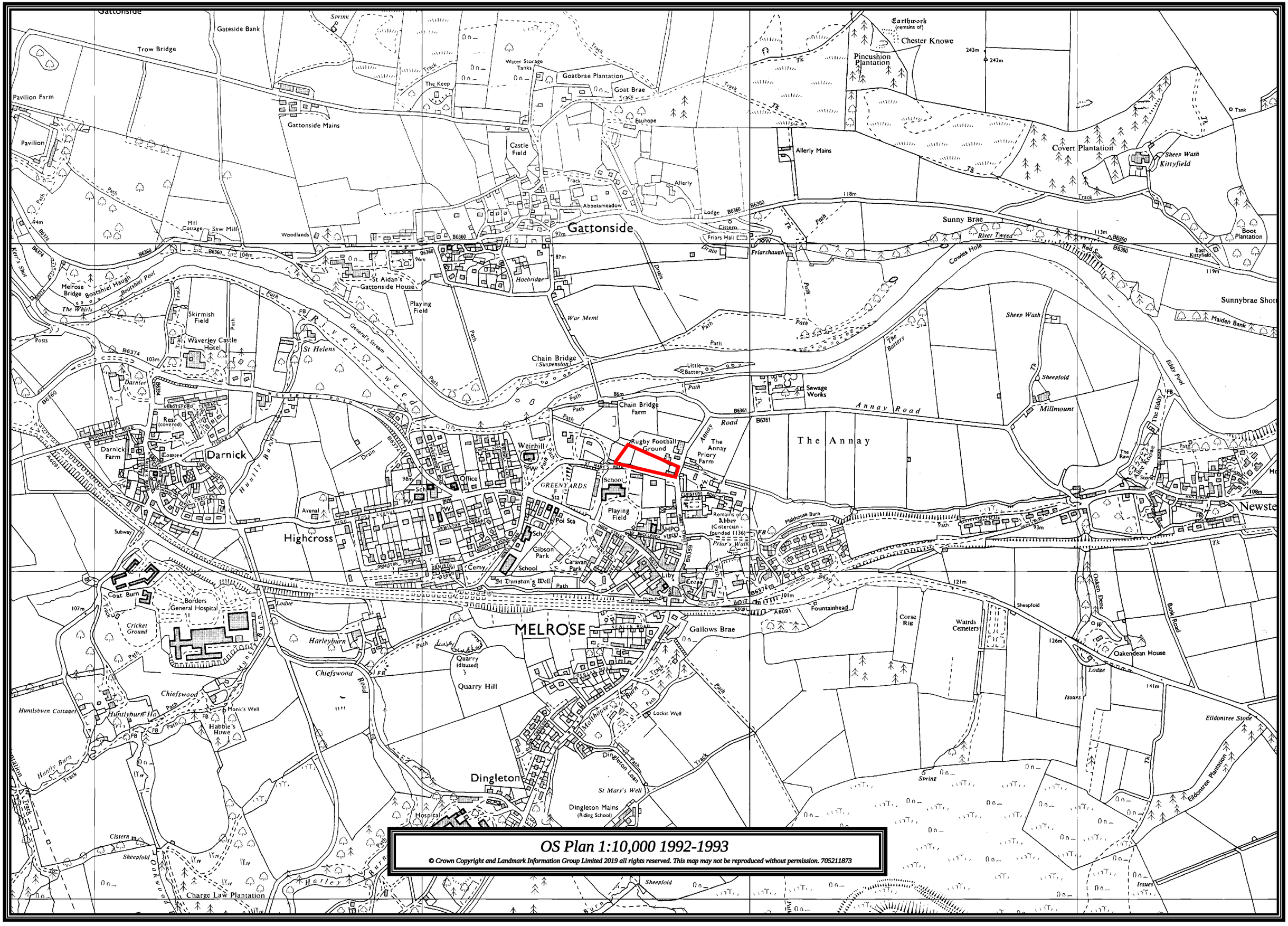
OS Plan 1:10,560 1967



OS Plan 1:1,250 1979



OS Plan 1:10,000 1983



OS Plan 1:10,000 1992-1993

Appendix C

Appendix C: Selected Historical BGS Borehole Records

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
Percussion shell & Auger 150mm Diam.	291·519	As Per Drawing	1

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon W20		Vertical	Fire Station - Melrose

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV. % & A.M. LEVEL	R.Q.D.	CORE RECOV. % & SIZE	DEPTH	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
					1.2m	Hard Ash and Clay FILL	290·319	
D 1.3m	30.12.76	▼	U 4 1.5m (25)		2.2m	Stiff light brown Clay, traces of Silt and Organic Matter	289·319	
D 2.5m W			U 4 3.0m		3.0m	Stiff blue/grey Sandy Silty Clay	288·519	
	29.12.76	▽	(13)		3.6m	Soft blue/grey Sandy Silty Clay	287·919	
D 4.0m			U 4" 4.5m (Sank)		4.9m	Very soft blue/grey silty Clay	286·619	
D 5.5m D 7.0m	29.12.76		C.P.T. 6.0m (18) C.P.T. 7.5m (24)		8.0m	Medium Dense Sand and Gravel with some Cobbles	283·519	
D 8.5m	30.12.76	8.5m	C.P.T. (34)		9.0m	Dense Sand and Gravel with some Cobbles	282·519	
						Borehole Complete		

KEY
U4 4in dia Undisturbed sample
U1½ 1½in dia " "
D Disturbed sample
BD Bulk Disturbed sample
W Water sample
Sample not recovered

2 - day
V - ground water depth first encountered
▼ morning water level
② - rate of penetration (mm/min)

SPT Standard penetration test
CPT Cone penetration test
No. in brackets is no. of blows for 12in. penetration

Ground water struck at 3.6m rapid rise to 2.8m then steady over ½ hr.observ.

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(STD 0896-84-465)

CLIENT
Lothian Regional Council
Edinburgh

REF
RG/12/76

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO
Percussion Shell & Auger 150mm diam.	291.422	AS Per Drawing	2

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon W20		Vertical	Fire Station - Melrose

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV % & SAM LEVEL	RQD	CORE RECOV % & SIZE	DESCRIPTION OF STRATA	OD LEVEL	SYMBOLIC LOG
					PIT	290.422	
			U 4 1.5m		1.0m CONCRETE BASE 1.15m		
		31.12.76 (15)			Firm blue/grey Silty Clay		
D 2.5m W							
		30.12.76				287.922	
30.12.76					3.5m Very soft blue/grey Silty Clay		
D 4.0m			C.P.T. 4.5m		4.0m	287.422	
			(27) C.P.T. 6.0m		Medium dense Sand and Gravel with some Cobbles	285.422	
D 6.0m					6.0m		
31.12.76			(39)		Dense Sand and Gravel with some Cobbles 6.5m	284.922	
					Borehole Complete		

KEY

U1 Undisturbed sample
U1g Undisturbed sample
D Disturbed sample
BD Bulk Disturbed sample
W Water sample
* Sample not recovered

2 day
▽ - ground water depth first encountered
▼ - morning water level
② - rate of penetration (min/min)

SPT Standard penetration test
CPT Cone penetration test
Nos in brackets as no. of blows for 12in. penetration

Ground water struck at 3.5m rapid rise to 2.8m steady over ½ hr. observation

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CLIENT: Lothian Regional Council Edinburgh

REF: RG/12/76

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
Percussion shell and Auger 150mm diam.	291·446	As Per Drawing	3

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon W 20		Vertical	Fire Station - Melrose

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV. % & R.L. LEVEL	RQD %	CORE RECOV. % & SIZE	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
D 1.0m W	5.1.77		U 4 1.5m		Hard Ash Clay etc. FILL		
					1.3m	290 ·146	
D 2.0m			(10) U 4 3.0m		Very loose Ash and Clay FILL. Distinct odour of gas from this strata		
					3.0m	288 ·446	
D 3.5m			(5) C.P.T. 4.5m		Soft blue/grey Sandy Silty Clay		
					3.7m	287 ·746	
D 5.0m			(15) C.P.T. 6.0m		Medium dense Sand and Gravel with some Cobbles		
D 7.0m			(28) C.P.T. 7.5m (31)				
					8.0m	283 ·446	
					Borehole Complete		

KEY

U4 4" dia. thin walled sample
U6 6" dia. " "
D Disturbed sample
BD Bulk disturbed sample
W Water sample
* Sample not recovered

2 day
▽ - ground water depth first encountered
▼ - morning water level
(2) - rate of penetration (mm/min)

SPT Standard penetration test
CPT Cone penetration test
Nos in brackets is no. of blows for 12" penetration

Ground water struck at 1.3m steady.

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CLIENT: Lothian Regional Council Edinburgh

REF: RG/12/76

Project :- Melrose Fire Station

Client :- Scottish Borders Council

Drilling Method & Size: Competitor 130 101

Co-ordinates: East / North

Orientation :- Vertical

Date Drilled: 23.06.00

GROUND WATER LEVELS	SAMPLES TYPE	SAMPLES DEPTH m	IN-SITU TESTING SPT CPT BLOWS	ROD %	TCR %	SCR %	DESCRIPTION OF STRATA (GROUND LEVEL :- mOD)	DEPTH	ORD. DATUM LEVEL mO.D.	SYMBOLIC LEGEND
	U80	0.2 1.0					Asphalt wearing and base courses - MADE GROUND	(0.150) 0.15	-0.15	
							Dense brownish grey fine gravel to small cobble grade crushed Concrete - MADE GROUND	(0.450) 0.6	-0.60	
							Medium dense black oily fine to coarse ash Sand - MADE GROUND	(0.100) 0.7	-0.70	
	D SPT U80	1.0 2.0 1.0 1.0 1.0	18				Soft light brown slightly sandy gravelly CLAY (gravel is medium to coarse and subrounded to rounded)	(0.300) 1.0	-1.00	
	D SPT U80	2.0 3.0 2.0 2.0 2.0	48				Firm becoming stiff with depth light brown mottled orange brown and grey slightly sandy SILT with widely spaced lenses of dark blue / black oily fine to medium sand. Strong oil and sulphur smell from sand lenses.	(1.300) 2.3	-2.30	
	D SPT U80	3.0 4.0 3.0 3.0 3.0	SC FOR 150MM				Firm, very soft between 2.7 - 2.8m, light brown mottled orange brown sandy gravelly CLAY with many angular cobbles. Black oil / tar contamination noted throughout stratum in small pockets and thin lenses, strong oil and sulphur smell throughout.	(1.500) 3.8	-3.80	
3.6	D SPT	4.0 4.0	SC FOR 265MM				Very dense dark grey stained blue slightly silty sandy fine to coarse subrounded to rounded GRAVEL with many cobbles. Strong oil and sulphur smell from stratum, groundwater has blue oily sheen.	(0.700) 4.5	-4.50	

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WINSTON ROAD
GALASHIELS
Phone:- 01896 752295
Fax :- 01896 751515

Remarks :-
Hand excavated trial pit GL - 0.3m
Groundwater level encountered at 3.8m, rising to 3.0m over 5mins
Unable to penetrate very dense gravel, borehole abandonned at 4.5m
Borehole backfilled with bentonite grout

BOREHOLE No A

Sheet No :- 1
No of Sheets :- 1

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
PERCUSSION SHELL & AUGER. 200mm Diam. Rotary Core Drilling	103.40	As per drawing A6091/1/59/06	19

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon W20 Pilcon W MK II	NMX Water Flush	VERTICAL	MELROSE BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV. % & A M LEVEL	R.Q.D	CORE RECOV % & SIZE	Depth	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
					0.4m	HARDCORE & ASH FILL (RAIL BALLAST)		
D1.0m			U4 1.5m (35)		2.8m	STIFF REDDISH/BROWN BOULDER CLAY SOME TRACES OF SAND	100.60	
D2.8m			CPT 3.0m (11)		3.5m	[illegible] GRAVEL & COBBLES WITH CLAYEY MATRIX.	99.90	
D4.0m			U4 4.5m (30)		5.8m	STIFF/[illegible] BROWN BOULDER CLAY. TRACES OF SAND	97.60	
D5.8m D6.0m			U4 6.0m		6.0m	Loose gravel & Cobbles Grey Brown Clay	97.40	
D6.5m			(36)		7.0m	FIRM STIFF RED BROWN BOULDER CLAY	96.40	
			SPT 7.5m (55)		8.6m	COMPLETELY [illegible] GREY SILTSTONE & SANDSTONE WITH BANDS OF HARD CLAY	94.80	

KEY:
U4 - 4in dia Undisturbed sample
U1½ - 1½in dia " "
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
* - Sample not recovered

2 - day
▽ - ground water depth first encountered
▼ - standing water level
② - rate of penetration (mm/min)

S( ) - Standard penetration test
C( ) - Cone penetration test
No. in brackets is no. of blows for 12in penetration

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REF. BRC/9/77

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
PERCUSSION CHELL & AUGER 200mm Diam. Rotary Core Drilling		As per Drawing	19 Cont'd

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon .20 Pilcon N NK	Water Flush	VERTICAL	MELROSE BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER LEVEL & & AM	RQD	CORE RECOV % & SIZE	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
Rotary Core Drilling		5/5		9	LIGHT GREY MEDIUM TO FINE GRAINED SANDSTONE WITH STRINGER AND VEINS OF QUARTZ. [illegible]		
				10	MEDIUM WEATHERED JOINTING 30°/60° to 30°/30° vertical jointing at 10.9m to 11.1m also at 11.7m to 12.2m		
				11	Heavily Fractured 9.6m to 10.5m		
				12	BAND OF DARK GREY SILTSTONE 9.15m to [illegible]. Highly Fractured, Mechanically Weathered		
				13	13.4m	90.00	
				14			

KEY

U4 - 4in dia Undisturbed sample
U1½ - 1½in dia " "
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
* - Sample not recovered

② - day
▽ - ground-water depth first encountered
▼ - standing water level
② - rate of percolation (mm/min)

SPT - Standard penetration test
CPT - Cone penetration test
No in brackets is no of blows for 12in penetration

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DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
PERCUSSION SHELL & AUGER. 200mm Diam. Rotary Core Drilling	103.50	AS PER DRAWING	21

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
PILCON W20 PILCON M MK II	TNK Water Flush	VERTICAL	MELROSE BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV. % & AM LEVEL	RQD	CORE RECOV. % & SIZE	DEPTH (m)	DESCRIPTION OF STRATA	O.D. LEVEL
					0.4m	HARDCORE ASH FILL (Railway Ballast)	
D1.0m			SPT 1.5m (6)			FIRM RED/BROWN BOULDER CLAY WITH NUMEROUS LARGE PIECES OF WEATHERED ROCK	
D2.5m					3.0m		100.50
D3.5m			SPT 3.4m (5)			FIRM GREYISH BLACK CLAY AND LARGE PIECES OF WEATHERED ROCK.	
			U4 4.5m (25)		4.0m	STIFF REDDISH/BROWN BOULDER CLAY WITH PIECES OF WEATHERED ROCK	94.50
D5.5m					5.4m	HARD GREYISH/BROWN BOULDER CLAY AND WEATHERED ROCK	98.10
		75%			5.8m	LIGHT GREY MEDIUM / FINE GRAINED SANDSTONE HIGHLY WEATHERED.	97.70
		75%			6.8m	LIGHT GREY MEDIUM/FINE GRAINED SANDSTONE, SLIGHTLY WEATHERED VERTICALLY JOINTING 7.03m to 7.23m	96.70
		25%			8.1m		95.40
					8.3m	Highly Weathered (As Above)	
						LIGHT GREY MEDIUM / FINE GRAINED SANDSTONE, SLIGHTLY WEATHERED.	

KEY.
U4 - 4in. dia. Undisturbed sample
U1½ - 1½in. dia
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
* - Sample not recovered

2 - day
▽ - ground water depth first encountered
▼ - morning water level
② - rate of penetration (mm/min)

S( ) - Standard penetration test
C( ) - Cone penetration test
No. in brackets is no. of blows for 12in. penetration

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CLIENT: BORDERS REGIONAL COUNCIL, ST. BOSWELLS

REF. SRC/9/77

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
PERCUSSION CHISEL & AUGER 200mm Diam. Rotary Core drilling		As per Drawing	21

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon 420 Pilcon II Mk II	Water Flush	Vertical	Melrose By-Pass

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV % & AM LEVEL	RQD	CORE RECOV % & SIZE	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
				10	Light grey Fine/Medium grained sandstone. Highly weathered.		
				10.5m		93.00	
		50%		11	Light grey fine/Medium grained Sandstone Slightly Moderately we.thered with Vertical Jointing from 11.05m to 11.8m		
				11.8m		91.70	
				12			

KEY:
U4 - 4in. dia. Undisturbed sample
U1¾ - 1¾ in. dia " "
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
* - Sample not recovered

2 - day
▽ - ground water depth first encountered
▼ measured water level
(2) - rate of percolation (min/min)

SO Standard penetration test
CO Core penetration test
No. in brackets is no. of blows for 12in. penetration

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REF.
BRC/9/77

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO.
PERCUSSION SHELL & AUGER 200mm Diam. Rotary Core Drilling	103.53	As per Drawing	22

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
PILCON 120 PILCON m MK II	Water Flush	VERTICAL	LINK 3 BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV'S & A.M. LEVEL	R.Q.D	CORE RECOV'S & SIZE	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
D1.0m			U4 1.5m	1	FIRM BLACK CLAY & ASH FILL	101.93	
				1.6m			
D2.0m			(31)	2			
			U4 3.0m*	3	SOFT/FIRM RED/BROWN MOTTLED CLAY		
D4.0m			(48)	4			
			CUT 4.5m				
			(48)	5		98. 93	
				5.3m			
Rotary Core Drilling from 5.3m				6			
		75%		7	MEDIUM GREY MEDIUM GRAINED SANDSTONE SLIGHTLY/MODERATELY WEATHERED/ MINOR IRON STAINING & VERTICAL JOINTING 8.6m to 9.75m		
				8			
				9		94. 33	
				9.2m			

KEY:
U4 - 4in. dia. Undisturbed sample
U1½ - 1½ in. dia. " "
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
* - Sample not recovered

2 - day
▽ - ground water depth first encountered
▼ - morning water level
② - rate of percolation (mm/min)

S( ) - Standard penetration test
CU - Core penetration test
No. in brackets is no. of blows for 12in. penetration

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REF.
BRC/9/77

DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO
PERCUSSION SHELL & [illegible] 200mm Diam. Rotary Core Drilling		As per drawing	22 cont'd

MACHINE	CORE BARREL AND BIT DESIGN.	ORIENTATION	SITE
PILCON [illegible] 20 PILCON [illegible] MK II	--- Water Flush	VERTICAL	MELROSE BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV % & A.M. LEVEL (20 40 60 80)	R.Q.D (20 40 60 80)	CORE RECOV % & SIZE (20 40 60 80)	Depth (m)	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
					9.2m			
					10	Medium Grey Siltstone. Moderately Weathered. Highly vertically jointed and broken up.	93.03	
					10.5m			
		75			11, 12	MEDIUM GREY MEDIUM GRAINED SANDSTONE SLIGHTLY [illegible] D WITH [illegible] QUARTZ STRINGS [illegible]. VERTICALLY JOINTED ALSO, JOINTING 30°/60°	90.93	
					12.6m			
					13			

KEY

U4 - 4in. dia. Undisturbed sample
U1½ - 1½in. dia.
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
* - Sample not recovered

2 - day
▽ - ground water depth first encountered
▼ - morning water level
② - rate of penetration (mm/min)

S( ) - Standard penetration test
C( ) - Cone penetration test
No. in brackets is no. of blows for 12in. penetration

	CLIENT	REF
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DRILLING METHOD	GROUND LEVEL	CO-ORDINATES	BOREHOLE NO
PERCUSSION SHELL & AUGER 200mm Diam. Rotary Core Drilling	103.55	As per Drawing No. 16091/1/59/06	23

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Pilcon W20 Pilcon H II	NWX Water Flush	VERTICAL	MELROSE BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV % & S.M LEVEL	R Q D	CORE RECOV % & SIZE	DEPTH	DESCRIPTION OF STRATA	O.D. LEVEL
		B/H DRY			0.5m	HARDCORE & ASH FILL (RAILWAY BALLAST)	
D1.0m			U4 1.5m (21)				
D2.8m			SPT 3.0 (23)		3.5m	HARD REDDISH/BROWN BOULDER CLAY	99.85
D4.0m			SPT 4.5m (48)		5.0m	VERY HARD REDDISH/BROWN BOULDER CLAY	98.35
D5.2m SPT at 5.8m 80 blows for 8" Penetration	1/9/77		SPT 5.8m (80)		6.0m	COMPLETELY WEATHERED GREY SANSTONE AND SILTSTONE	97.35
Rotary Core Drilling from 6.0m					7.2m	Highly weathered Grey fine/Medium Grained Sandstone and Siltstone	96.15
	2/9/77	75%			8.3m	Moderately to Highly Weathered Grey Medium/Fine Grained Sandstone with some Siltstone. Numerous Quartz stringers up to 5mm thick. Jointing 60°	95.05
						Highly weathered to Completely weathered Siltstone & Sandstone	

Borehole Continuous.

KEY:
U4 - 4in dia Undisturbed sample
U1½ - 1½ in. dia " "
D - Disturbed sample
BD - Bulk Disturbed sample
W - Water sample
★ - Sample not recovered

2 day
▽ - ground water depth first encountered
▼ - morning water level
② - rate of penetration (mm/min)

S( ) Standard penetration test
C( ) Cone penetration test
No. in brackets is no. of blows for 12in. penetration

HOLEQUEST LTD.
STATION ROAD, EARLSTON, BERWICKSHIRE
Telephone: Earlston 465
(STD 0896-84-465)

CLIENT: BORDERS REGIONAL COUNCIL ST. BOSWELLS

REF. BRC/9/77

DRILLING METHOD	GROUND LEVEL	CO ORDINATES	BOREHOLE NO.
PERCUSSION & [illegible] 200mm Diameter Rotary Core Drilling		As per Drawing	23 Cont'd

MACHINE	CORE BARREL AND BIT DESIGN	ORIENTATION	SITE
Edeon W20 Edeon I. [illegible] II	Water Flush	VERTICAL	BERWICK BY-PASS

SOIL SAMPLES DEPTH AND TYPE	DRILLING AND CASING PROGRESS	WATER RECOV % & A.M LEVEL	R.Q.D	CORE RECOV % & SIZE	DESCRIPTION OF STRATA	O.D. LEVEL	SYMBOLIC LOG
				9			
				10	LIGHT GREY SANDSTONE AND SILTSTONE. HIGHLY WEATHERED TO COMPLETELY WEATHERED		
		75%		11	11.0m	92.35	
					MEDIUM GREY SILTSTONE AND SANDSTONE SLIGHTLY WEATHERED		
				12	12.2m	91.15	
					Medium Grey Siltstone and Sandstone Moderately weathered		
					12.9m to Highly weathered.	90.45	
				13			

KEY

U4 - 4in. dia. Undisturbed Sample
U1½ - 1½in. dia.
D - Disturbed Sample
BD - Bulk Disturbed Sample
W - Water Sample
* - Sample not recovered

2 - day
▽ - ground water depth first encountered
▼ - morning water level
② - rate of percolation (min/min)

S( ) Standard penetration test
C( ) Core penetration test
No. in brackets is no. of blows for 12in. penetration

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Telephone: Earlston 465
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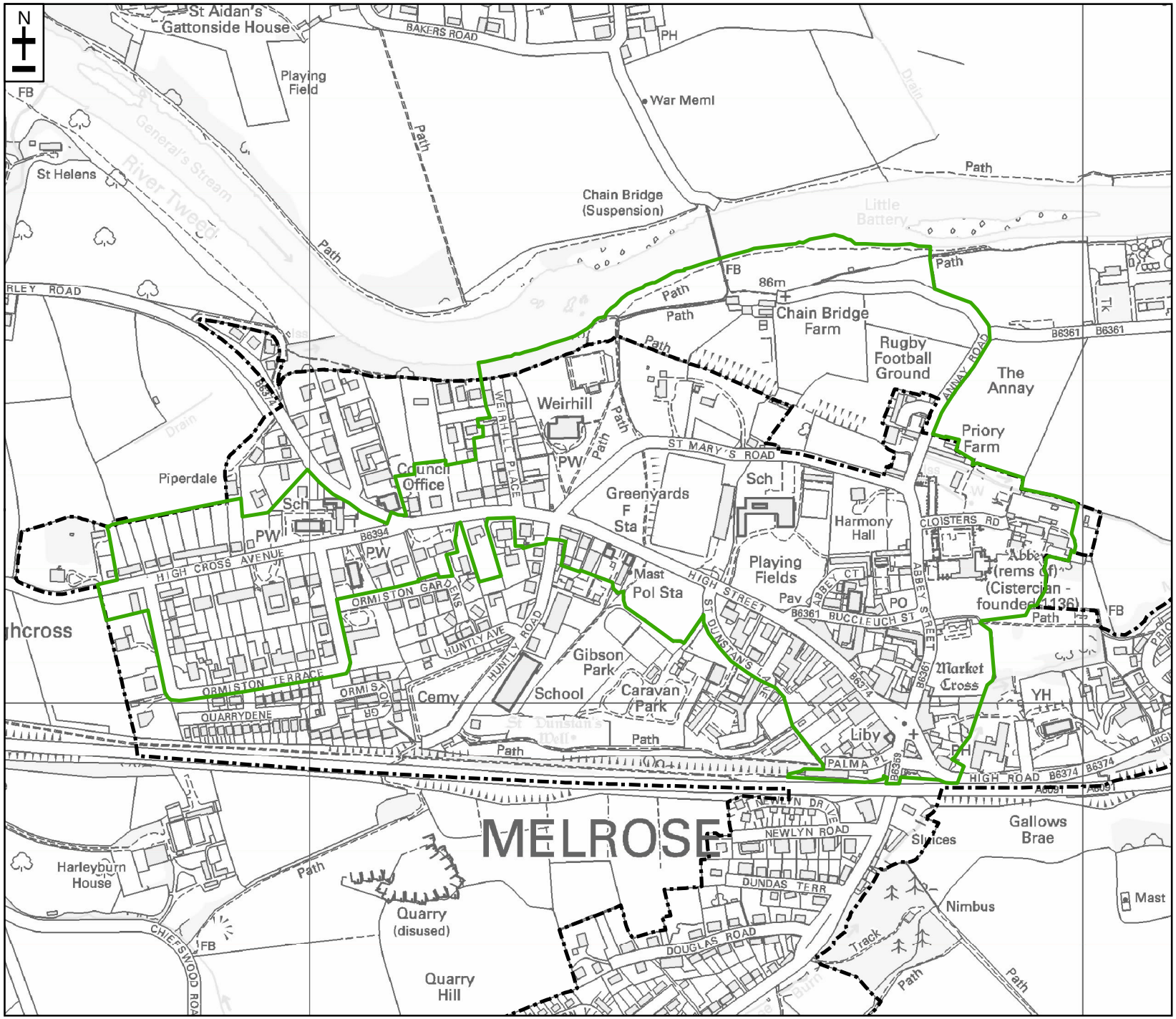
CLIENT
BORDER REGIONAL COUNCIL
St. BOSWELLS

REF.
BR//9/77

Appendix D

Appendix D: Supportive Environmental Classification Data sheets



Scottish Borders Council
Conservation Area March 2012
Melrose
Scale 1:7,000

Key

Conservation Area Boundary

Development Boundary

For further information, including help reading this document, please contact:

Plans and Research Team
Planning and
Economic Development
Council Headquarters
Newtown St Boswells
Melrose TD6 0SA

Tel: 01835 826511
Email: localplan@scotborders.gov.uk

Scottish Natural Heritage

River Tweed Special Area of Conservation

Special Area of Conservation

Longitude: 2° 47' 30" W
Latitude: 55° 36' 00" N

Scale: 1:270,000

Version number: 1 (05/11/2012)
Projection: British National Grid

300000 320000 340000 360000 380000

650000 630000 610000

RIVER TWEED SPECIAL AREA OF CONSERVATION (SAC)

Designation date: 17 March 2005

Administrative area: Northumberland; Scottish Borders

Qualifying Interests for which the site is designated:

SCIENTIFIC NAME	COMMON NAME
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Rivers with floating vegetation often dominated by water-crowfoot

Conservation Objectives for
River Tweed Special Area of Conservation

To avoid deterioration of the qualifying habitat (listed below) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

To ensure for the qualifying habitat that the following are maintained in the long term:

- **Extent of the habitat on site**
- **Distribution of the habitat within site**
- **Structure and function of the habitat**
- **Processes supporting the habitat**
- **Distribution of typical species of the habitat**
- **Viability of typical species as components of the habitat**
- **No significant disturbance of typical species of the habitat**

Qualifying Habitat:

- Rivers with floating vegetation often dominated by water-crowfoot

NB The conservation objectives for the qualifying species are on the next page

Conservation Objectives for
River Tweed Special Area of Conservation

To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

To ensure for the qualifying species that the following are maintained in the long term:

- **Population of the species, including range of genetic types for salmon, as a viable component of the site**
- **Distribution of the species within site**
- **Distribution and extent of habitats supporting the species**
- **Structure, function and supporting processes of habitats supporting the species**
- **No significant disturbance of the species**

Qualifying Species:

Scottish Natural Heritage

River Tweed SSSI

Site of Special Scientific Interest

Longitude: 2° 47' 19" W
Latitude: 55° 35' 43" N
Scale: 1:270,000

Version number: 1 (05/11/2012)
Projection: British National Grid

300000 320000 340000 360000 380000

650000 630000 610000

The banks of rivers and other watercourses are liable to change naturally. Where the site boundary is the river bank itself, and where this changes over time, the site boundary will vary in line with such changes. Existing bridges are not included in the site.

Scottish Natural Heritage

RIVER TWEED
Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 1366

Anderson's Chambers
Market Street
Galashiels
TD1 3AF

Tel: 01896 756652
Fax: 01896 750427
e-mail: galashiels@snh.gov.uk

Purpose

This is a public statement prepared by SNH for owners and occupiers of the SSSI. It outlines the reasons it is designated as an SSSI and provides guidance on how its special natural features should be conserved or enhanced. This Statement does not affect or form part of the statutory notification and does not remove the need to apply for consent for operations requiring consent.

We welcome your views on this statement.

Description of the site

The River Tweed Site of Special Scientific Interest (SSSI) has been notified for its limnological (biological, chemical and physical) interest. The notification reflects the significance of the SSSI as a prime example of a "whole river system", which in turn supports other notified features including: [redacted].

Forming the main drainage system of the eastern Southern Uplands and north-east Cheviots, the Tweed and its tributaries are clean river systems of high conservation and ecological value. The vegetation shows a natural succession from mineral-poor upland streams through to species which are typical of mineral-rich lowland rivers, the floating beds of water-crowfoot (*Ranunculus* species) on the lower river being of particular importance. A rich insect fauna is associated with riverine and adjacent habitats. Large migrations of salmon and sea-trout as well as the resident brown trout population support a major sport fishery. [redacted] Associated with the river are adjacent habitats of high nature conservation importance including rough grassland, wetland, riparian and floodplain woodland. Nationally important geological sites also occur within the SSSI. Features of overlapping SSSI are listed in Appendix 1

The Tweed estuary lies within England, but from a point near its mouth, the centre line of the channel forms the border between England and Scotland for some 30km upstream, a short section of which (2.4m) is tidal. Of the four largest tributaries, three lie wholly or partly within Scotland, the exception being the River Till, which is entirely within England. The Whiteadder Water joins the Tweed below the tidal limit and, along with its tributary, the Blackadder Water, it drains the southern flank of the Lammermuir Hills. The largest sub-catchment is that of the River Teviot, which joins the Tweed at Kelso. Further upstream above Galashiels, the Ettrick Water flows into the Tweed. Above this confluence, the Ettrick and its tributary, the Yarrow

Water, drain narrow steep-sided valleys running north-westwards, with St Mary's Loch lying near the head of the Yarrow Valley. Above Drumelzier, the gradient of the Tweed steepens and the main river becomes a more rapid upland watercourse, with its source being found amongst springs in the hills of Tweedsmuir to the west.

The catchment of the Tweed consists of a horseshoe-shaped rim of hills composed of older, harder rocks which surround a relatively flat basin of younger rocks covered with a thick layer of glacial debris. The hills can be divided into two distinct units. To the north and west, the steep valleys and rounded hills of the Southern Uplands are composed of strongly folded sedimentary shales and greywackes from the Silurian and Ordovician. To the south, volcanic lavas surround the granite mass of the Cheviot. The Tweed lowlands consist of an undulating plain covered by a thick layer of glacial boulder clay overlying Old Red Sandstone rocks and Carboniferous Limestones through which the river has cut a narrow floodplain.

Along the length of the river, the changes in plant species reflect the changing gradient of the river from torrent to slow flowing and the change in the geology and nutrient status from nutrient-poor (oligotrophic) to nutrient-rich (eutrophic). The small nutrient-poor upland streams which form the source of the Tweed and its tributaries originate from a series of springs and flushes rich in species of mosses and sedge. Typical streamside plants of the upland streams include purple moor-grass, lesser spearwort and the moss species *Fontinalis antipyretica.* Once these streams join to form small rivers, larger aquatic plants become more frequent, particularly water-crowfoot and water-milfoil. A typical invertebrate fauna is present including mayflies, stoneflies and freshwater shrimps.

In the middle reaches, as the gradient reduces and depth increases, the nutrient level of the water becomes richer, particularly when the bedrock changes to sandstone. Within the channel, water-crowfoot becomes more abundant, forming large beds in shallow sections. Curled pondweed is another characteristic species here. Marginal emergent vegetation becomes more of a feature with branched bur-reed and particularly reed canary grass. Invertebrate species become more numerous with stoneflies and mayflies still the most abundant but with increasing numbers of caddisflies, molluscs and leeches.

The lower sections of the Teviot and also the Tweed, downstream of Kelso (below the confluence with the Teviot), are deeper and slower with a higher degree of deposition. The nutrient status of these sections is naturally high, reflecting the geology. Plants growing within the river increase in diversity but not abundance. Species of water-crowfoot including the nationally scarce Kelso water-crowfoot, pondweed *Potamogeton* species and spiked water-milfoil, which are characteristic of the high nutrient status waters, are present. The non-native species giant hogweed, Japanese knotweed and Himalayan balsam are established marginal plants. Mayflies and stoneflies become less dominant in this stretch of the Tweed with molluscs, beetles, flatworms and shrimps becoming more numerous.

Riparian woodland along the Tweed and its tributaries is mainly in the form of thin strips of either alder or willow species. Floodplain woodland is scarce, the best examples found in the upper sections of the Ettrick Valley. Wetlands in the form of backwaters, oxbow lakes and flood channels are scarce, with the best examples being in the middle and upper Tweed.

Rare plants species found along the banks and islands of the Tweed include hairy stonecrop and pale forget-me-not, water figwort, maiden pink and flowering rush. In addition to these, there are over 40 species of locally rare vascular plants occurring within the site, i.e. those which feature in less than six of the 63 10 km squares of the Scottish Borders. The nationally scarce lichen *Verrucaria praetermissa* is recorded from submerged siliceous rocks within the river. The rare (Red Data List) moss *Thamnobryum alopecurum* has also been recorded.

Twenty-two species of fish have been recorded from the Tweed, although many of these will have been the result of artificial introductions. [redacted] are two of the most significant species, with suitable gravel bed spawning habitat for both species being widespread. [redacted] also occur within the Tweed as significant breeding species, whilst the rare allis shad has been recorded occasionally. Other characteristic native species include [redacted].

[redacted]

The invertebrate fauna of the Tweed is diverse and contains many species of limited distribution. The most important invertebrates are the beetles (Coleoptera), especially those which live in the marginal shoals of silt, gravel and shingle. Mayflies, caddisflies, stoneflies and many other groups occur in great diversity.

The 1995 site condition monitoring (SCM) assessments of the 'beetle' and 'fly' assemblages found both features to be in unfavourable - recovering condition on account of the site failing the required target for water quality. Much of the River Tweed catchment meets the water quality target, but there are significant reaches that did not meet the required standard. The water quality on these reaches is, however, considered to be gradually improving through a combination of upgrading of wastewater treatment works, more sympathetic land management practice, and also through recent regulation to address diffuse pollution issues.

The 2004 SCM assessment of the 'Trophic range river/stream' found the feature to be in an unfavourable condition due to stretches of the riverbank which had been subject to re-profiling and/or modification. The feature also failed on account of water quality and a lack of desirable indicator species present.

The 2004 SCM assessment of the '[redacted]' found the feature to be in an unfavourable - recovering condition. This was, in part, due to the site failing to meet the required target for water quality and also the fact that the average rod catch of spring running fish in the years since the site was designated was less than the catch in the year of designation. Annual catch numbers in recent years have generally been increasing, with the total for 2010 being the highest ever recorded. These figures will count towards the next SCM assessment.

The 2004 SCM assessments of the '[redacted]', '[redacted]' and '[redacted]' found each feature to be in unfavourable condition. This was on account of the site failing the required target for water quality and population densities for the three lamprey species. However, the survey was badly disrupted by unexpectedly high water levels and this is thought to have reduced the catch efficiency (and water quality).

The 2005 SCM assessment of the 'vascular plant assemblage' found the feature to be in an unfavourable-declining condition. This was largely based on a failure to locate populations of the component species, failure to meet the population size thresholds for each and an overall lack of plant regeneration recorded.

Natural features of River Tweed SSSI	Condition of feature (and date monitored)	Other relevant designations
Trophic range river/stream	Unfavourable – no change (September 2004)	River Tweed SAC
Vascular plant assemblage	Unfavourable - declining (September 2005)	
[redacted]	Unfavourable – recovering (August 2004)	River Tweed SAC
[redacted]	Unfavourable – no change (November 2004)	River Tweed SAC
[redacted]	[redacted]	[redacted]
[redacted]	Unfavourable – no change (November 2004)	River Tweed SAC
[redacted]	Not yet assessed	River Tweed SAC
Beetle assemblage	Unfavourable – recovering (January 1995)	
Fly assemblage	Unfavourable – recovering (January 1995)	

Features of overlapping Natura sites that are not notified as SSSI natural features	Condition of feature (date monitored)	Designation
Rivers with floating vegetation often dominated by water-crowfoot	Unfavourable – no change (November 2004)	River Tweed SAC
[redacted]	[redacted]	[redacted]

See Appendix 1 for a list of features of other SSSI overlapping the River Tweed SSSI.

Water-crowfoot (*Ranunculus* spp.)	River Tweed at Leaderfoot
	

Past and present management

The history of man's use of the Tweed as a source of food and as an east-west transport route dates back at least to Neolithic times. Clearance of the ancient woodland which filled the Tweed valley started at this time. By medieval times, the importance of the river as a fishery and source of water power was well established. During the monastic period, drainage and extensive bank protection took place. The agricultural and industrial revolutions caused a fundamental change to the river as the use of drainage methods became far more widespread and ploughed areas greatly extended. The industrial use of water power increased with the rise of the textile mills. Caulds constructed to provide the mill water restricted the spawning runs of salmon and sea trout. Large-scale pollution of the river by dyestuffs, industrial wastes and the sewage of an increased population occurred. Pressure from fishery interests and the introduction of water purification measures saw a slow return of water quality and the eventual breaching of caulds as the textile mills declined. Post-WWII modern agriculture and forestry brought a more recent major change with the introduction of deep ploughing of hill ground, arterial drainage schemes and an increase in arable areas, particularly winter barley. The latter coincided with the increase in algal (diatom) slime growth in the summer months.

Land use and hydrology

The Tweed is the major recipient of the treated domestic and industrial point source effluent of a population in excess of 100,000. The quality of that effluent has for many years been improving due to major investment by the water authorities. Diffuse source pollution, particularly nitrates from agriculture, is less well understood and controlled, although it is anticipated that the situation will improve as a result of recent legislation to tackle diffuse pollution. Sub-catchments with a high proportion of arable use, particularly the Leet and Eden, are currently the worst affected. Water abstraction for agriculture is also an issue, with the greatest depletion of summer flow being experienced on the River Till. A series of reservoirs were built between 1900 and 1970 to export water out of the catchment to supply Edinburgh. The release of freshets and compensation flow from these reservoirs has been significant in maintaining summer flow in dry years.

Recreation

The Tweed now has the highest annual r in Scotland as well as being an important . The economic value of this fishery has a major influence on the management of the river. Management in areas where fishing takes place includes cutting bank vegetation, management of sediment, the construction/maintenance of croys (groynes) and the placing of boulders in the river to create .

In addition to fishing, the Tweed is an important recreational resource for walking (both informal

and longer routes) and canoeing. Power boat use on the lower river has caused concern in the past; however, the middle and upper stretches are not navigable to larger craft. Several golf courses and large public parks are situated along the river. In places, mown fertilised grass has replaced bankside vegetation of native plant species.

Tweed Forum

The Tweed Forum was formed in 1991 "*to promote the sustainable use of the whole of the Tweed catchment through holistic and integrated management and planning*". The Forum was initially set up as an informal liaison group for parties and agencies with an interest in the river, and has since evolved into a fully staffed not-for-profit company specialising in integrated catchment management at a national level.

The Tweed Invasives Project was established through the Tweed Forum in 2002. The aim of this pioneering project was to implement the long-term, sustainable control of invasive species within the Tweed catchment and the successful re-establishment of native flora. The most notable species being addressed by the project include giant hogweed, Japanese knotweed and Himalayan balsam, all of which pose a significant threat to the ecology and biodiversity of the region.

This ongoing project also provides advice to local farmers, landowners, residents and fishing interests regarding the best means of control and the appropriate type of native replanting. The project is the largest of its kind in the UK, covering the whole 3,000 square miles of the Tweed catchment.

In November 2003, the Tweed Catchment Management Plan (TCMP) was launched, having been developed in partnership with the Tweed Forum's members and a wider stakeholder group to identify what the collective issues, priorities and potential solutions were for all aspects of water within the Tweed Catchment. The TCMP covers a broad range of issues, from tourism and recreation to flood management, water resources and habitats and species.

The TCMP sets out to identify the various issues relating to the utilisation, conservation, and protection of the Tweed's water resources, and sets out clear objectives with actions and targets for meeting those objectives. The original TCMP, which was produced in 2003, has subsequently been reviewed in 2006 and 2010, and updated to reflect the current situation.

Legislation

Many management activities associated with the water environment are now regulated by the Scottish Environment Protection Agency (SEPA) under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR). These activities include: in-stream/bankside engineering work, abstraction, impoundment, and discharges (both point source and diffuse). Any of the above activities which are not subject to licensing by SEPA, and are to be carried out within the River Tweed SSSI, will require SNH consent. As such, land managers should contact either one of these agencies if they have plans to carry out these activities.

One activity which needs careful assessment is the removal/management of in-stream gravel as this can result in unexpected changes to the fluvial dynamics of a watercourse, and potentially cause upstream and/or downstream erosion of riverbanks. It can also cause direct damage to in-stream habitat, particularly salmon, brown trout and lamprey spp. spawning areas.

Any engineering work affecting watercourses (e.g. sediment management, bank repair work) should ideally be carried out during the summer months to avoid the sensitive time period for Atlantic salmon and lamprey spp. This ensures that there are no impacts on spawning/juvenile fish spp., which in turn simplifies the assessment process by the relevant agencies. As a result, applications for engineering work over the summer months are more likely to be

approved and should take less time to process.

The SSSI can benefit from land managers entering into an appropriate Rural Development Contract scheme, run under the Scotland Rural Development Programme (SRDP) (available until 2013). This offers benefits for positive riparian management and should aim to protect and enhance the nature conservation value of the site, and promote the removal/control of non-native species. There are currently many areas within the Tweed catchment that are being positively managed under SRDP, in particular through fencing of riverbanks, which reduces grazing pressure and associated poaching. This in turn reduces bank erosion and siltation of the watercourse.

Work has also been carried out by the River Tweed Commission to remove barriers and improve passage for migratory fish, across the whole of the Tweed Catchment. Some of this work, on existing fish passes, has been funded under the EU Life Programme, and also through SEPA's Restoration Fund.

Objectives for Management (and key factors influencing the condition of natural features)

We wish to work with the owners and occupiers to protect the site and to maintain and, where necessary, enhance its features of special interest. SNH aims to carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and its natural features and to monitor the effectiveness of the management.

The EU Habitats and Birds Directives oblige Government to avoid, in SACs and SPAs, the deterioration of natural habitats and the habitats of species, as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of these Directives. The objectives below have been assessed against these requirements. All authorities proposing to carry out or permit to be carried out operations likely to have a significant effect on the European interests of this SSSI must assess those operations against the relevant Natura conservation objectives (which are listed on our website through the SNHi - SiteLink facility).

1. **To maintain and, where possible, improve the quality and quantity of water flow.**

   This can be achieved through maintaining/adopting management practices sympathetic to the water environment, possibly through SRDP schemes, in particular through fencing the riverbank. This should also be enhanced by the recently introduced Diffuse Pollution General Binding Rules (GBRs).

2. **To avoid deterioration of, or significant disturbance to the notified habitat and species.**

   Regulation of activities (by SEPA under CAR and SNH consents) will help to minimise any impacts on watercourses within the River Tweed SSSI.

3. **To maintain the characteristic sequence of riparian habitats along the length of the river.**

   This can be achieved by adopting a sympathetic approach to management of riparian vegetation, again possibly through entry into appropriate SRDP schemes.

4. **Support the work of the Tweed Invasives Project through appropriate control/eradication of Invasive Non-Native Species (INNS).**

   There is concern about the potential spread, and further introduction, of American signal

crayfish, which is already present at several locations within the Tweed Catchment, and the resulting impacts on the riverine ecosystem. There is also concern about the potential for the accidental introduction of the parasite *Gyrodactylus salaris,* and resulting impacts on Atlantic salmon populations. Along with existing legislation, there are current initiatives from various sources, including information leaflets, aimed at raising awareness and encouraging riparian owners and recreational users to maintain vigilance in order to prevent the introduction of the above species.

Other factors affecting the natural features of the site

Potential changes to rainfall patterns, associated flow-rates and also the distribution and functioning of species could occur through climate change.

Date last reviewed: 28 March 2011

Appendix 1 List of features of other SSSI overlapping the River Tweed SSSI

Features of overlapping SSSI	Condition of feature (date monitored)	Designation
Palaeozoic Palaeobotany	Unfavourable – no change (January 2002)	Whiteadder Water SSSI
Palaeozoic Palaeobotany	Favourable – maintained (November 2006)	Lennel, Charley's Brae SSSI
Carboniferous – Permian Igneous	Favourable – maintained (November 2006)	Lintmill Railway Cutting SSSI
Upland mixed ash woodland	Favourable – maintained (July 2008)	Kirkhope Linns SSSI
Oligo-mesotrophic loch	Favourable – maintained (June 2004)	St Mary's Loch SSSI
Flood-plain fen	Favourable – maintained (August 2003)	Riskinhope SSSI
Lowland neutral grassland	Unfavourable – no change (June 2008)	Makerstoun - Corbie Craigs to Trows' Craigs SSSI
Upland oak woodland	Unfavourable – no change (June 2003)	Abbey St Bathans Woodlands SSSI
Lichen assemblage	Unfavourable – no change (October 2004)	Abbey St Bathans Woodlands SSSI
Upland mixed ash woodland	Favourable – declining (June 2009)	Newtown St Boswells Woods SSSI
Upland oak woodland	Favourable – maintained (September 2001)	Tweedwood - Gateheugh SSSI
Beetle assemblage	Favourable – maintained (September 2001)	Tweedwood - Gateheugh SSSI

28 March 2011

RIVER TWEED SITE OF SPECIAL SCIENTIFIC INTEREST

OPERATIONS REQUIRING CONSENT FROM SCOTTISH NATURAL HERITAGE

If you propose to carry out, or permit to be carried out, any of the operations listed below, you must first obtain consent from SNH unless a local authority has granted you planning permission (under Part III of the Town and Country Planning (Scotland) Act 1997) or a designated regulatory authority has given you written permission (under s.15 of the Nature Conservation (Scotland) Act 2004). If you have such a permission you may proceed without obtaining consent from SNH for the same operation.

Standard Ref. No.	*Type of Operation*
2	Grazing and changes to grazing management (including the introduction, re-introduction, changes to stock numbers, types and dates).
3	Stock feeding and changes to stock feeding practices (including the introduction, re-introduction and changes to the type and location).
4	The introduction of mowing and changes in the mowing or cutting regime (including hay-making to silage and cessation).
5	Application of manure, fertilisers and lime.
6	Application of pesticides, including herbicides (weedkillers) and fungicides, whether terrestrial or aquatic.
7	Dumping, spreading or discharge of any materials.
9	The introduction or release into the site of any wild, feral or domestic animal[1], plant[2], seed, or micro-organism (including genetically modified organisms), except for duck and gamebirds.
10	The killing or removal of any wild animal[1], except for:- legal pest control; fishing and the removal and killing of any species of fish by lawful means; bird species covered by the General License issued by Scottish Government Rural Directorate under the Wildlife & Countryside Act 1981 (as amended); other species under a specific license issued by Scottish Government Rural Directorate.
11	The destruction, displacement, removal or cutting of any plant[2] or plant[2] remains, including aquatic and riparian vegetation.

Standard Ref. No.	*Type of Operation*
13a	Drainage (including moor-gripping, the use of mole, tile, tunnel or other artificial drains).
13b	Modification of the structure of water courses (rivers, streams, springs, drains and ditches) including their banks and beds, as by re-alignment, regrading and dredging.
16a	Freshwater fishery production and/or management[3] and the introduction of or changes in freshwater fishery production and/or management[3], including for sporting fishing and angling.
20	Extraction of minerals including shingle, sand and gravel.
21	Construction, removal or destruction of tracks, walls, fences, hardstands, banks (including bank protection works), or the laying, maintenance or removal of pipelines and cables, above or below ground.
23	Erection of permanent or temporary structures.
24	Modification of natural or man-made features (including former river channel features, terraces, ox-bows, abandoned meander-loops), clearance of boulders and large stones.
26	Use of vehicles or craft which would damage or disturb vegetation or water quality.
27	Recreational or other activities which would affect vegetation or water quality, other than those carried out responsibly in keeping with the Scottish Outdoor Access Code.

Notes

1 "animal" includes any mammal, reptile, amphibian, bird, fish or invertebrate.

2 “plant” includes any flowering plant, tree, fern, alga, fungus, lichen or moss.

3 Includes the use of traps and fish cages.

CITATION

RIVER TWEED
SITE OF SPECIAL SCIENTIFIC INTEREST
Scottish Borders

Site code: 1366

NATIONAL GRID REFERENCE:

NT664633 – NT946529 : Whiteadder Water (reservoir outfall) to English border;
NT622543 – NT865546 : Blackadder Water (source) to confluence with Whiteadder Water;
NT052139 – NT947521 : River Tweed (source) to English border;
NT192166 – NT444273 : Yarrow Water/Little Yarrow (source) to confluence with Ettrick Water;
NT172063 – NT489323 : Ettrick Water (source) to confluence with River Tweed;
NT323027 – NT725339 : River Teviot (source) to confluence with River Tweed;
NT892195 – NT837302 : Bowmont Water (source) to English border.

OS 1:50,000 SHEET NO: Landranger Series 67, 72, 73, 74, 75, 78, 79, 80
1:25,000 SHEET NO: Explorer Series 330, 331, 336, 337, 338, 339, 345, 346, OL16

AREA / LENGTH: 2597.58 hectares / 478.84 km

NOTIFIED NATURAL FEATURES

Biological:	**Freshwater habitats:**	**Trophic range river/stream**
	Vascular plants:	**Vascular plant assemblage**
	[redacted]	[redacted]
	Invertebrates:	**Beetle assemblage**
	Invertebrates:	**Fly assemblage**

DESCRIPTION

From its source 20km north of Moffat to where it crosses the English border near Berwick-upon-Tweed, the River Tweed Site of Special Scientific Interest (SSSI) and its tributaries cover almost the entire Scottish Borders, and form the main drainage system of the eastern Southern Uplands and north-east Cheviots. The notification reflects the significance of the SSSI as a prime example of a “whole river system”, which in turn supports other notified features including: [redacted].

The Tweed estuary lies within England, but from a point near its mouth, the centre line of the channel forms the border between England and Scotland for some 30km upstream, a short section of which (2.4m) is tidal. Of the four largest tributaries, three lie wholly or partly within Scotland, the exception being the River Till, which is entirely within England. The Whiteadder Water joins the Tweed below the tidal limit and along with its tributary, the Blackadder Water, it drains the southern flank of the Lammermuir Hills. The largest sub-catchment is that of the River Teviot, which joins the Tweed at Kelso. Further upstream above Galashiels, the Ettrick Water flows into the Tweed. Above this confluence, the Ettrick

and its tributary, the Yarrow Water, drain narrow steep-sided valleys running north-westwards, with St Mary's Loch lying near the head of the Yarrow Valley. Above Drumelzier, the gradient of the Tweed steepens and the main river becomes a more rapid upland watercourse, with its source being found amongst springs in the hills of Tweedsmuir to the west.

Habitat Interest

The Tweed and its tributaries are clean river systems of high conservation and ecological value. Along the length of the river, the changes in plant species reflect the changing gradient of the river from torrent to slow flowing, and the change in the geology and nutrient status from nutrient-poor (oligotrophic) to nutrient-rich (eutrophic).

The small nutrient-poor upland streams, which form the source of the Tweed and its tributaries, originate from a series of flushes rich in species of mosses and sedge *Carex* spp. Flowing across open moorland, characteristic streamside plants include mat-grass *Nardus stricta,* purple moor-grass *Molinia caerulea*, lesser spearwort *Ranunculus flammula* and water forget-me-not *Myosotis scorpioides*. Moss species including *Fontinalis antipyretica* and *Philonotis fontana* are common on boulders and bedrock. Once these streams join to form upland rivers, larger aquatic plants become more frequent, particularly stream water-crowfoot *Ranunculus penicillatus*, common water-crowfoot *Ranunculus aquatilis* and alternate-flowered water-milfoil *Myriophyllum alternifolium*. A typical invertebrate fauna is present including mayflies and stoneflies.

In the middle reaches as the gradient reduces and depth increases, the nutrient level of the river becomes richer, particularly where the bedrock changes to sandstone. Within the channel, water-crowfoot species become more abundant, forming large beds in shallower sections. Curled pondweed *Potamogeton crispus* is another characteristic species within the channel. Marginal emergent vegetation becomes more of a feature, with branched bur-reed *Sparganium erectum* and particularly reed canary-grass *Phalaris arundinacea* forming a narrow fringe to the river. Invertebrate species become more numerous with stoneflies and mayflies still the most abundant, but with increasing numbers of caddisflies.

The lower sections of the Teviot and also the Tweed, downstream of Kelso (below the confluence with the Teviot), are deeper and slower with a higher degree of deposition. The nutrient status of these sections is naturally high, reflecting the geology. Plants growing within the river increase in diversity but not abundance, possibly being limited by light penetration. Species such as fennel pondweed *Potamogeton pectinatus*, shining pondweed *Potamogeton lucens* and spiked water-milfoil *Myriophyllum spicatum,* which are characteristic of the high nutrient status waters, are present but stream water-crowfoot *Ranunculus penicillatus* and river water-crowfoot *Ranunculus fluitans* dominate. Reed canary grass and branched bur-reed are still characteristic species of the fringes of the river. Mayflies and stoneflies become less dominant in this stretch of the Tweed, with beetle species becoming more numerous.

Species Interest

Within the water-crowfoot *Ranunculus* spp. beds mentioned above are the nationally scarce Kelso water-crowfoot *Ranunculus x kelchoensis*, a hybrid water-crowfoot *Ranunculus fluitans x circinatus* known only from the Blackadder Water and stream water-crowfoot *Ranunculus penicillatus* subspecies *pseudofluitans*, growing here at its northernmost limit. There are also a number of other interbreeding hybrids.

Of ten species of pondweeds *Potamogeton* spp., the hybrids Cooper's pondweed *Potamogeton x cooperi*, graceful pondweed *Potamogeton x olivaceus* and Swedish

pondweed *Potamogeton x suecicus* are nationally scarce. Willow-leaved pondweed *Potamogeton x salicifolius* is also found here, at its main (of three) Scottish location.

On stony stream margins of the upper rivers, the nationally scarce hairy stonecrop *Sedum villosum* and pale forget-me-not *Myosotis stolonifera* occur, while the same status is accorded to the scarce water figwort *Scrophularia umbrosa* on lower margins, and maiden pink *Dianthus deltoides* on the more basic soils of the middle river. Flowering rush *Butomus umbellatus*, unusual this far north, grows on the lower third of the Whiteadder Water and appears to be native here. In addition to these, there are over 40 species of locally rare vascular plants occurring within the site.

The nationally scarce lichen *Verrucaria praetermissa* is recorded from submerged siliceous rocks within the river. The rare (Red Data List) moss *Thamnobryum alopecurum* is recorded, while nationally scarce moss species occurring are *Fontinalis antipyretica var. gracilis, Philonotis caespitosa,* and *Sphagnum angustifolium*. There are, in addition, fifteen moss species recorded as being of only local abundance, for the Scottish Borders.

The Tweed supports nationally important populations of Atlantic salmon *Salmo salar*, with a strong run of salmon in the autumn and a smaller spring run mainly into the Whiteadder Water and Ettrick Water. [redacted] Suitable gravel bed spawning habitat is widespread for both salmon and lamprey spp. The rare allis shad *Alosa alosa* is known to occur but its breeding status is as yet unknown.

[redacted].

The invertebrate fauna of the Tweed is diverse and contains many species of limited distribution. The most important invertebrates are the beetles *Coleoptera,* especially those which live in the marginal shoals of silt, gravel and shingle. The Tweed system has been known for some time as an important location for this species group, containing a number of nationally important sites on the Yarrow Water and tributaries. The mayfly *Ephemeroptera* list contains over half the British species and the caddisflies *Trichoptera* have a list of 53, which is one quarter of the UK total. Other groups with species of restricted distribution include stoneflies *Plecoptera*, soldier flies *Stratiomyidae*, long-legged flies *Dolichopodidae*, craneflies *Tipulidae*, and dance flies *Empididae*. In total, 13 invertebrate species listed on the Red Data List and 45 invertebrate species classed as notable (occurring in less than 100 of the 10km squares of the national grid) are recorded from the Tweed.

NOTIFICATION HISTORY

First notified under the 1949 Act: 1976 as Tweed River SSSI; and
1971, 1975 as Putts Pool SSSI (de-notified in 1986).

Re-notified under the 1981 Act: 2 March 2001 with amended boundary
(Notification confirmed 23 November 2001 with a 77ha decrease in area).

Notification reviewed under the 2004 Act: 28 March 2011

REMARKS

Measured area of site corrected (from 2597.6 ha).

Parts of the adjacent Tweed River SSSI are still notified under the 1949 Act for the feature: Trophic range river/stream.

The River Tweed SSSI is part of the River Tweed special area of conservation (SAC) designated for the European habitat and species listed below:

Habitat: Rivers with floating vegetation often dominated by water-crowfoot

Species: [redacted]

Part of the River Tweed SSSI is designated as part of the Whiteadder Water SSSI, which is notified for the Palaeontology feature: Palaeozoic Palaeobotany

Part of the River Tweed SSSI is designated as part of Lennel, Charley's Brae SSSI, which is notified for the Palaeontology feature: Palaeozoic Palaeobotany

Part of the River Tweed SSSI is designated as part of Lintmill Railway Cutting SSSI, which is notified for the Igneous petrology feature: Carboniferous – Permian Igneous

Part of the River Tweed SSSI is designated as part of Kirkhope Linns SSSI, which is notified for the habitat: Upland mixed ash woodland

Part of the River Tweed SSSI is designated as part of St Mary's Loch SSSI, which is notified for the habitat: Oligo-mesotrophic loch

Part of the River Tweed SSSI is designated as part of Riskinhope SSSI, which is notified for the habitat: Flood-plain fen

Part of the River Tweed SSSI is designated as part of Makerstoun - Corbie Craigs to Trows' Craigs SSSI, which is notified for the habitat: Lowland neutral grassland

Part of the River Tweed SSSI is designated as part of Abbey St Bathans Woodlands SSSI, which is notified for the habitat: Upland oak woodland and its Lichen assemblage

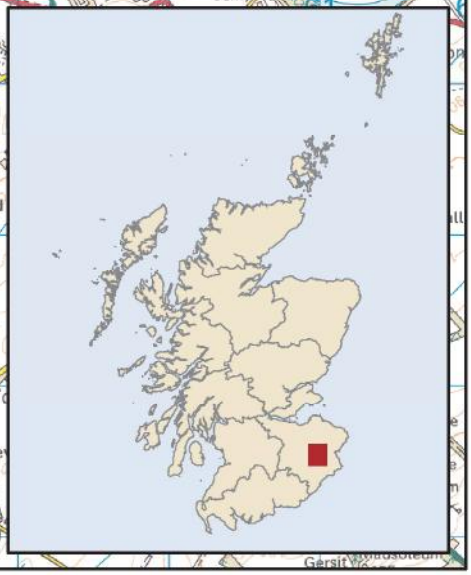
Part of the River Tweed SSSI is designated as part of Newtown St Boswells Woods SSSI, which is notified for the habitat: Upland mixed ash woodland

Part of the River Tweed SSSI is designated as part of Tweedwood - Gateheugh SSSI, which is notified for the habitat: Upland oak woodland and its Beetle assemblage

The River Tweed SSSI is contiguous with the River Till SSSI and the River Tweed-Whiteadder SSSI in England.

Eildon & Leaderfoot

National Scenic Area



Original description of the NSA from the publication *Scotland's Scenic Heritage* published by the Countryside Commission for Scotland in 1978, and available on the Scottish Natural Heritage website at http://www.snh.gov.uk/docs/B464646.pdf (6.52mb)

EILDON AND LEADERFOOT NATIONAL SCENIC AREA

The Scottish Borders

Description from *Scotland's Scenic Heritage* 1978

Between its confluence with the Ettrick and that with the Teviot, the Tweed exhibits neither the youthful characteristics of an upland river, nor the mature nature of a lowland river that it assumes below Kelso, but its valley is wide and moderate, open and fertile, while still affording fine views of the surrounding hills. The scene comprises shapely uniform hills enclosing the valley, the winding, incised and wooded course of the river, mixed land use of arable, pasture, plantation and moorland, and a settlement pattern that still bears a scale and form closely related to the topography.

Adding drama to the landscape the trio of the volcanic Eildon Hills elegantly overhangs the valley, and dominates from this position a wide area of Border scenery. Across the Leader, Black Hill echoes their shape and character, the whole area being seen to best advantage from the famous Scott's View above Dryburgh. Abbeys, bridges and mansion houses add variety of incident to this very humanised and cultivated landscape.

The Special Qualities of the Eildon and Leaderfoot National Scenic Area

- Great landscape diversity within a compact area
- The distinctive triad of the Eildon Hills
- Spectacular views from the hill summits
- A strongly united landscape pattern of lively rhythm and colour
- A richly wooded scene of great variety
- The Tweed, an iconic river of international renown
- A rich array of historic buildings, structures and estates
- The hub of Border settlement
- A harmonious and varied prospect from unequalled viewpoints
- Inspiration for the arts, literature and painting
- Border country ballads and battles
- The historic crossings of Leaderfoot
- Scott's View
- The Wallace Statue

Special Quality	Further information
• ***Great landscape diversity within a compact area***	
At the confluence of two rivers and with its dramatic hills arising from inhabited, pastoral surrounds, this area distils the essence of the Borders' landscape. Although a compact area, no one land use dominates the scene. Instead it contains a rich intermingling of landscape types, with sharp delineation between the long-established settlements, the fertile fields, the woodlands, the rough grazing and the steep, heather-clad slopes.	The NSA is situated where the Border uplands meet lower lying lands, encompassing areas of both and the transitional lands between. Six different landscape character types merge in the NSA: Grassland with Hills, East Gala Undulating Grasslands, Lowland Margin with Hills, Pastoral Upland Fringe of the Lower Leader Valley, Upland Fringe Valley, and Lowland Valley with Farmland. It is also the meeting point of three Regional Landscape Areas: the Tweed Lowlands, the Lammermuir and Moorfoot Hills, and the Central Southern Uplands.
• ***The distinctive triad of the Eildon Hills***	
The three Eildon Hills, with their strikingly isolated, heather-capped summits rising from the ordered farmland below, are the heart of the NSA. Their distinctive profiles instil a strong scenic drama, and the peaks have long been recognised for both their aesthetic appeal and their strategic	*'From almost any viewpoint on the Middle Tweed basin the triple summits of the Eildon Hills dominate the skyline, and they remain as aesthetically stimulating today as they must have been to the Iron Age people (who built a hill-fort on the northern summit) and to the Romans (who placed the aptly named fort Trimontium at their feet)…*' Whittow (1977) They are distinctive because: • They are isolated topographically, standing proud amidst other lower, less accentuated landform types.

importance. As identifiable landmarks, commanding attention from many viewpoints both near and far, the prominence of these three hills gives this NSA a particular focus and sense of place. The hills have become a cultural icon – a potent symbol of the Scottish Borders.	• They have concave slopes and pyramidal summits that contrast markedly with other Border hills (which are dome-shaped and merge into long ridges enclosing linear river valleys). • They have heather-topped, moorland summits rising dramatically from the Tweed-valley fields, pastures and woods. • They appear relatively natural within wider surroundings which are more managed and settled. The fact that there are three peaks provides a naturally balanced visual focus. They act as key locators, assisting in orientation because views of them change as one moves through the countryside. The number of peaks visible changes, with two generally seen from the north and all three from the south. The long history of strategic importance is witnessed by Eildon North having an Iron Age fort and a Roman signal station.
• ***Spectacular views from the hill summits***	
The summits of the hills provide unparalleled viewpoints for long-distant panoramas over the Border landscapes.	'*The Eildon Hills cannot be equalled as a viewpoint in the Border Country for, although their highest point is only 1,385 feet (422 metres), their central location and their isolation give then an advantage over some of their loftier neighbours*.' Whittow (1977) From the Eildon summits, the panorama extends: • Northwards across the Middle Tweed Basin, with a backdrop of the East Gala Undulating Grasslands to the east, and the Lammermuirs forming the outer visual boundary. • To the south, towards the hills of Liddesdale and Eskdale, and beyond appear the summits of the Cheviots.
• ***A strongly united landscape pattern of lively rhythm and colour***	
Land-use is distinctive and long-established, with the different uses set out over a strongly undulating landform and related to the topography and relief. The visual and spatial patterns formed by woodlands, enclosed fields, unenclosed moorlands, together with the colours of fallow or ploughed lands and pastures, all give a strong sense of unity and lively rhythm. The red-coloured soil and stone add warmth to the landscape. This patterning affects more than just the scenery. It imbues the entire landscape with a sense of place, affecting the way that the area is experienced spatially, in terms of movement, sound and shelter.	'*The country is extremely picturesque, valleys with fine trees and streams; intermingled with great cultivation*'. Queen Victoria (1817) Agricultural improvements exerted considerable impact in shaping the landscape seen today, while the influence of the earlier monastic estates has also been important. Distinctive elements that make-up this pattern and patchwork of colours are: • A pattern of rectilinear fields of grazed pasture, interspersed with arable, possibly dating from 18-19th Century agricultural improvements. • Field boundaries made up of hedgerows, lines of field trees and drystane dykes that highlight the landform by accentuating undulating land and flatter areas. • Woodlands of diverse species and age-structure, especially along the river valleys, with conifer plantations mainly on upland slopes. • Designed landscapes with their policy parklands and woodlands, and individual parkland trees.

	• The sinuous meandering of the river, with flatter haughlands and meadows enclosed by loops of the river. • River terraces that form distinct sinuous edges and linear undulating ridges, between the uplands and lower, flatter haughs. • Villages whose distinctive street layouts originated in the medieval period. • The red of ploughed soils in Lauderdale.
• ***A richly wooded scene of great variety***	
The variety of woodland adds greatly to the NSA, whether clothing the steep banks of a river or hill, providing shelter to the fields or occurring as individual parkland trees. The woods provide habitats for wildlife, a setting for buildings and settlements, and give an intimate, enclosed feel to many areas. With the presence of both broadleaves and conifers, the form, texture and colour varies both spatially and seasonally, adding great interest to the scene.	In the farmed valleys there are riparian woodlands along the Tweed; mixed woodland across steeper slopes; policy woodlands and parkland planting (with some policy woodlands, specimen parkland exotics). The River Tweed meanders cut through steep wooded slopes; tributaries of the Tweed cut through steep, wooded gullies. Diverse woodlands provide structure planting for designed landscapes and elsewhere farmland shelter. In the Leader Water, a narrower farmed valley, woodland is dense compared to elsewhere within the NSA, but it provides a framework for several fine buildings. The dome-shaped upland hills, containing the Leader Water are dissected and defined by steep slopes which form well defined wooded valleys. Melrose is especially well wooded to its south-west, where land is undulating and complex. Riverside poplars, especially bordering haughlands are distinctive (Sunnybrae at Leaderfoot, Mertoun Bridge).
• ***The Tweed, an iconic river of international renown***	
The River Tweed forms a strong serpentine feature as it meanders through the landscape, its banks varying from the flat, haughlands to steep-sided, wooded slopes. This powerful river forms the core of an essentially picturesque landscape. It is also of international renown, synonymous with excellent fishing.	The Tweed is the principal river of the Scottish Borders and, at 96 miles (155 km), the fourth longest in Scotland. In its middle reaches it flows through the NSA, between its confluence with Gala Water and the Leader Water. The river valley is broad with flat river terraces raised above the valley floor. Surrounding, dome-shaped, Border hills are cut by the Tweed's winding, incised course. Fishing on the Tweed has been a great source of food and profit since the 11th century. Anglers catch more salmon on the Tweed than any other river in the European Union, and it ranks among the very top salmon rivers in the world. Brown trout and grayling also provide good sport.
• ***A rich array of historic buildings, structures and estates***	
The area is rich historically and archaeologically, so that the landscape exhibits a distinct a time-depth. Within a small area can be found visible remains of structures and buildings dating back through Victorian, medieval and Roman times to the Iron Age.	The Iron Age hillfort on Eildon North sits on a very prominent landscape feature, and is one of the largest such sites in Scotland, particularly unusual for the presence of a Roman signal station within it. The Roman fort at Newstead is extremely well-known. Crop-mark evidence shows it sits within an earlier hub of pre-Roman settlement. Additionally there are the remains of the village of Old Melrose, the famous, ruined Border abbeys of Melrose and Dryburgh, villages dating from the medieval period, and

The ruins of Dryburgh Abbey, prominent within a horseshoe bend of the River Tweed, and Melrose Abbey, forming the focus of the town, are both renowned. The Eildon Hills, the Tweed and the surrounding area have lent themselves to the creation of designed landscapes and to the siting of follies, which are now key components of this landscape.	later designed landscapes. Both Dryburgh and Melrose were great ecclesiastical centres with large surrounding estates. Dryburgh Abbey is the most complete, although ruined complex, founded in 1150. Dryburgh Abbey evolved into the ornamented, designed landscape of Dryburgh Abbey House. Follies in the policies celebrate national history and the arts. Designed landscapes and agricultural estates were also created at Bemersyde, Priorwood House, Drygrange House, and Chiefswood.
• ***The hub of Border settlement***	
The sheltered valleys of the middle Tweed are well-cultivated, the hub of human population, settlement and activity in the Borders. Settlement is strongly related to the landform, the rivers and natural communication corridors, with buildings often set just above the flood plain. A blend of both English and Scottish settlement characteristics and elements in building-style create a strong Borders identity.	'*Most of these towns have developed as part of the tweed and knitwear manufacturing complex that has brought fame to the Scottish borders, utilizing the well-known Cheviot hill sheep and the availability of water power for the earliest looms…*' Whittow (1977) Stone is the traditional building material, a mixture of dark Silurian greywackes and ruddy Old Red Sandstone (reflecting the location of the towns astride a geological boundary). The strong Border identity of the settlements includes: • Some village greens (St Boswell's, Bowden). • A wooded setting to many of the settlements (Gattonside, Melrose). • Settlements historically tightly constrained. • A lack of large-scale development. • Individual farmsteads and estates. St Boswell's 40 acre common is reputedly the largest village green in Scotland.
• ***A harmonious and varied prospect from unequalled viewpoints***	
Many elevated viewpoints provide broad, sweeping views encompassing both wild-looking land and areas of more richly intimate, managed character. This varied prospect of beauty and grandeur is memorable. The balance, visual composition and variety of land use create an attractive landscape of great delight.	'*And what a varied prospect lies around!* *Of hills, and vales, and woods, and lawns, and spires*.' James Thomson, quoted in Andrews (1989) The scene is harmonious on account of the: • Clear hierarchy of visual dominance in views, the eye is drawn from the upland summits of the Eildons down to other scenic components in succession. • The balance between elements in the scene – so that woodland, open land, uplands and lowlands flow on from one another, with no element dominant. • The serpentine course of the Tweed that flows through the composition. Accessible ridges and key summits are found both within the NSA, at Black Hill, Bemersyde Hill, Craighouse, Clintmains, St Boswells, Gattonside; and from the variety of ridges and small rounded, isolated hills – outliers to the NSA.

- ***Inspiration for the arts, literature and painting***

The picturesque scenery around Melrose, Dryburgh and the Tweed has long been an inspiration to writers, poets, dramatists and artists, and contributed to the discovery of 'Nature' and its appreciation as a major subject in literature and the arts. The major influence in establishing its distinctive image and identity internationally in literature was Sir Walter Scott. He in turn introduced and enthused the renowned painter Turner, whose sketches and watercolours of the area were widely circulated as engravings in the nineteenth century. There are also strong associations with the landscape poet James Thomson, and through him Robert Burns.	Sir Walter Scott found inspiration for his work in this area, an example being his use of Melrose Abbey in *The Lay of the Last Minstre*l. The painter J.M.W.Turner visited Scott at Abbotsford in 1831 and his illustrations portray the NSA, highlighting the timelessness of its special qualities. These include *View of the Tweed with Melrose and the Eildon Hills* and *A view of the River Tweed and Dryburgh Abbey*. Between 1750 and 1850, there were three hundred separate editions of the poet James Thomson's The Seasons. '*No single British poet contributed more to awakening and broadening the appreciation of the natural world*' Andrews (1989). A Borderer, born in Kelso, he is commemorated by the Temple of the Muses, erected in 1817 on the banks of the Tweed within the NSA. Robert Burns wrote a poem *Address to the Shade of Thomson* for the opening of the temple.

- ***Border country ballads and battles***

The area is rich in romantic and historic associations, with Border ballads, legends and accounts of battles. Thomas the Rhymer is especially connected with the area. The Rhymer met with the Queen of Elfland on the Eildon Hills, and the ballad tells of the Eildon Tree. The Eildon Tree Stone, a large moss-covered boulder, lies on the road two miles west of Melrose. It marks the spot where the Fairy Queen led the Rhymer into the heart of the hills.	'*I can stand on the Eildon Hill,'* said Sir Walter Scott, *'and point out forty-three places famous in war and verse.'* There are long-established traditional oral and historical ties to this tract of Border landscape. Places associated with the legend of Thomas the Rhymer include Huntly Banks and Bogle Burn. Rhymer's Glen was created by Sir Walter Scott at his home in Abbotsford, just outwith the NSA. The symbol of the Eildon Tree has persisted as inspiration in Scottish modern poetry through the work of Sydney Goodsir Smith and through the Eildon Tree poetry magazine. It is said that beneath the Eildon Hills there is a hidden cave, which is the resting place of King Arthur.

Location-specific qualities

- ***The historic crossings of Leaderfoot***

The tightly constrained Leader Water meets the broad River Tweed at Leaderfoot, a site of historic river crossings. Bridges here comprise the distinctive and prominent Drygrange Viaduct with its nineteen slender piers, and the three-arched Drygrange Old Bridge.	The hills to the east and west of the Leader Water contrast with one another in form but together they enclose an intimate wooded and farmed valley. At its foot the river joins the Tweed; thereafter the Tweed enters a series of tighter meanders than elsewhere. The Drygrange Railway (Leaderfoot) Viaduct opened in 1865 for the Berwickshire Railway which ran from St Boswells to Reston. The railway was closed in 1964. Drygrange Old Bridge (1779-80) is a three-arched stone bridge, now closed to vehicular traffic. Traffic is now taken by a reinforced concrete and steel box girder Road Bridge

	(1971-73) a short distance downstream from this viewpoint.
• ***Scott's View***	
The Eildon Hills, their shapely, heather-clad summits rising above the neatly ordered fields and woodlands of the meandering Tweed, are best seen from Scott's View, a panoramic beauty spot high on Bemersyde Hill, above Dryburgh. This long-recognised, classic viewpoint is known to be one of Sir Walter Scott's most loved views; his funeral hearse stopped here as a mark of respect.	'*But it was Sir Walter Scott who brought most fame to these conical eminences, for the graceful lines of his "delectable mountains" stimulated some of his greatest writings and it is not by chance that his home, the famous Abbotsford, "that Romance in stone and lime", was built only a short distance away. The hills are best seen from the east, from the so-called Scott's View near Melrose, where …*' Whittow (1977)
• ***The Wallace Statue***	
A prime viewpoint to the Eildons is marked by a tall, red sandstone statue of William Wallace. He stands looking out over the Tweed, his broadsword in his right hand and his shield resting at his left. As one of the follies within Buchan's designed landscape at Dryburgh, its siting (as with other follies) indicates awareness and appreciation of the scenic beauties of the area, allied with a conscious historical and cultural expression.	The statue is some 31 ft high, made by John Smith of Darnick. Originally painted white, the statue was unveiled on 22nd September 1814. Born in 1742, the 11th Earl of Buchan was responsible for much of the building and development work on Dryburgh Estate during the early 19th century, including the Suspension Bridge, the Orchard and its Gates, The Temple of the Muses and the Wallace Statue. Buchan persuaded Sir Walter Scott to accept a burial plot at Dryburgh Abbey.

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Appendix E

Appendix E: Zetica Ltd., UXO Risk Map

UNEXPLODED BOMB RISK MAP

SITE LOCATION

Map Centre: 354681,634341

LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary | **industry** | **UXO find**
transport | **dock** | **Luftwaffe targets**
utilities | **other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.