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St Nicholas Waste Water Treatment Works Cardiff Wales

Archaeological Evaluation
Report No. 4366
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St. Nicholas Wastewater Treatment Works
Cardiff
Wales

Archaeological Evaluation

Report No. 4366

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Summary

An archaeological evaluation comprising the excavation and recording of 3no. 30m by 1.8m trial trenches was undertaken by CFA Archaeology Ltd at St Nicholas Wastewater Treatment Works, Cardiff, Wales from the 25th-27th September 2023. No archaeological features were identified in the trial trenches.

Crynodeb

Gwerthusiad archeolegol yn cynnwys cloddio a chofnodi 3no. 30m wrth 1.8m o ffosydd prawf ymgymerwyd gan CFA Archaeology Ltd yng Ngwaith Trin Dŵr Gwastraff St Nicholas, Caerdydd, Cymru rhwng 25 a 27 Medi 2023. Ni nodwyd unrhyw nodweddion archeolegol yn y ffosydd prawf.

1. INTRODUCTION

1.1 General

This report presents the results of an archaeological evaluation undertaken by CFA Archaeology Ltd (CFA) on behalf of Morgan Sindall, carried out between the 25th and the 27th of September 2023. The CFA site code and project number for the works are SNIC and 5073.

The work was carried out in accordance with a Written Scheme of Investigation (WSI) prepared by CFA Archaeology (CFA) on behalf of Morgan Sindall in accordance with the Archaeological Evaluation Project Design provided by Arcadis (Ewart-Blake 2023). It outlines the details for methodology for the archaeological evaluation undertaken for the proposed extension of the St Nicholas Wastewater Treatment Works.

1.2 Site Location and Description

The development site (hereafter the Site) was located 850m south of the village of St. Nicholas and 2km west of Cardiff. The existing St Nicholas Wastewater Treatment Works, centered at NGR: ST 08775 73310, occupies a 0.32ha triangular parcel of land and is surrounded by agricultural fields on all sides. Ground level at the southern end of the field was 61.96m above Ordnance Datum (aOD), rising to 67.11m aOD at the northern end of the field.

The Proposed Development is to upgrade the existing Wastewater Treatment Works, through extending it to cover 0.45ha of additional land adjacent to the eastern side of the existing works. The area will include works for a new permanent plant infrastructure, and a temporary works compound.

The proposed new plant will consist of:

- An above ground inlet works and screen;
- A below ground lift pumping station;
- A 15.5m diameter partially buried trickling filter;
- 2 No. 5m diameter partially buried humus tanks;
- 3 No. buried small return pumping stations;
- An above ground 30m3 sludge holding tank;
- An above ground motor control centre kiosk;
- A 600m2 reed bed; and
- Appropriate mitigation planting and ecological mitigation measures.

Of the above the sludge holding tank, liquor return pumping station, alkalinity dosing kiosk, wash water booster set, and an above ground de-sludge pump are located in the existing site boundary. No demolition or modifications to the plant on the existing WwTW are required, beyond provision of connections to the new equipment. The final settlement tank on the existing site will be retained, however, no longer used.

The geology of the Site consists of Mercia Mudstone Group (conglomerate) a sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period. (BGS 2023). The soils of the site are described as freely draining slightly acid but base-rich soils (LandIS 2023).

1.3 Historical and Archaeological Background

There are three scheduled monuments located within 1km of the Site. A Cultural Heritage Desk Based Assessment was undertaken by Arcadis which includes a full historic baseline of the site (Arcadis 2023). The following is a summary of the known archaeological and historical background of the Site and the area within a 1km radius. Numbers in parenthesis relate to NPRN numbers.

Prehistoric

The Scheduled Ancient Monument, Tinkinswood Chambered Tomb (GM009), is located c.485m east of the Site. Tinkinswood Chambered Tomb is one of the earliest Neolithic monuments in Wales and one of the best-preserved chambered tombs of its type in Europe, providing a nationally significant insight into the funerary and ritual landscapes of the Neolithic (Reynolds 2014). The monument comprises the remains of a chambered long cairn, dating to the early Neolithic period. A range of stones lie to the east and south-east of the monument which possibly represent standing stones or further chambered tombs (307726). The tomb was excavated in 1914 and found to be a Neolithic communal tomb of the Cotswold-Severn tradition, being trapezoidal in plan and forecourt with chamber opening off it. Excavations recovered 920 pieces of human bone from the tomb and the nearby area, thought to have come from roughly 40 individuals with a mixture of sexes and ages. Chambered Tombs are thought to have been constructed by local farming communities, and due to the quantity and variety of bone found it is likely that this tomb was used by a small community over an extended period of time, with evidence that it was used up until the end of the Neolithic period. A Bronze Age burial monument was discovered 100m from the original Neolithic Tomb during a Community Archaeology Project in 2014, showing a continued use of the funerary landscape (Reynolds 2014).

A second less well-preserved Neolithic Chambered Tomb is located c.830m north-west of the Site, the Schedule Ancient Monument Coed-y-Cwm Chambered Cairn (GM116). A handaxe was recovered during excavations in 1936.

St Lythans Chambered Tomb which also holds Scheduled Monument status (GM008) is located outside of the study area, c.1.55km to the south-west of the Site. The monument comprises the remains of a Neolithic burial chamber, constructed of the same mudstone as Tinkinswood mentioned above. Human remains and coarse pottery were recovered in 1875 from the interior (RCAHMW 1976, 39). Surface finds of a fine leaf-shaped arrowhead, a polished stone axe fragments and several flint flakes were discovered following severe erosion to the monument caused by cattle in 1992 (Driver 1993).

The presence of three Neolithic funerary monuments within the environs of the Site, points to an important and extensive funerary landscape within the area, several of the Sites also have evidence of continued use through to later periods.

The HER records two Bronze Age standing stones within c.1km of the Site. Redland Standing Stone (307721) is recorded c. 1km west-north-west of the Site and was observed several times during the 20th Century but on subsequent surveys has not been observed, it is possible that it was removed during the planting of a modern hedgerow. Cottrell Park Standing Stone (307723) is recorded 1c.km north-west of the Site.

Earthworks of a possible Iron-Age or Romano-British enclosure (420966) is recorded 1km south-east of the Site. The earthworks comprise a partial subrectangular cropmark which was observed during aerial reconnaissance in 2015. However, due to its proximity to Dyffryn House and gardens it may also represent a post-medieval garden feature.

Further evidence of possible prehistoric occupation within the area is recorded c.790m north-east of the Site where earthworks of a prehistoric or medieval field system (418652) were observed during aerial reconnaissance by RCAHMW in 2011.

Romano-British

In general, there is a reasonable paucity of Roman sites that are known about and researched adequately in Wales. Recorded Roman assets within the environs of the site include the former Roman road between Cardiff and Cowbridge, now the modern A48, which lies c. 900m north of the Site.

Medieval

The medieval Scheduled Ancient Monument Coed y Cwm Ringwork (GM117) is located c620m north-west of the Site. The monument comprises the remains of a well preserved castle-ringwork consisting of a circular bank and external ditch. Excavations in 1963-1965 revealed some structural with associated 12th century pottery.

The nearby village of St Nicholas was historically called Llaneinydd, and likely acquired its present name after the Norman conquest of Glamorgan. The village grew around the church and the medieval manor, which following the conquest likely belonged to Sir John Fleming. The Norman manor was subsequently divided in the 12th century and by the 16th century there were three controlling lords; Miles Button of Dyffryn, Rice Meyrick of the Cottrell estate, and the Earl of Pembroke. This division can still be seen the layout of the modern village in the arrangement of estates (Quick & Thomas 2001).

Post-Medieval to Modern

There are several Listed Buildings dating to the post-medieval period within 1km of the Site, all within the village of St Nicholas. These include Smiths Row northeast of the Site, also known as Blacksmiths Cottages, a row of three Grade II thatched cottages with three phases of construction the earliest of which dates to the 17th century (16323, 16324 and 16325). Opposite Smiths Row, on the south side of the A42 are the Grade II listed buildings of Tinkins Hall (13463) and Church Hall House (16326) which were both

formerly part of the Cory Institute. Constructed in 1896-7 by Lansdowne and Griggs Architects of Newport, as a Temperance Institute with Mission Hall, Coffee Tavern and Temperance Institute Rooms, commissioned by the Cory family who were well known local industrialists, philanthropists and supporters of the Temperance movement.

Immediately south of the Site are the remains of a post-medieval barn belonging to Brook farm, comprising a three-bay barn dating to the 18th Century (414419). The farm is depicted on both the Tithe map and OS 1st edition maps of the area.

1.4 Project Objectives

The aims of the evaluation were:

- To undertake a trial trench evaluation in order to establish the presence/absence, extent, condition, character, quality and date of any archaeological features or deposits;

- Where remains were present, to make a full record to current CIfA and GGAT standards;

- To establish the potential impacts of the proposed development and associated infrastructure and to allow mitigation measures to be proposed, where appropriate;

- To disseminate the results of the archaeological evaluation to the wider public in a manner appropriate to their significance, to be agreed with the client.

Selected research themes and priorities were derived from the Wales Archaeological Research Framework (IFA 2017) and are fully detailed in the Archaeological Evaluation Project Design (Ewart-Blake 2023).

2. ARCHAEOLOGICAL METHODS

2.1 Standards and Guidance

CFA Archaeology is a registered organisation with the Chartered Institute for Archaeologists (CIfA). Work was conducted with regard to the Institute's standards documents (CIfA 2020a-c), relevant Historic England guidance documents (Historic England 2011, 2015a, and 2015b), the GGAT Guide for Archaeology and Planning in South East Wales (GGAT 2023) and the WSI (Winslow, 2023). Recording of all elements was conducted following established CFA procedures. The archaeological works were undertaken in a method agreed in advance by the GGAT Archaeological Officer.

A visual inspection of the Site was undertaken before the commencement of works. This included identification of any surface features of potential archaeological interest, areas of potentially significant disturbance, and any hazards or constraints in undertaking further archaeological work on site.

2.2 Method of Excavation

No archaeologically led assessment, either intrusive or non-intrusive (beyond a walkover survey) has taken place in the Site or its immediate vicinity (within 250m). Therefore, the trenching approach used a non-targeted sample strategy.

Upon arrival, and due to the presence of other contractors conducting works on site, Trenches 1&2 were adjusted to avoid interference. These variations were recorded by GPS and transferred to a digital plan of the site (Fig. 1).

Three trenches measuring 30m x 2m, representing a 5% sample of the accessible area of the proposed development site, were excavated to assess the potential for surviving archaeological remains and depths of overburden.

The trenches were machine excavated using a 24" toothless ditching bucket operated under direct archaeological supervision. Topsoil and alluvium deposits encountered were excavated, in successive level spits of a maximum 0.2m thickness, to the natural substrate or to the first archaeological horizon encountered. Due to the Sites topography, whenever the natural substrate was not reached, it was exposed through the machine excavation of sondages at the southernmost edge of each trench, following approval of the GGAT Archaeological Officer.

Following the GGAT Archaeological Officer site visit, it was agreed to extend part of Trench 1 to the south-west, in order to further investigate a series of large stones (0104) that were found within the alluvium deposit (0102) in this trench. The stones were exposed, and the area was cleaned by hand in order to establish if the stones were part of a possible structure. Once it was established that no structure was present, the stones were recorded by GPS and photograph (Fig. 1.7).

2.3 Method of Recording

Once opened, the trenches were recorded by means of written records, drawings and photographs conforming to CIfA standards (CIfA 2020c) and CFA's quality manuals.

The location of the trenches were recorded using industry standard surveying equipment and tied to the OS National Grid. Vertical survey control was tied to the Ordnance Survey Datum.

Representative sections of each trench were recorded by means of a measured drawing at a scale of 1:10. The height of the datum on the drawing was calculated and recorded. The locations of sections were recorded on the site plans.

Photographs included an appropriate scale, an arrow to indicate the direction of north, and a photo information board. All photographs were recorded on a photographic register detailing the subject, location, and direction of shot. Photographs taken adhere to Historic England's guidance 'Digital Image Capture and File Storage' (Historic England, 2015). Photographs were taken with a high-resolution digital SLR camera with sensors exceeding 12 Mega pixels, using the highest quality setting. Photographs were stored in both JPEG and RAW formats and metadata were embedded in the RAW files,

including: the name of the site, the national grid reference for the site, the date, the subject, the direction of the shot, and reference to CFA Archaeology Ltd.

The trenches were machine backfilled on completion of excavation, after being signed off by the GGAT Archaeological Officer.

2.4 Artefact and Environmental Recovery

Spoil heaps and trenches were scanned for ferrous and non-ferrous metal artefacts using a metal detector capable of making this discrimination and operated by a capable metal detectorist. Modern (c.20th century onward) artefacts were noted but not retained. Collection and post-excavation work on artefacts follows current CIfA guidance (CIfA 2020c).

No deposits with the potential for conducting palaeobotanical or other soil analysis were not encountered.

2.5 Dissemination and Archiving

An archive was prepared by CFA Archaeology in accordance with the current guidelines (CIfA 2020c and the National Panel for Archives in Wales 2019) and arrangements were made for its deposit with the designated museum. A copy of the report (a single bound copy with PDF/A on CD) and accompanying data was submitted to the Glamorgan-Gwent Archaeological Trust (GGAT) in accordance with the 'Guidance for the Submission of Data to the Welsh Historic Environment Records' and 'Archaeological Archives: Selection, Retention and Disposal Guideline for Wales' (Welsh Archaeological Trust 2018; National Panel for Archaeological Archives in Wales 2019). A digital copy of the site archive will be deposited with the RCAHMW.

Phase	File/Box No.	Description	Quantity
Evaluation	File no. 1	Trench Record Sheets	3
		Digital photographic register sheets	1
		Drawing Sheet	1
		Context Register	1
		Finds Register	1
		Field Drawing Register	1

Table 1. Contents of the Archive

3. RESULTS

3.1 General

No archaeological features or deposits were observed in the trial trenches, and following the completion of recording, all 3 trenches were backfilled. A summary of the trenches can be found in Appendix 1 and a context summary can be found in Appendix 2.

3.2 Description of Stratigraphy

The stratigraphy across the site was generally uniform, and strongly influenced by the topography of the area: topsoil (suffixed -01 in each trench) was recorded overlying alluvial deposits (suffixed -02) which overlay the natural substrate (suffixed -03) (Figs. 7-8).

The topsoil consisted of dark brownish-grey, silty-sand containing occasional small to medium size rounded pebbles; the alluvium deposit was dark reddish-brown, silty-sand containing occasional medium and large sand stones, sub-angular and subrounded. The natural substrate was exposed in the northernmost part of Trenches 1 and 3, and in Trench 2 was visible in a sondage excavated at the south-western end of the trench, with a level of 60.12m AOD (Figs. 4-6). The natural geology was characterized by a light greyish-yellow, silty-clay with patches of red clay and frequent small and medium sub-angular and sub-rounded sand stones.

3.3 Trench 1

A series of irregularly sized sandstone blocks were identified towards the north-western end of Trench 1 and to further investigate these, the trench was extended c.3m to the west. After cleaning the stones, it became apparent that they were not part of any structure or archaeological feature, and they were noted cutting the alluvial layer within the trench.

4. CONCLUSION

Despite the historical importance of the area, with the Site having three scheduled monuments within 1km distance, no archaeological features or deposits were identified by the archaeological evaluation carried out at the St. Nicholas Wastewater Treatments Works.

The large stones (0104) recorded in Trench 1 were concentrated in an area of 7.25m x 4.12m within Trench 1 and its extension, with the largest stone measuring 1.10m x 0.5m. No visible cuts or evidence of a structure were recorded, and with the stones lying within the alluvial deposits in the trench, it can be suggested that they could have been imported into the site by previous landowners or that they were washed downhill at some point in the past.

No information was recorded from the Site that could provide new insight on research themes as outlined in the Wales Archaeological Research Framework.

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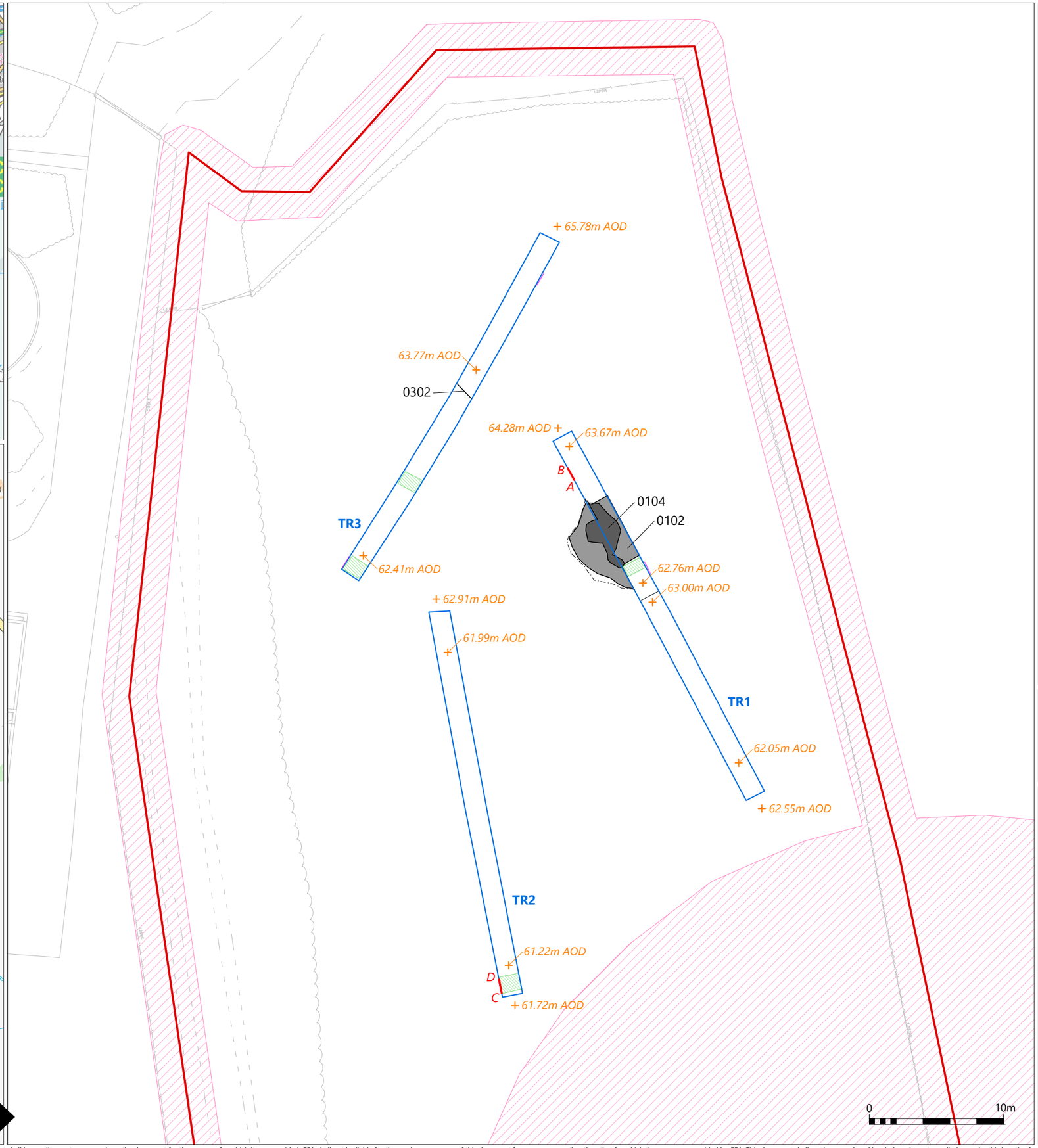
FIGURES



Key:

- Site Boundary
- Trench
- Archaeological Feature
- Sondage
- Inaccessible Area

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Title:
Site Location and Trench layout

Project:
St Nicholas Wastewater Treatment Works

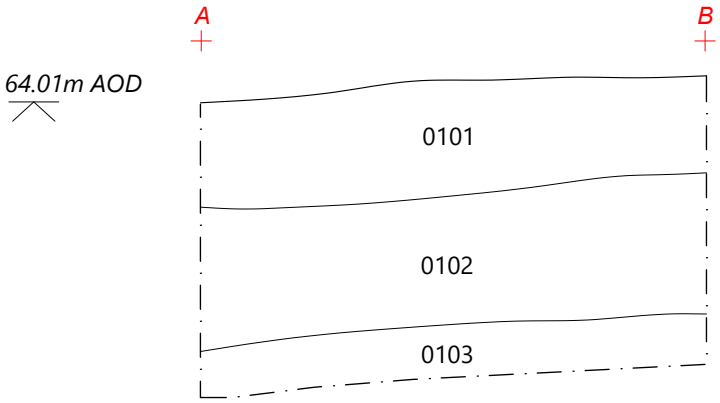
Client:
Morgan Sindall

Scale at A3:
1:300 (main inset)

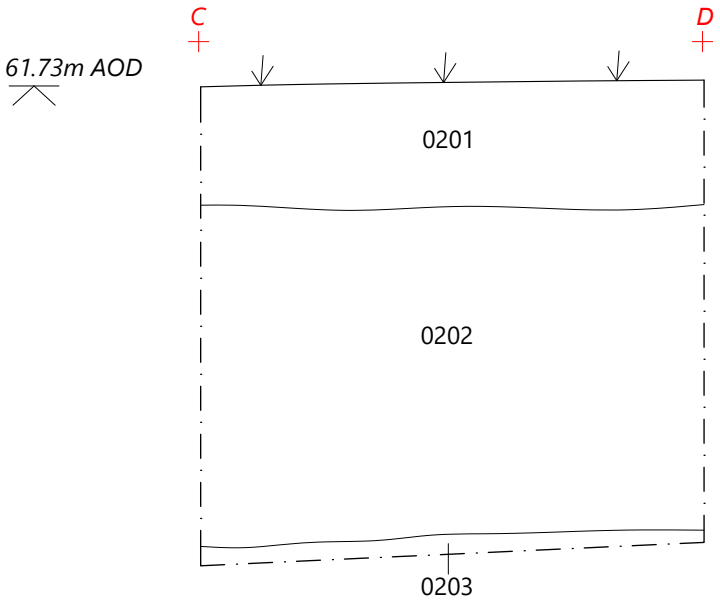
Drawn by:	Checked:	Date:
CA	SW	29/09/2023

Report No:	Fig. No:
4366	1

North-east facing representative section of Trench 1



East-North-East facing representative section of Trench 2



Title:	Client:
Representative Sections	Morgan Sindall

CFA ARCHAEOLOGY LTD

Project: St. Nicholas Wastewater Treatment Works

Scale at A4:	Drawn by:	Checked:	Date:	Report No:	Fig. No:
1:15	CA	SW	02/10/2023	4366	2

Fig. 3: View of site looking South-east

Fig. 4: General view of Trench 1 looking South-east

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Fig. 5: General view of Trench 2 looking South-south-east

Fig. 6: General view of Trench 3 Looking North-north-east

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Fig. 7: Representative section of Trench 1, looking South-west

Fig. 8: Representative section of Trench 3, looking West-south-west

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Fig.9: Large stone blocks (0104) within Trench 1, looking South

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	Project: St. Nicholas Wastewater Treatment Works	Checked: SW	Report No: 4366

Appendix 1: Trench Summary

Trench	Description
1	The trench was orientated NW/SE and the base of the trench sloped from NW 63.67m AOD to 62.05m to SW. Topsoil was up to 0.27m thick, overlying a 0.25m to 0.80m thick alluvium deposit. Underlying this was the natural silty clay geology. A spread of stones (104) was identified and investigated but this proved to be irregularly sized fragments of sandstone cut into the alluvial/natural layers, and not part of any structure or archaeological feature. No archaeological features were identified.
2	The trench was orientated NNW/SSE and the topography of the NNW edge sloped from 64.28m AOD to 62.55m AOD to the SSE edge. A sondage was dug at the southern end of the trench to determine the depth of the natural substrate. Topsoil was up to 0.25m thick, overlying an up to 0.92m thick alluvium deposit. Underlying this was the natural silty clay geology. No archaeological features were identified.
3	The trench was orientated NNE/SSW and the base sloped from 65.43m AOD at the NNE edge to 62.41m AOD to the SSE edge. A sondage was dug at the south-western end of the trench to determine the depth of the natural substrate. Topsoil was up to 0.27m thick, overlying a 0.20 to 0.70m thick alluvium deposit. Underlying this was the natural silty clay geology. No archaeological features were identified.

Appendix 2: Context Summary

Context No.	Trench	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Description
101	1	Layer					0.24-0.27	Topsoil. Dark grey-brown silty sand.
102	1	Layer					0.25-0.80	Subsoil. Alluvial deposit. Dark red-brown silty clay with large sandstone inclusions and occasional charcoal flecks.
103	1	Layer					-	Natural. Light yellow-grey clay with patches of clay-silt and sandstone.
104	1	Deposit					-	Irregularly sized sandstone blocks cut into alluvial/natural layers. On investigation did not form part of any structure or archaeological feature. Blocks were of varying sizes with the largest recorded 0.5m x 1.0m in size.
201	2	Layer					0.22-0.25	Topsoil. Dark grey-brown silty sand with occasional sub-rounded fragments of sandstone.
202	2	Layer					0.40-0.92	Subsoil. Alluvial deposit. Dark red-brown silty clay with small-medium sized sandstone inclusions. Contained an iron nail and two fragments of post-med pottery.
203	2	Layer					-	Natural. Encountered in sondage at south-eastern end of the trench. Light yellow-grey clay with patches of clay-silt and sandstone.
301	3	Layer					0.27	Topsoil. Dark grey-brown silty sand with occasional small-medium sized stones.
302	3	Layer					0.70	Subsoil. Alluvial deposit. Dark red-brown silty clay with large sandstone inclusions. Occasional charcoal flecking.
303	3	Layer	-				-	Natural. Light yellow-grey clay with patches of clay-silt and frequent sandstone inclusions.

Appendix 3: Written Scheme of Investigation

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WRITTEN SCHEME OF INVESTIGATION

St Nicholas Wastewater Treatment Works
Cardiff

Archaeological Evaluation

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This document has been prepared in accordance with CFA Archaeology Ltd standard operating procedures

St Nicholas Wastewater Treatment Works
Cardiff

Written Scheme of Investigation
Archaeological Evaluation

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St Nicholas Wastewater Treatment Works, Cardiff: Archaeological Evaluation

Written Scheme of Investigation

1. Introduction

1.1 This Written Scheme of Investigation (WSI) has been prepared by CFA Archaeology Ltd on behalf of Morgan Sindall in accordance with the Archaeological Evaluation Project Design provided by Arcadis (Ewart-Blake 2023). It outlines the details for methodology for undertaking an archaeological evaluation to be undertaken at St Nicholas Wastewater Treatment Works (NGR: ST 08775 73310). All evaluation work would be carried out in accordance with this document and with the research aims and objectives as set out in the Project Design (Appendix 1).

2. Site Background

2.1 The proposed development site (the Site) is located 850m south of the village of St. Nicholas and 2km west of Cardiff. The existing St Nicholas Wastewater Treatment Works occupies a 0.32ha triangular parcel of land and is surrounded by agricultural fields on all sides.

2.2 The Proposed Development is to upgrade the existing Wastewater Treatment Works, through extending it to cover 0.45ha of additional land adjacent to the eastern side of the existing works. The area will include works for a new permanent plant infrastructure, and a temporary works compound.

2.3 The proposed new development would also require a temporary construction access road. The temporary construction access road will extend from Dyffryn Lane in the east and cross agricultural fields in an approximate west, north-west and south-west orientation where it would adjoin the main part of the Proposed Development. The temporary construction access road would utilise the existing field gateways and be approximately 4m wide. The trees and hedgerows located between the existing treatment works and the new plant to the east will require removal to facilitate the Proposed Development and site access, though the hedgerow will be replanted following construction.

2.4 The proposed new plant will consist of:

- An above ground inlet works and screen;
- A below ground lift pumping station;
- A 15.5m diameter partially buried trickling filter;
- 2 No. 5m diameter partially buried humus tanks;
- 3 No. buried small return pumping stations;
- An above ground 30m3 sludge holding tank;

- An above ground motor control centre kiosk;
- A 600m2 reed bed; and
- Appropriate mitigation planting and ecological mitigation measures.

2.6 Of the above the sludge holding tank, liquor return pumping station, alkalinity dosing kiosk, wash water booster set, and an above ground de-sludge pump are located in the existing site boundary. No demolition or modifications to the plant on the existing WwTW are required, beyond provision of connections to the new equipment. The final settlement tank on the existing site will be retained, however, no longer used.

2.7 The geology of the Site consists of Mercia Mudstone Group (conglomerate) a sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period. (BGS 2023). The soils of the site are described as freely draining slightly acid but base-rich soils (LandIS 2023).

3. Historic and Archaeological Background

3.1 There are three scheduled monuments within 1km of the Site. A Cultural Heritage Desk Based Assessment was undertaken by Arcadis which includes a full historic baseline of the site (Arcadis 2023). The following is a summary of the known archaeological and historical background of the Site and the area within a 1km radius. Numbers in parenthesis relate to NPRN numbers.

Prehistoric

3.2 The Scheduled Ancient Monument, Tinkinswood Chambered Tomb (**GM009**), is located c.485m east of the Site. Tinkinswood Chambered Tomb is one of the earliest Neolithic monuments in Wales and one of the best-preserved chambered tombs of its type in Europe, providing a nationally significant insight into the funerary and ritual landscapes of the Neolithic (Reynolds 2014). The monument comprises the remains of a chambered long cairn, dating to the early Neolithic period. A range of stones lie to the east and south-east of the monument which possibly represent standing stones or further chambered tombs (**307726**). The tomb was excavated in 1914 and found to be a Neolithic communal tomb of the Cotswold-Severn tradition, being trapezoidal in plan and forecourt with chamber opening off it. Excavations recovered 920 pieces of human bone from the tomb and the nearby area, thought to have come from roughly 40 individuals with a mixture of sexes and ages. Chambered Tombs are thought to have been constructed by local farming communities, and due to the quantity and variety of bone found it is likely that this tomb was used by a small community over an extended period of time, with evidence that it was used up until the end of the Neolithic period. A Bronze Age burial monument was discovered 100m from the original Neolithic Tomb during a Community Archaeology Project in 2014, showing a continued use of the funerary landscape (Reynolds 2014).

3.3 A second less well-preserved Neolithic Chambered Tomb is located c.830m north-west of the Site, the Schedule Ancient Monument Coed-y-Cwm Chambered Cairn (**GM116**). A handaxe was recovered during excavations in 1936.

3.4 St Lythans Chambered Tomb which also holds Scheduled Monument status (**GM008**) is located outside of the study area, c.1.55km to the south-west of the Site. The monument comprises the remains of a Neolithic burial chamber, constructed of the same mudstone as Tinkinswood mentioned above. Human remains and coarse pottery were recovered in 1875 from the interior (RCAHMW 1976, 39). Surface finds of a fine leaf-shaped arrowhead, a polished stone axe fragments and several flint flakes were discovered following severe erosion to the monument caused by cattle in 1992 (Driver 1992).

3.5 The presence of three Neolithic funerary monuments within the environs of the Site, points to an important and extensive funerary landscape within the area, several of the Sites also have evidence of continued use through to later periods.

3.6 The HER records two Bronze Age standing stones within c.1km of the Site. Redland Standing Stone (**307721**) is recorded c. 1km west-north-west of the Site and was observed several times during the 20th Century but on subsequent surveys has not been observed, it is possible that it was removed during the planting of a modern hedgerow. Cottrell Park Standing Stone (**307723**) is recorded 1c.km north-west of the Site.

3.7 Earthworks of a possible Iron-Age or Romano-British enclosure (**420966**) is recorded 1km south-east of the Site. The earthworks comprise a partial sub-rectangular cropmark which was observed during aerial reconnaissance in 2015. However, due to its proximity to Dyffryn House and gardens it may also represent a post-medieval garden feature.

3.8 Further evidence of possible prehistoric occupation within the area is recorded c.790m north-east of the Site where earthworks of a prehistoric or medieval field system (**418652**) were observed during aerial reconnaissance by RCAHMW in 2011.

Romano-British

3.9 In general there is a reasonable paucity of Roman sites that are known about and researched adequately in Wales. Recorded Roman assets within the environs of the site include the former Roman road between Cardiff and Cowbridge, now the modern A48, which lies c. 900m north of the Site.

Medieval

3.10 The medieval Scheduled Ancient Monument Coed y Cwm Ringwork (**GM117**) is located c620m north-west of the Site. The monument comprises the remains of

a well preserved castle-ringwork consisting of a circular bank and external ditch. Excavations in 1963-1965 revealed some structural with associated 12th century pottery.

3.11 The nearby village of St Nicholas was historically called Llaneinydd, and likely acquired its present name after the Norman conquest of Glamorgan. The village grew around the church and the medieval manor, which following the conquest likely belonged to Sir John Fleming. The Norman manor was subsequently divided in the 12th century and by the 16th century there were three controlling lords; Miles Button of Dyffryn, Rice Meyrick of the Cottrell estate, and the Earl of Pembroke. This division can still be seen the layout of the modern village in the arrangement of estates (Quick & Thomas 2001).

Post-Medieval to Modern

3.12 There are several Listed Buildings dating to the post-medieval period within 1km of the Site, all within the village of St Nicholas. These include Smiths Row north-east of the Site, also known as Blacksmiths Cottages, a row of three Grade II thatched cottages with three phases of construction the earliest of which dates to the 17th century (**16323, 16324** and **16325**). Opposite Smiths Row, on the south side of the A42 are the Grade II listed buildings of Tinkins Hall (**13463**) and Church Hall House (**16326**) which were both formerly part of the Cory Institute. Constructed in 1896-7 by Lansdowne and Griggs Architects of Newport, as a Temperance Institute with Mission Hall, Coffee Tavern and Temperance Institute Rooms, commissioned by the Cory family who were well known local industrialists, philanthropists and supporters of the Temperance movement.

3.13 Immediately south of the Site are the remains of a post-medieval barn belonging to Brook farm, comprising a three-bay barn dating to the 18th Century (**414419**). The farm is depicted on both the Tithe map and OS 1st edition maps of the area.

4. Previous Archaeological Investigations

4.1 No previous intrusive archaeological investigations have taken place within the boundary of the Site; however, a trial trenching evaluation has been undertaken on the fields directly to the south, west and north-west of the Site as part of a larger trial trenching evaluation scheme.

4.2 The trial trenches in the fields adjacent to the site found evidence of former post-medieval field boundaries, which were identified through a geophysical survey and historical mapping. A square ditched enclosure was also identified by the geophysical survey in the fields adjacent to the Site but was not excavated as part of the trial trenching evaluation (Glass et al. 2022).

5. Project Objectives

5.1 The aims of the evaluation are:

- To undertake a trial trench evaluation in order to establish the presence/absence, extent, condition, character, quality and date of any archaeological features or deposits;
- Where remains are present, make a full record to current CIfA and GGAT standards;
- To establish the potential impacts of the proposed development and associated infrastructure and to allow mitigation measures to be proposed, where appropriate;
- To disseminate the results of the archaeological evaluation to the wider public in a manner appropriate to their significance, to be agreed with the client.

5.2 Selected research themes and priorities have been derived from the *Wales Archaeological Research Framework* (IFA 2017) and are fully detailed in the Archaeological Evaluation Project Design (Ewart-Blake 2023, Appendix 1).

6. Archaeological Methods

6.1 CFA Archaeology is a registered organisation with the Chartered Institute for Archaeologists (CIfA). Work will be conducted with regard to the Institute's standards documents (CIfA 2020a-c), relevant Historic England guidance documents (Historic England 2011, 2015a, and 2015b), *GGAT Guide for Archaeology and Planning in South East Wales* (GGAT 2023) and this WSI. Recording of all elements will be done following established CFA procedures. The archaeological works will be undertaken in a method agreed by the GGAT Archaeological Officer.

6.2 Should there be unexpectedly significant or complex discoveries that warrant more detailed recorded than is described in this WSI, the archaeological contractor, CFA Archaeology Ltd, will contact the GGAT Archaeological Officer with the relevant information.

6.3 A visual inspection of the Site will be undertaken before the commencement of works. This will include identification of any surface features of potential archaeological interest, areas of potentially significant disturbance, and any hazards or constraints in undertaking further archaeological work on site.

Method of Excavation

6.4 No archaeologically led assessment, either intrusive or non-intrusive (beyond a walkover survey) have taken place in the Site or its immediate vicinity (within 250m). Therefore, the trenching approach uses a non-targeted sample strategy. Trenches will be positioned, where practicable, based upon the plan given in Figure 1. This may be subject to change due to the presence of fenced-off areas

within the Site that have not been recorded on available mapping but were visible during the Site Visit and will need to be avoided. Any variations will be recorded by GPS and transferred to a digital plan of the site.

6.5 Three trenches measuring 30m x 2m, representing a 5% sample of the accessible area of the proposed development site have been located, to assess the potential for surviving archaeological remains and depths of overburden. The locations of these trenches are not targeted and have been placed in a standard trench array to assess the archaeological potential of the trenchable area of the Site, as depicted on Figure 1.

Trench No.	Target
1	Standard trench array
2	Standard trench array
3	Standard trench array

Table 1: Summary of Trenches and Potential Archaeology

6.6 The trenches will be machine excavated using a wide toothless ditching bucket operated under direct archaeological supervision. Topsoil and subsoil will be removed to the level of the natural substrate or the first significant archaeological horizon, whichever is reached first, in successive level spits of a maximum 0.2m thickness. Machine excavation will be halted if archaeological deposits are encountered and any further excavation required to fulfil the objectives of the evaluation will be carried out by hand, unless otherwise agreed with the GGAT Archaeological Officer. Trenches will not exceed 1m in depth, should the natural geology or archaeological horizon not be found at this depth a single sondage will be excavated at one end of the trench to discern this, under agreement of the GGAT Archaeological Officer.

6.7 Samples of all features of archaeological interest will be hand excavated in an archaeologically controlled and stratigraphic manner in order to establish their likely date, nature, extent, and condition. The complete stratigraphic sequence, down to natural geological deposits, will be excavated and all inter-relationships and intersections between features will be investigated.

6.8 A minimum 25% sample will be taken of any linear features, such as ditches or trackways, and all ditch, gully, and other feature termini will be investigated. Each sample section should be at least 1m long and, where possible, located and recorded adjacent to the trench edge.

6.9 A minimum 50% sample of discrete features, such as pits, postholes, stake holes, and kilns will be excavated. Where possible, sample sections will be located and recorded adjacent to the trench edge.

6.10 Built structures such as walls and floors will be exposed and preserved in-situ for further excavation in more appropriate circumstances, to be agreed with the GGAT Archaeological Officer.

Method of Recording

6.11 All excavation and on-site recording will be carried out according to standard CFA procedures, principally by drawing, photography, and completing standard CFA record forms.

6.12 The location of the trenches will be recorded using industry standard surveying equipment and tied to the OS National Grid. Vertical survey control will be tied to the Ordnance Survey Datum.

6.13 Sections will be recorded by means of a measured drawing at an appropriate scale, typically at 1:10. The height of a datum on the drawing will be calculated and recorded. The locations of sections will be recorded on the site plans.

6.14 Cut features will be recorded in profile, hand planned at an appropriate scale, normally 1:20, and their location accurately identified on the appropriate trench and site plans.

6.15 Photographs will include an appropriate scale, an arrow to indicate the direction of north, and a photo information board. All photographs will be recorded on a photographic register detailing subject, location, and direction of shot. Photographs taken will adhere to Historic England's guidance '*Digital Image Capture and File Storage*' (Historic England, 2015). Photographs should be taken with a high-resolution digital SLR camera with sensors exceeding 12 Mega pixels and taken using the highest quality setting. Photographs should be stored in both JPEG and RAW formats and metadata will be embedded in the RAW files, to include: the name of the site, the national grid reference for the site, the date, the subject, the direction of the shot, and reference to CFA Archaeology Ltd.

6.16 The trenches will be machine backfilled on completion of excavation once sign-off has been received from the GGAT Archaeological Officer.

Artefact and Environmental Recovery

6.17 Spoil heaps and trenches are to be scanned for ferrous and non-ferrous metal artefacts using a metal detector capable of making this discrimination and operated by a capable metal detectorist. Modern (*c*. 20th century onward) artefacts are to be noted but not retained.

6.18 All artefacts, including faunal remains, will be retained for analysis. Post-excavation storage requirements will be assessed. Modern finds (*c*. 20th century onward) will be recorded but not retained. Collection and post-excavation work on artefacts will follow current CIfA guidance (CIfA 2020c).

6.19 If any finds are uncovered which may fall under the purview of the Treasure Act 1996, the terms of the aforementioned Act will be followed. Any finds will be

removed to a safe place and reported to the local coroner. Where removal cannot be affected on the same day as discovery, suitable security measures will be taken to protect the finds from theft.

6.20 Any human remains encountered will be reported to the appropriate authorities and left *in situ*, covered and protected. The discovery of any human remains will be reported to the GGAT Archaeological Officer. If removal is deemed necessary, a Ministry of Justice Burial License will be obtained, and excavation will comply with the relevant regulations and government guidelines.

6.21 CFA's Palaeoenvironmental specialist will: assess the environmental potential of the site; advise on whether the deposits have potential for conducting palaeobotanical or other soil analysis; and assess the potential for the preservation of faunal remains. Environmental sampling will be carried out in accordance with current guidelines (Historic England 2011), namely that bulk samples will be taken from all securely stratified deposits using a strategy of systematic and judgement sampling.

6.22 Samples will consist of 40 litres of environmental material recovered from, at a minimum, the basal deposits of any archaeological features. Environmental samples will not usually be recovered from intersections or unclear relationship sample sections.

7. Analysis and Reporting

7.1 Artefact and Environmental Sample Analysis

7.1.1 All finds, if appropriate, will be retained, washed, and assessed in accordance to accepted professional standards. For all categories of material recovered, including finds, paleoenvironmental, industrial, and other specialist samples, an assessment by an appropriately experienced specialist will be undertaken. Samples will be processed and sorted, and any artefacts recovered provided to the appropriate specialist(s) to be considered alongside the hand-recovered material. Basic stratigraphic information will be supplied to the project specialists.

7.1.2 All finds are to be treated in accordance with current best practice guidance (Historic England. 2011). Finds will be cleaned and marked according to accepted principles and in line with appropriate period/material guidelines.

7.1.3 For ceramic assemblages, recording shall be carried out in a manner compatible with existing typological series in local pottery reference collections. The guidelines for handling ceramics will be followed for relevant material (Barclay, et al 2016).

7.1.4 Environmental samples will be processed to aid in the recovery of artefactual material, including ceramics, animal and fish bones, human remains, industrial

residues, charcoal, and mineralised plan remains. Specialist samples such as monoliths or cores will be processed separately, as appropriate.

7.1.5 Where material suitable for scientific dating is recovered, such as charcoal or bone, sufficient dating will be undertaken to meet the aims of the evaluation. These materials will be identified to species and assessed for suitability prior to submission to a dating laboratory.

7.1.6 Artefact assessment reports will include the production of a descriptive catalogue including quantification of finds by context and discussion or interpretation, if appropriate. Finds critical for dating or interpretation will be illustrated or digitally photographed. Environmental assessment reports will include the identification of the remains, a quantification by context, appropriate discussion or interpretation, and a description of the processing methodology.

7.2 Reporting

7.2.1 A report will be produced which includes background information on the project, a description of the methodology, and a full description and interpretation of the results.

7.2.2 Specifically, the report will contain:

- A concise non-technical summary of the project results;
- The site location given as an 8-figure grid reference;
- A front cover/frontispiece which includes the planning application number and the national grid reference of the site;
- The dates on which the work was undertaken;
- A description of the site location and geology;
- A description of the historic and archaeological background of the site;
- An explanation of any agreed variations from the WSI, including justification for any work not undertaken;
- A description of the methodology employed, work undertaken, and the results obtained;
- Contexts and feature descriptions;
- Maps and other illustrations at an appropriate scale including all trench plans and trench sections and detailed plans of all excavated features;
- A specialist assessment report for all finds materials including palaeoenvironmental and other samples;
- A description of any environmental or other specialist work undertaken and outline of the results obtained;
- A selection of photographs of work in progress;
- Recommendations regarding the need for, and scope of, any further archaeological work;
- A discussion of how the work contributed to the aims and objectives set out in the project design;
- A bibliography;

- A context index;
- An archive index;

7.2.3 A draft copy of the report will be issued to the Client for comment before being finalised usually within 6 weeks of the completed fieldwork. One digital (PDF-A format) and one hard copy of the final report will be deposited with the HER. This will ensure that the report is made available as a public document as part of the HER. The deposition of the report to the HER will follow all guidance as outlined in the *Guidance for Submission of Data to the Welsh Historic Environment Records* (2022) which would include a summary description of the project in both English and Welsh.

7.2.4 If significant remains are encountered, then arrangements will be made for the publication of results within an appropriate journal.

7.3 Archive Preparation and Deposition

7.3.1 An archive will be prepared by CFA Archaeology in accordance with the current guidelines (CIfA 2020c and National Panel for Archives in Wales 2019) and arrangements will be made for its deposit with the designated museum. A copy of the report (a single bound copy with PDF/A on CD) and accompanying data will be submitted to the Glamorgan-Gwent Archaeological Trust (GGAT) in accordance with the '*Guidance for the Submission of Data to the Welsh Historic Environment Records*' and '*Archaeological Archives: Selection, Retention and Disposal Guideline for Wales*' (Welsh Archaeological Trust 2018; National Panel for Archaeological Archives in Wales 2019).

7.3.2 CFA are ISO 9001 accredited, with all our internal archiving and digital record systems being fully compliant with CIfA Standards and Guidance, particularly the guidance on Planning and Data Management Plans for Archaeological Projects (2022). The digital archive will be subject to a selection process, depending on the results of the works, and the resulting digital archive will be deposited with the Archaeological Data Service (ADS). A digital copy will also be sent to the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW). All digital deposition will be undertaken in line with guidance from ADS (2023), RCAHMW (2015) and CIfA (2022).

7.3.3 Consent for full transfer of title of finds to the recipient museum will be agreed in principle with the landowner at the outset. Confirmation of transfer of title from the landowner, and confirmation of assignment of copyright, along with a full archive inventory, will be submitted with a project completion form to the recipient museum. The GGAT HER Officer will be provided with a copy of the completion form.

7.3.4 The recipient museum will be licensed to use the deposited material in perpetuity, without restrictions; this licence will allow the archive to reproduce

material, including for use by third parties, with the copyright owner suitably acknowledged.

7.3.5 The requirements of the repository will be adhered to, and the GGAT HER will be notified in advance. Contact will be made with the archiving museum prior to the start of any fieldwork to confirm their acceptance of the archive and to receive an accession number. The nominated museum will be notified at set stages of the project, including at project initiation (comprising a project initiation form), a mid-point review, and completion stages, to discuss archaeological archiving requirements.

8. Resources and Programming

8.1 Key Personnel

8.1.1 **Phil Mann** (BA MCIfA) is Senior Project Manager for CFA Archaeology. Phil has project managed numerous archaeological projects of all periods throughout the country including those undertaken for large infrastructure projects.

8.1.2 A **Field Director** from CFA will be selected from CFA's pool of Field Officers, depending on availability, all of whom have appropriate experience. The CV for the selected Field Officer can be forwarded prior to the start of the project.

8.1.3 **Dr Shelly Werner** (BSc MPhil PhD) is CFA's Graphics Manager, responsible for the organisation and management of all GIS, CAD and Illustrative material. She is an experienced illustrator with specialist knowledge in GIS consultancy and standing building survey and has worked on a variety of projects in Scotland and England.

8.1.4. Post-excavation and environmental coordination will be managed by CFAs post excavation and archiving manager **Christina Hills**; CVs for CFA's 'in house' specialists or external consultants can be supplied on request.

8.2 Project Specialists

Archaeobotany	Mhairi Hastie BSc MSc ACIfA (CFA Archaeology)
Archaeozoology	Hannah Russ MA PhD FSA
Ceramic building material	Phil Mills BA MA PhD
Clay pipes	Peter Hammond
Conservation laboratory	Ian Panter (York Archaeological Trust)
Dendrochronology	Ian Tyers
Industrial residue	Gerry McDonnell PhD
Leather	Quita Mould
Mollusca and fish remains	Hannah Russ MA PhD FSA
Neolithic and Bronze Age pottery	Alex Gibson PhD
Osteoarchaeology	Malin Holst MSc

Palynology	Robert McCulloch BA PhD (University of Stirling)
Post-medieval small finds	Gail Drinkall
Post-Roman pottery	Paul Blinkhorn BA PhD
Roman and Pre-Roman Iron Age pottery	Jamie Walker (CFA Archaeology) Jane Timby
Roman glass	Hilary Cool
Soil micromorphology	Clare Ellis BA PhD MCIfA
Worked bone	Gail Drinkall
Worked Flint and Stone	Ann Clarke

Table 2: List of Artefact and Ecofact Specialists

8.2.1 The above list is not exhaustive, should unusual or locally specific archaeological materials be discovered; appropriate specialists will be source.

8.3 Health and Safety

8.3.1 CFA has an ISO45001 certified health and safety management system. All CFA staff have been inducted into CFA's Health and Safety Policy and will operate with due regard for Health and Safety regulations. All work for the project will be subject to Risk Assessment procedures and a Risk Assessment (RA) will be produced, disseminated, and agreed with all staff on site.

8.4 Monitoring

8.4.1 Close contact will be maintained with the client and the GGAT Archaeological Officer for the purposes of monitoring the project. Important or unexpected discoveries will be communicated to them, and a monitoring visit will be arranged if appropriate. Any monitoring visit will include a site tour and overview by the senior archaeologist present and the opportunity will be afforded to view all trenches, any artefactual finds still on site, and any records that are not in immediate use.

8.4.2 Any deficiencies noted during the site monitoring visit will be made good to the satisfaction of the GGAT Archaeological Officer by the next agreed site meeting.

8.4.3 The GGAT Archaeological Officer will be provided with a minimum 10 working days' notice of the commencement of on-site works. Contact numbers for the site will be forwarded in advance of the work starting.

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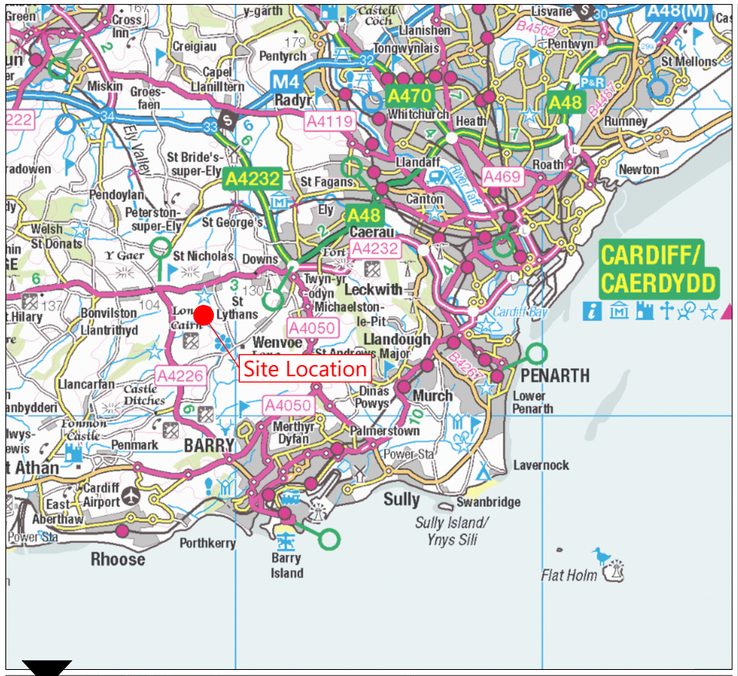
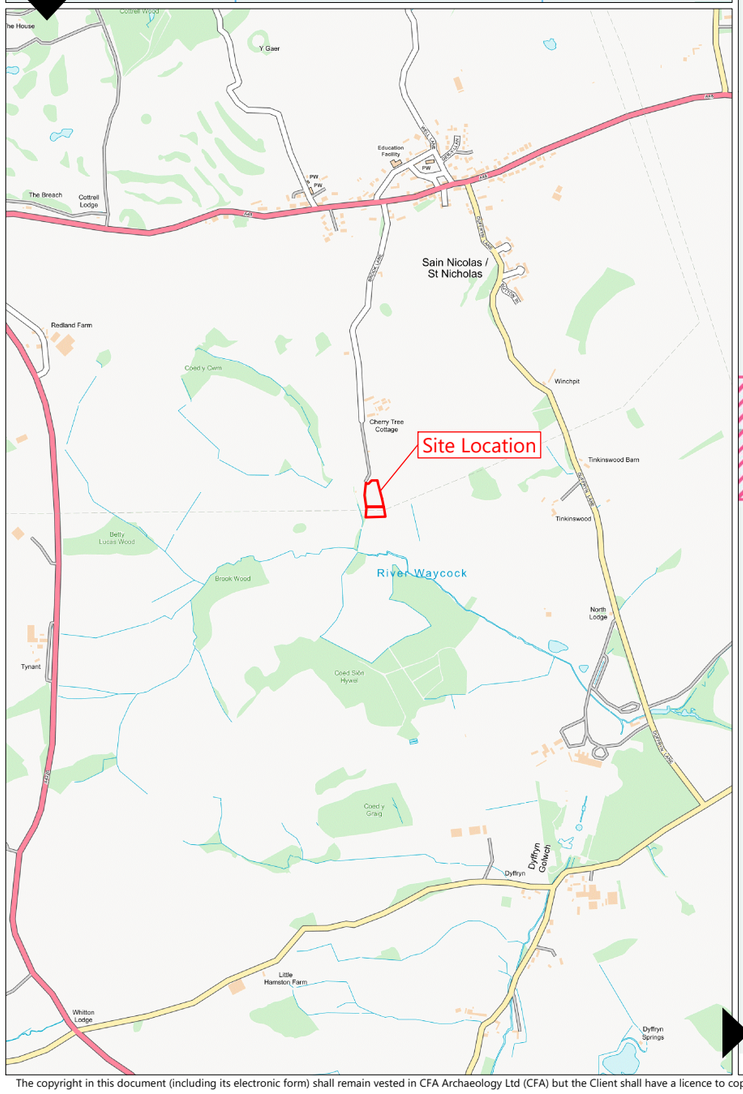
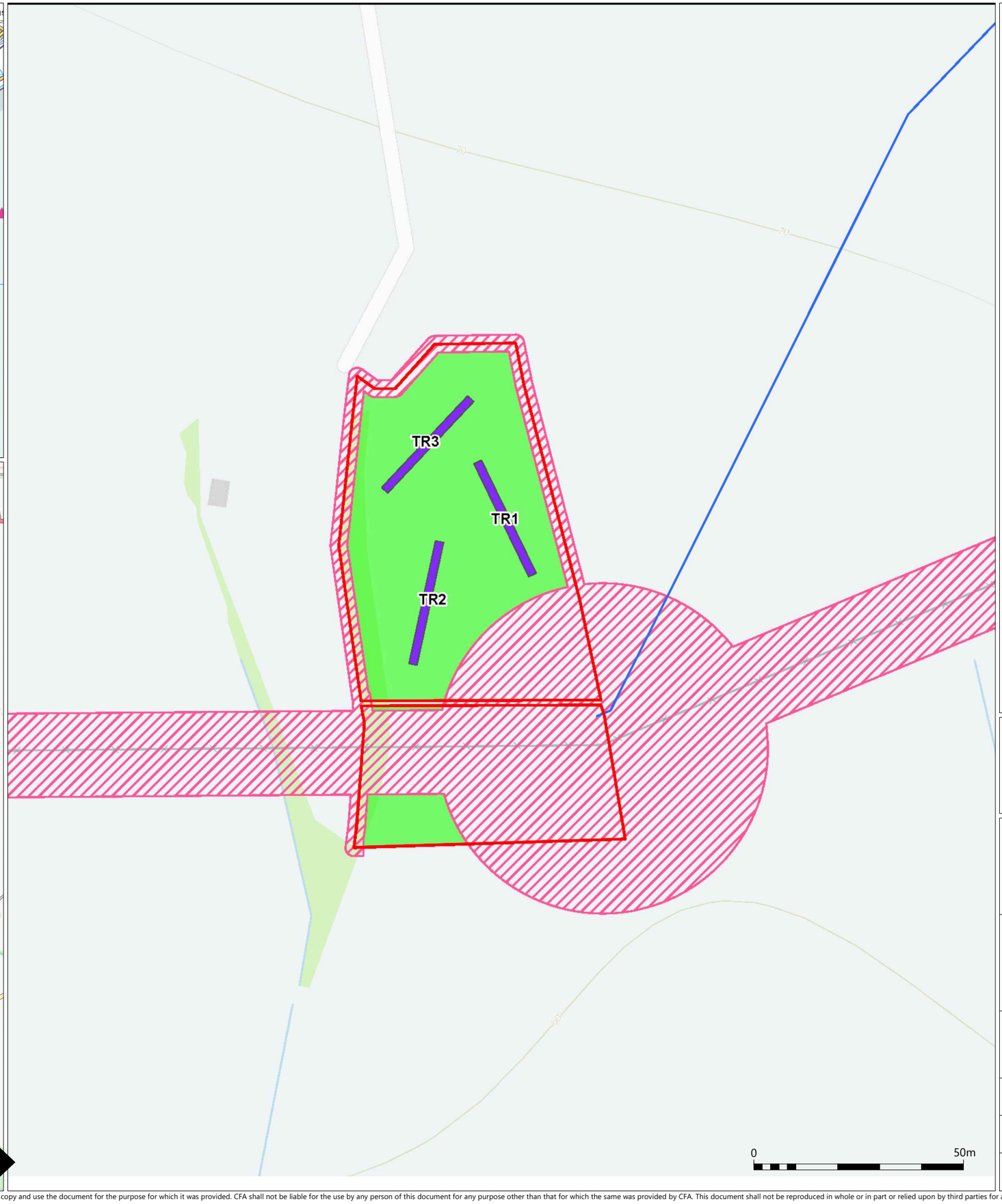
Figure 1







Key:

- Site Boundary
- Trench
- Inaccessible Area

CFA ARCHAEOLOGY LTD

Title:
Site Location and Trench Layout

Project:
St Nicholas Wastewater Treatment Works, Cardiff

Client:
Morgan Sindall

Scale at A3:
1:1,000 (main inset)

Drawn by:	Checked:	Date:
CA	SW	29/08/2023

Report No:	Fig. No:
n/a	1

Appendix 1

Dŵr Cymru Welsh Water and Morgan Sindall

St. Nicholas Wastewater Treatment Works Archaeological Evaluation Project Design

Document Ref: B10181-0AG964-ZZ-ZZ-RP-CA-AL0241

Revision: 01

Dŵr Cymru Welsh Water and Morgan Sindall

St. Nicholas Wastewater Treatment Works Archaeological Evaluation Project Design

Author	Jana Ewart-Blake
Checker	Daniel Evans
Reviewer	Jenny Wylie
Approver	Simon Peck
Document Ref.	B10181-0AG964-ZZ-ZZ-RP-CA-AL0241
Date	JUNE 2023

Version Control

Version	Date	Author	Checker	Reviewer	Approver	Changes
01	**12/06/2023**	**J. Ewart-Blake**	**D. Evans**			**First Draft and Checker Review**
01	**16/06/2023**	**J. Ewart-Blake**	**D. Evans**	**J. Wylie**		**Amended after Technical Review**
01	**23/06/2023**	**J. Ewart-Blake**	**D. Evans**	**J. Wylie**	**S. Peck**	**Final**

Contents

Figures

1 Introduction

1.1.1 Arcadis Consulting (UK) Limited (Arcadis) has been commissioned by Welsh Water ('the Client') to design a phase of evaluative archaeological trial trenching specific to the proposed extension of the St. Nicholas Wastewater Treatment Works. The project location is at St. Nicholas Wastewater Treatment Works, Cardiff, CF5 6TB (Hereafter referred to as 'The Site').

1.1.2 The archaeological evaluation will comprise a phase of non-targeted archaeological trial trenching, utilising a total of 3 trenches (30m x 2m) representative of a 5% sample size, of the trenchable area of the Site (calculated at 0.354 ha). The purpose of the works is to further understand and characterise the nature of the archaeological resource within the Site.

1.2 Project Background

1.2.1 The Proposed Development is to upgrade the existing Wastewater Treatment works by, extending it to cover 0.45ha of additional land adjacent to the existing work's eastern side. The 0.45ha area will include works for new permanent plant infrastructure, as well as a temporary works compound during the construction period to be located immediately south of the proposed permanent infrastructure.

1.2.2 The proposed new development would also require a temporary construction access road. The temporary construction access road will extend from Dyffryn Lane in the east and cross agricultural fields in an approximate west, north-west and south-west orientation where it would adjoin the main part of the Proposed Development. The temporary construction access road would utilise the existing field gateways and be approximately 4m wide. The trees and hedgerows located between the existing treatment works and the new plant to the east will require removal to facilitate the Proposed Development and site access, though the hedgerow will be replanted following construction.

1.2.3 The proposed new plant will consist of:

- An above ground inlet works and screen;
- A below ground lift pumping station;
- A 15.5m diameter partially buried trickling filter;
- 2 No. 5m diameter partially buried humus tanks;
- 3 No. buried small return pumping stations;
- An above ground 30m3 sludge holding tank;
- An above ground motor control centre kiosk;
- A 600m2 reed bed; and
- Appropriate mitigation planting and ecological mitigation measures.

1.2.4 Of the above the sludge holding tank, liquor return pumping station, alkalinity dosing kiosk, wash water booster set, and an above ground de-sludge pump are located in the existing site boundary. No demolition or modifications to the plant on the existing WwTW are required, beyond provision of connections to the new equipment. The final settlement tank on the existing site will be retained, however, no longer used.

1.3 Scope of Works

1.3.1 This specification sets out the initial strategy and methodology by which the archaeological contractor will implement the programme of archaeological works. For the purposes of the archaeological evaluation, and the remainder of this document, the Site will refer specifically to the area of the plant extension and temporary construction compound, and not to the proposed access road. The proposed access road is not proposed to be trial trenched and will instead be monitored through archaeological watching brief during construction.

1.3.2 The scope of works will comprise a 5% trenching strategy that has been developed for the accessible areas of the Site. The accessible area has been calculated by establishing no-access areas on the grounds of health and safety and ecological constraints and is estimated at 0.354 ha. The areas scoped out are the following:

- Area within a 30m buffer of the electricity pylon;
- Area within a 10m buffer of the overhead cable lines; and
- Area within a 2m buffer of hedgerows.

1.3.3 The above areas have been identified as constraints for the development and are discussed in **Section 4**.

1.3.4 In format and content, this document conforms with current best practice and to the guidance outlined in Management of Research Projects in the Historic Environment (Historic England, 2015) and the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Archaeological Field Evaluation (CIfA, 2020). No guidance documents have yet been released by Cadw or GGAT for archaeological fieldwork, though the GGAT Guide for Archaeology and Planning in South East Wales (GGAT 2023) has been reviewed.

1.3.5 The 5% trenching strategy has been developed for the accessible areas of the Site, however this strategy is subject to agreement with the GGAT Archaeological Planning Officer, and is therefore subject to change once consultation is undertaken. The Officer is to approve this document and a detailed Written Scheme of Investigation (WSI), written by the appointed archaeological contractor, prior to fieldwork commencing.

1.4 Location, Geology and Topography

1.4.1 The existing waterworks is located 850m to the south of the village of St. Nicholas, itself 2km west of Cardiff. The treatment works are centred roughly around National Grid Reference (NGR) ST 08775 73310. The existing St. Nicholas Wastewater Treatment Works presently occupies a triangular-shaped piece of land approximately 0.32 ha in total.

1.4.2 The existing St. Nicholas Wastewater Treatment Works is currently occupied by:

- A wastewater treatment works dating to the late 1970s, comprising various tanks and biofilter units in the north of the site, the control and mess building in the centre of the site, and sludge drying beds to the south. The southern part of the site is largely vegetated with the exception of the access to the sample chamber in the south of the site.
- Landscaping on all sides of the site comprising trees, shrubbery and an access road (Brook Land) on the east side, joined to the site through hardstanding, which connects to the A48.

1.4.3 The Site is located in a topographical low point at approximately 60m Above Ordnance Datum (AOD), with the land rising to the north-east and north-west. St. Nicholas to the north is situated on a hill at 115m aOD. The topography falls slightly to the south to where the River Waycock is located, then rises further south of the river.

1.4.4 The British Geological Survey indicates that geology of the Site broadly has an underlying bedrock geology comprising of conglomerate sedimentary mudstone (Mercia Mudstone Group), with no superficial geology (BGS, 2023).

2 Historic Environment Background

2.1.1 The full heritage baseline for the Site and Study Area is available in the Cultural Heritage Desk-Based Assessment (CHDBA, Arcadis 2023). This CHDBA established the archaeological potential for the Site, by period, as follows:

- Prehistoric – **medium** potential;
- Romano-British – **low** potential;
- Early Medieval – **negligible** potential;
- Medieval – **low** potential;
- Post-Medieval – **medium** potential; and
- Modern – **low** potential.

2.1.2 The CHDBA identified that the Site and the proposed access road are situated on mostly undeveloped land and thus the survival of any potential below-ground archaeological remains associated with different archaeological periods is considered possible and should thus be investigated prior to development.

2.1.3 It recommended that further archaeological investigation be undertaken to determine the presence or absence of archaeological remains through trial trench evaluation within the footprint of the proposed new waterworks infrastructure and temporary construction compound only.

3 Archaeological Investigations

3.1 Aims and Objectives

3.1.1 This section sets out the approach to a programme of archaeological evaluation and reporting to ensure an appropriate level of recording is undertaken of archaeological assets prior to their loss or partial loss and aims to establish the character and extent of archaeological activity within the Site and relate it to the known activity within the area where appropriate.

3.1.2 The aims of these tasks will be to:

- Determine the presence and/or absence of archaeological remains with the Site not previously subject to archaeological evaluation. Where remains are present, make a full record to current CIfA and GGAT standards;
- Determine the approximate extent, condition and state of preservation of any remains;
- Confirm the approximate date or range of dates of the remains;
- Produce a report on the results of the archaeological evaluation;

- Ensure adequate provision for archival deposition of the archaeological record; and
- Inform on the need for further archaeological mitigation of all or part of the evaluated areas.

3.1.3 The overriding objective of this project design and associated archaeological works will be to inform the planning process associated with the Proposed Development.

3.2 Proposed Trial Trench Locations

3.2.1 Proposed trench locations are illustrated on Figure 1. A total of three trial trenches are proposed (all 30m x 2m). This is representative of just over a 5% sample size of the accessible area of the Site (0.354 ha). This sample size is subject to the approval of the Archaeological Planning Officer at GGAT.

3.2.2 The accessible area has been identified as the part of the Site that can be safely accessed and also accommodate the process of undertaking an archaeological field evaluation outlined in this document. The area of no-access has been determined by the presence of active services and ecologically significant hedgerows (Figure 2).

3.2.3 No archaeologically led assessment, either intrusive or non-intrusive (beyond a walkover survey) have taken place in the Site or its immediate vicinity (within 250m). Therefore, the trenching approach uses a non-targeted sample strategy. Trenches will be positioned, where practicable, based upon the plans given in Figure 1-Figure 2. This may be subject to change due to the presence of fenced-off areas within the Site that have not been recorded on available mapping but were visible during the Site Visit and will need to be avoided. Any variations will be recorded by GPS and transferred to a digital plan of the site. A shapefile of the trench layout shown in Figure 1 will be provided to the archaeological contractor.

3.3 Archaeological Research Framework

3.3.1 The evaluation programme will also seek to determine the relationship of any archaeological remains encountered with the broader archaeological landscape. An attempt will also be made to assess the regional context in which the archaeological evidence rests and will aim to highlight any relevant research issues within the Wales archaeological research framework (IFA 2008).

3.3.2 This project design uses the 2017 edition of the research framework documents (IFA 2017) where applicable, which is split by period. This review supersedes the original 2008 version. This project design reviews the research objectives for the five key periods identified in the CHDBA: Neolithic and Bronze Age, Roman, Medieval, Post-Medieval and Later Post Medieval and Industrial. The key research priorities and themes will be addressed during analysis of the results of the evaluation programme, where appropriate.

Neolithic and Earlier Bronze Age

3.3.3 In summary, research priorities include:

- Adequately assessing any evidence of Neolithic or Early Bronze Age settlement, even where ephemeral;
- Higher excavation sampling, around 50% of identified features;
- Palaeoenvironmental sampling where possible/likely;

- Analysis or artefact clusters to identify new settlement sites
- Less preservation in situ and trenching to yield more information.

3.3.4 Key research themes are:

- Everyday life in the Neolithic and Early Bronze Age;
- The transition from houses in the early Neolithic to other settlement types post 3500 BC, and why these other settlement types appear scarce in the archaeological record;
- How evidence for settlement fits into patterns of land use and the regional variations; and
- How palaeoenvironmental evidence can do to elucidate on settlement patterns.

Roman

3.3.5 It is highlighted that there is a reasonable scarcity of Roman sites (known about and researched adequately) in Wales.

3.3.6 Key research themes are:

- How the conquest of Wales proceeded under the Julio-Claudian and Flavian emperors;
- The extent that the regions of Roman Wales were integrated with the wider imperial economy;
- The relationship and interactions between conquered and conqueror in Roman Wales;
- Settlement patterns;
- Principle industries and technologies; and
- Main funerary practices, and how they varied from pre-Roman practices, regionally or according to economic or social status.

Medieval

3.3.7 In summary, priorities include assessment of:

- The location and distribution of settlement sites;
- The links between settlement type, tenure and social hierarchy;
- The wider environmental context of settlements in the agricultural landscape;
- The nature of the functioning agricultural landscape (including transhumance);
- The development of agricultural techniques, crops and livestock;
- The nature and development of structures within settlements; and
- Development of field systems and morphological relationship to tenure.

Earlier Post-Medieval

3.3.8 In summary, priorities include assessment of:

- The relationship between Wales and the wider world, with focus on the contribution of Wales to the coal, metal, and slate mining and production industries;
- Appreciation and understanding of vernacular, polite industrial, religious and agricultural buildings and gardens;
- Appreciation and understanding of the development and use of transport corridors (railways, roads and waterways);
- Preservation and appreciation of Wales' historic rural farmlands, and engagement with its rural communities;
- Better integration of finds and excavated material with written evidence;
- Developing a framework of Welsh architectural and landscape types; and
- More detailed excavations and analysis.

Later Post-Medieval and Industrial

3.3.9 In summary, priorities include assessment of:

- The significance and scale of technical change within the major industries of coal, iron, copper, tin, lead and slate, and the impact of that change within the landscape; their context and significance in terms of similar sites elsewhere in the world; their relationship with the markets they served;
- The extent to which some industrial sites might have origins predating 1750;
- The significance of military and defensive sites;
- The erosion or survival of local and regional characteristics in domestic building from the later eighteenth century onwards; the varieties of planned and unplanned settlement; evidence for migration and social diversity in housing stock;
- The extent to which the proliferation of social infrastructure and communal institutions such as chapels, churches, institutes is a distinctive feature of the period and in what ways these structures might be distinctive to Wales;
- The significance, form and archaeological survival of transport corridors – turnpikes, government-sponsored roads, canals, railways – their engineering, the industries they served and the settlements they sustained; and
- The significance, form and archaeological survival of major dock systems; their context and significance in terms of similar sites elsewhere in the world.

4 Key Constraints

4.1.1 As aforementioned in **Section 1.3**, inaccessible areas comprising constraints for the project were identified. Shown on Figure 1, they are:

- Area within a 30m buffer of the electric pylon;
- Area within a 15m buffer of the overhead cable lines; and
- Area within a 2m buffer of hedgerows.

4.1.2 Additional ecological stipulations are to ensure no trenches under the canopy of standard trees (pending a root protection zone drawing), and ensuring excavations have a sloped end to ensure nocturnal animals do not get trapped.

4.1.3 Regarding the electric pylon and overhead cable lines, these will be avoided both in the interest of health and safety and for possible ground disturbance of below-ground archaeological deposits. Prior to the excavation of trenches, a cat and genny survey will be done to ensure no additional and unrecorded services are located within the footprint of the trenches.

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Appendix A

Figure 1

Figure 1: Indicative Trench Locations

A3

N

TR3

TR1

TR2

0 10 20 Metres

Legend

- Site Boundary
- Temporary Construction Access Route
- Indicative Trench Locations
- Accessible area
- Inaccessible areas

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
P01	23/06/23	MS	For Information	JB	DE	23/06/23

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP10 8FZ

Project Name.
St Nicholas WwTW

Drawing Title.
Figure 1
Indicative Trench Locations.

Suitability.	Suitability Code.
Information	S2

Originator	Designer	Date.
M. SHETYE	J. EWART-BLAKE	23JUN23

Internal Project Number	Scale	Rev.
10048098	1:1,000	P01

Drawing Number.
01

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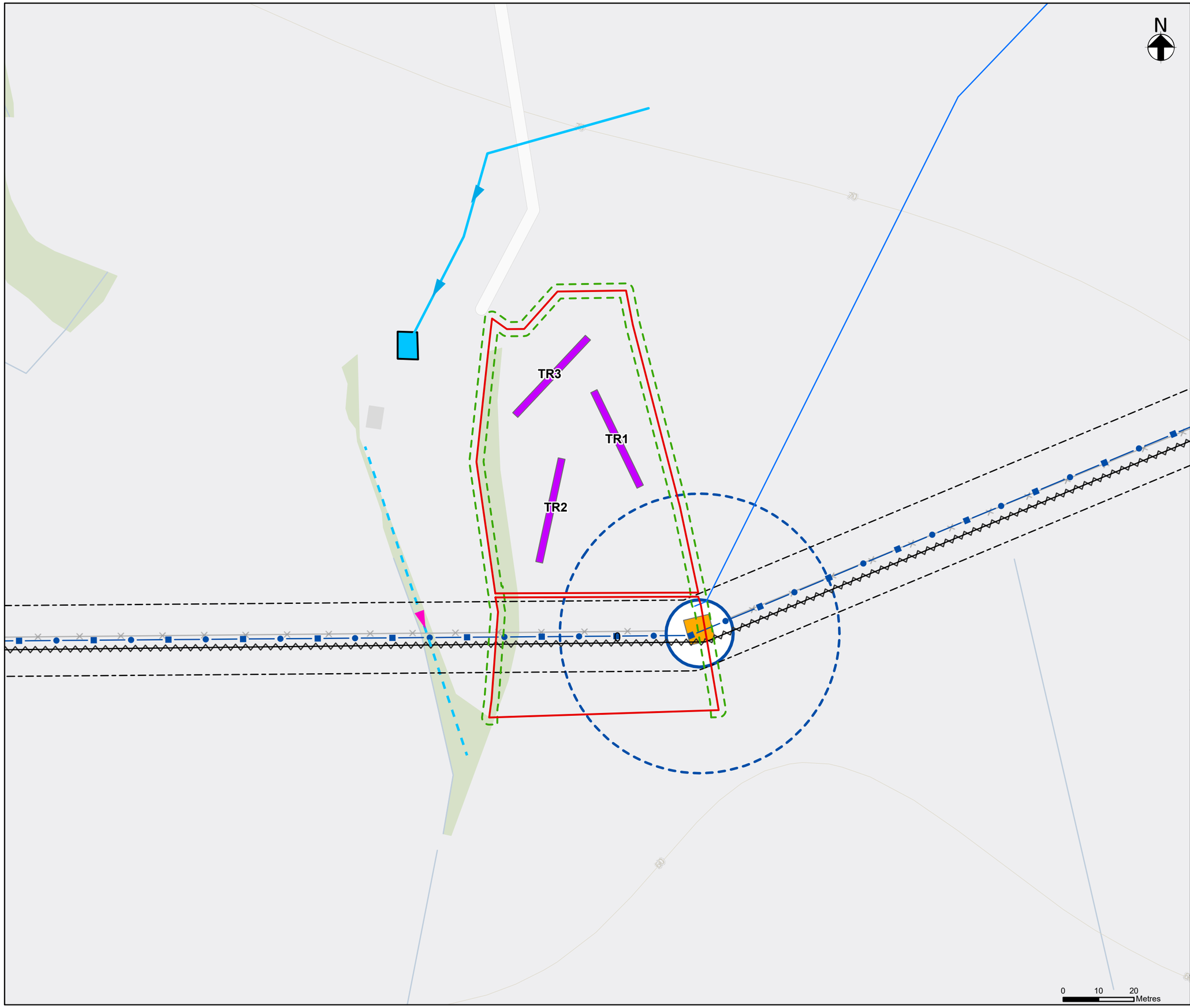
Figure 2

Figure 2: Indicative Service Locations and Safety Buffer Areas



A3

Legend

- Site Boundary
- Temporary Construction Access Route
- Indicative Trench Locations
- Hedgerows and Ecological Constraints Buffer
- Overhead Cabled Buffer

Non-Welsh Water

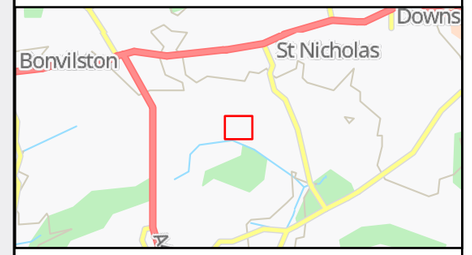
- Private Drain
- Private Foul

Welsh Water

- Rising Main
- Motor
- Combined

National Grid

- High-Voltage Line
- Transformer
- National Grid Services
- National Grid Services Buffer



Rev.	Date.	Drawn	Description.	Chkd.	Appd.	Date.
P01	23/06/23	MS	For Information	JB	DE	23/06/23

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Project Name.
St Nicholas WwTW

Drawing Title.
Figure 2
Indicative Service Locations and Safety Buffer Areas

Suitability.	Suitability Code.
Information	S2

Originator	Designer	Date.
M. SHETYE	J. EWART-BLAKE	23JUN23

Internal Project Number	Scale	Rev.
10048098	1:1,000	P01

Drawing Number.
02

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